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Various pagings.

In Sessional paper No. 11A, page 329 is incorrectly numbered page 239.

In Sessional paper No. 11D, pages 10-11 & 117 are incorrectly numbered
pages 11, 10 & 17.

SESSIONAL PAPERS

VOLUME 8

SECOND SESSION OF THE EIGHTH PARLIAMENT

OF THE

DOMINION OF CANADA

SESSION 1897



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OF THE
PARLIAMENT OF CANADA

SECOND SESSION, EIGHTH PARLIAMENT, 1897.

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CONTENTS OF VOLUME 1.

1. Report of the Auditor General, for the year ended 30th June, 1896. Presented 30th March, 1897, by Hon. W. S. Fielding.....*Printed for both distribution and sessional papers.*

CONTENTS OF VOLUME 2.

2. Public Accounts of Canada, for the fiscal year ended 30th June, 1896. Presented 30th March, 1897, by Hon. W. S. Fielding.....*Printed for both distribution and sessional papers.*
- 2a. Estimates of sums required for the service of the Dominion, for the year ending on the 30th June, 1898. Presented 8th April, 1897, by Hon. W. S. Fielding.
Printed for both distribution and sessional papers.
- 2b. Supplementary Estimates for the year ending 30th June, 1897. (For the Militia attending the Queen's Jubilee.) Presented 20th May, 1897, by Hon. W. S. Fielding.
Printed for both distribution and sessional papers.
- 2c. Supplementary Estimates for the year ending 30th June, 1897. Presented 10th June, 1897, by Hon. W. S. Fielding.....*Printed for both distribution and sessional papers.*
- 2c.* Supplementary Estimate for the year ending 30th June, 1897. (Post Office Department.) Presented 14th June, 1897, by Hon. W. S. Fielding.....*Printed for both distribution and sessional papers.*
- 2d. Supplementary Estimates for the year ending 30th June, 1898. Presented 18th June, 1897, by Hon. W. S. Fielding.....*Printed for both distribution and sessional papers.*
- 2e. Further Supplementary Estimates for the year ending 30th June, 1898. (Intercolonial Railway extension to Montreal.) Presented 23rd June, 1897, by Hon. W. S. Fielding.
Printed for both distribution and sessional papers.
3. List of Shareholders of the Chartered Banks of Canada, as on the 31st December, 1896. Presented 5th April, 1897, by Hon. W. S. Fielding.....*Printed for both distribution and sessional papers.*
- 3a. Report of dividends remaining unpaid and unclaimed balances in the Chartered Banks of Canada, for five years and upwards, prior to 31st December, 1896.
Printed for both distribution and sessional papers.

CONTENTS OF VOLUME 3.

4. Report of the Superintendent of Insurance, for the year ending 31st December, 1896.
Printed for both distribution and sessional papers.
- 4a. Preliminary statements of the business of Life Insurance Companies in Canada, for the year ending 31st December, 1896. Presented 29th June, 1897, by Hon. W. S. Fielding.
Printed for both distribution and sessional papers.
- 4b. Abstract of Statements of Insurance Companies in Canada, for the year ended 31st December, 1896. Presented 5th April, 1897, by Hon. W. S. Fielding.
Printed for both distribution and sessional papers.

CONTENTS OF VOLUME 4.

5. Report of the Department of Trade and Commerce, for the fiscal year ended 30th June, 1896. Presented 25th March, 1897, by Sir Richard Cartwright.
Printed for both distribution and sessional papers.
6. Tables of the Trade and Navigation of Canada, for the fiscal year ended 30th June, 1896. Presented 30th March, 1897, by Hon. W. Paterson.*Printed for both distribution and sessional papers.*

CONTENTS OF VOLUME 5.

7. Inland Revenues of Canada. Excise, &c., for the fiscal year ended 30th June, 1896. Presented 26th March, 1897, by Sir Henri Joly de Lotbinière.*Printed for both distribution and sessional papers.*
- 7a. Inspection of Weights, Measures, Gas and Electric Light, for the fiscal year ended 30th June, 1896. Presented 26th March, 1897, by Sir Henri Joly de Lotbinière.
Printed for both distribution and sessional papers.
- 7b. Report on Adulteration of Food, for the fiscal year ended 30th June, 1896. Presented 26th March, 1897, by Sir Henri Joly de Lotbinière.*Printed for both distribution and sessional papers.*
8. Report of the Minister of Agriculture of Canada, for the calendar year 1896. Presented 23rd April, 1897, by Hon. W. Mulock.*Printed for both distribution and sessional papers.*
- 8a. Report on Canadian Archives, 1896. Presented 23rd April, 1897, by Hon. W. Mulock.
Printed for both distribution and sessional papers.

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- 8c. Report of the Director and Officers of the Experimental Farms, for the year 1896.
Printed for both distribution and sessional papers.
- 8d. Criminal Statistics for the year 1896.*Printed for both distribution and sessional papers.*

CONTENTS OF VOLUME 7.

9. Annual Report of the Minister of Public Works, for the fiscal year ended 30th June, 1896. Presented 9th April, 1897, by Hon. J. I. Tarte*Printed for both distribution and sessional papers.*
10. Annual Report of the Department of Railways and Canals, for the fiscal year ended 30th June, 1896. Presented 5th April, 1897, by Hon. A. G. Blair.*Printed for both distribution and sessional papers.*

CONTENTS OF VOLUME 8.

11. Annual Report of the Department of Marine and Fisheries (Marine), for the fiscal year ended 30th June, 1896. Presented 26th May, 1897, by Hon. L. H. Davies.
Printed for both distribution and sessional papers.
- 11a. Annual Report of the Department of Marine and Fisheries (Fisheries), for the fiscal year ended 30th June, 1896. Presented 26th May, 1897, by Hon. L. H. Davies.
Printed for both distribution and sessional papers.

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- 11b.** Special reports containing notes on the natural history of the lobster, with special reference to the Canadian lobster industry. *Printed for both distribution and sessional papers.*
- 11c.** Discolouration in Canned Lobsters. *Printed for both distribution and sessional papers.*
- 11d.** Report of the joint commission relative to the preservation of the fisheries in waters contiguous to Canada and the United States. *Printed for both distribution and sessional papers.*

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- 11e.** Report of the Chairman of the Board of Steamboat Inspection, etc., for calendar year ended 31st December, 1896. *Printed for both distribution and sessional papers.*
- 12.** Report of the Postmaster General for the year ended 30th June, 1896. Presented 28th May, 1897, by Hon. W. Mulock. *Printed for both distribution and sessional papers.*
- 12a.** Supplement to the Report of the Postmaster General, for the year 1896, with reference to the letting of certain contracts for mail service. Presented 4th June, 1897, by Hon. W. Mulock. *Printed for both distribution and sessional papers.*

CONTENTS OF VOLUME 10.

- 13.** Annual Report of the Department of the Interior, for the year 1896. Presented 12th May, 1897, by Hon. W. Mulock. *Printed for both distribution and sessional papers.*
- 13a.** Summary Report of the Geological Survey Department, for the year 1896. Presented 29th June, 1897, by Hon. S. A. Fisher. *Printed for both distribution and sessional papers.*
- 13b.** Report by Hon. T. Mayne Daly on his visit to Great Britain and Ireland in the interests of emigration to Canada, 1896. Presented 14th April, 1897, by Hon. C. Sifton. *Not printed.*

CONTENTS OF VOLUME 11.

- 14.** Annual Report of the Department of Indian Affairs, for the year ended 30th June, 1896. Presented 5th April, 1897, by Hon. C. Sifton. *Printed for both distribution and sessional papers.*
- 15.** Report of the Commissioner of the North-west Mounted Police Force, 1896. Presented 22nd April, 1897, by Hon. W. Laurier. *Printed for both distribution and sessional papers.*

CONTENTS OF VOLUME 12.

- 16.** Report of the Secretary of State of Canada, for the year ended 31st December, 1896. Presented 30th March, 1897, by Hon. S. A. Fisher. *Printed for both distribution and sessional papers.*
- 16a.** Civil Service List of Canada, 1896. Presented 30th March, 1897, by Hon. S. A. Fisher. *Printed for both distribution and sessional papers.*
- 16b.** Report of the Board of Civil Service Examiners, for the year ended 31st December, 1896. Presented 22nd April, 1897, by Hon. S. A. Fisher. *Printed for both distribution and sessional papers.*
- 16c.** Annual Report of the Department of Public Printing and Stationery, for the year ended 30th June, 1896, with a partial report for services during six months ending 31st December, 1896. Presented 29th June, 1897, by Hon. S. A. Fisher. *Printed for both distribution and sessional papers.*
- 17.** Report of the Joint Librarians of Parliament, for the period since the close of the session in October, 1896. Presented 25th March, 1897, by the Hon. The Speaker. *Printed for sessional papers only.*
- 18.** Report of the Minister of Justice as to Penitentiaries of Canada, for the year ended 30th June, 1896. Presented 9th June, 1897, by Hon. C. Fitzpatrick. *Printed for both distribution and sessional papers.*

 CONTENTS OF VOLUME 13.

- 19.** Report of the Department of Militia and Defence of Canada, for the year ended 31st December, 1896. Presented 8th April, 1897, by Sir Richard Cartwright.
Printed for both distribution and sessional papers.
- 20.** Return to an Order of the House of Commons, dated 28th September, 1896, giving particulars in reference to the Eighth General Election for the House of Commons of Canada. Presented 29th April, 1897.—*Mr. Lavergne* *Printed for both distribution and sessional papers.*
- 21.** Copy of an Order in Council relative to the issue of licenses to United States fishing vessels. Presented 26th March, 1897, by Hon. L. H. Davies *Not printed.*
- 22.** Statement of Governor General's Warrants issued since last session of parliament, on account of fiscal year 1896-97. Presented 30th March, 1897, by Hon. W. S. Fielding *Not printed.*
- 23.** Return of Treasury Board Over-Rulings on appeals from decisions of the Auditor General, between the sessions of 1896 and 1897. Presented 30th March, 1897, by Hon. W. S. Fielding.
Printed for sessional papers.
- 24.** General Order of the Exchequer Court. Presented 30th March, 1897, by Hon. S. A. Fisher.
Not printed.
- 25.** Return to an order of the House of Commons, dated 28th September, 1896, for a return of all papers and correspondence regarding the claims of Messrs. Penhallwick, of Edenwold, for destruction of machinery by Indians. Presented 5th April, 1897.—*Mr. Davin* *Not printed.*
- 26.** Return to an address of the House of Commons to his excellency the Governor General, dated 14th September, 1896, for a copy of all correspondence in connection with all grants of land in the town of Revelstoke to J. A. Mara, ex-member for Yale and Cariboo, and the order in council under which the said grants were made. Presented 5th April, 1897. *Mr. Bostock* *Not printed.*
- 26a.** Return to an address of the House of Commons to his excellency the Governor General, dated 14th September, 1896, for a copy of all correspondence and the order in council of the 11th July, 1890, by which a grant of land in the town of Revelstoke was made to the Kootenay Smelting and Trading Company. Presented 5th April, 1897.—*Mr. Bostock* *Not printed.*
- 27.** Return to an address of the House of Commons to his excellency the Governor General, dated 14th September, 1896, for a copy of all correspondence in connection with grants of land within the railway belt in British Columbia made by the province subsequent to the date when the lands in the belt passed under control of the government of Canada, and of the orders in council of the 29th March, 1895, and the 6th December, 1895, setting forth the terms of the agreement between the government of Canada and the province of British Columbia, acting on behalf of the grantees. Presented 5th April, 1897.—*Mr. Bostock* *Not printed.*
- 28.** Statement of expenditure on account of miscellaneous unforeseen expenses, from 1st July, 1896, to 24th March, 1897. Presented 5th April, 1897, by Hon. W. S. Fielding *Not printed.*
- 29.** Statement of all superannuations and retiring allowances in the civil service during year ended 31st December, 1896, giving name, rank, salary, service, allowance and cause of retirement of each person superannuated or retired, also whether vacancy filled by promotion or new appointment, and salary of any new appointee. Presented 5th April, 1897, by Hon. W. S. Fielding *Not printed.*
- 30.** Statement of the moneys expended in payment of bounties on iron and steel manufactured from Canadian ore, the persons to whom paid, the places at which the iron and steel was manufactured, together with copies of the regulations governing such payments, as required by the Act 57-58 Victoria, chapter 9. Presented 7th April, 1897, by Hon. W. Paterson *Printed for sessional papers.*
- 31.** Return furnished annually by the Canadian Pacific Railway Company under the provisions of section 8 of 49 Victoria, chapter 9, being a list of all lands sold by that company from 1st October, 1895, to the 1st October, 1896. Presented 13th April, 1897, by Hon. C. Sifton *Not printed.*
- 31a.** Return under resolution of the 20th February, 1882, in so far as the same is furnished by the department of the interior, respecting the Canadian Pacific Railway Company. Presented 13th April, 1897, by Hon. C. Sifton *Not printed.*

 CONTENTS OF VOLUME 13—*Continued.*

- 32.** Return of orders in council which have been published in the *Canada Gazette* and in the *British Columbia Gazette*, in accordance with the provisions of: (1st) Clause 91 of the Dominion Lands Act, chapter 54 of the Revised Statutes of Canada. (2nd) Subsection (d) of section 38 of the regulations for the survey, administration, disposal and management of Dominion lands within the 40-mile railway belt in the province of British Columbia. (3rd) Section 46 of the North-west Irrigation Act. Presented 13th April, 1897, by Hon. C. Sifton..... *Not printed.*
- 33.** Return to an order of the House of Commons, dated 10th May, 1897, for a copy of the evidence taken by Inspector Fletcher when investigating charges made last November against the postmaster of Northfield, British Columbia. Presented 28th May, 1897.—*Mr. Davin*..... *Not printed.*
- 34.** Statement of the affairs of the British Canadian Loan and Investment Company, as on the 31st December, 1896. Presented 20th April, 1897, by the Hon. The Speaker..... *Not printed.*
- 35.** Return to an address of the House of Commons to his excellency the Governor General, dated 12th April, 1897, for copies of all orders in council, reports to council, petitions, memorials or other documents relating to the Manitoba School Question, not already submitted to this House. Presented 20th April, 1897.—*Mr. LaRivière*..... *Printed for both distribution and sessional papers.*
- 36.** Statement of all bonds registered in the department of the secretary of state, since last return (1896) and submitted to parliament in accordance with section 23 of chapter 19, of the Revised Statutes of Canada. Presented 20th April, 1897, by Hon. S. A. Fisher. *Not printed.*
- 37.** Return to an address of the House of Commons to his excellency the Governor General, dated 5th April, 1897, for copies of all correspondence relating to the retirement of Messrs. Bompas, Bischoff & Co., and the appointment of Mr. Charles Russell as solicitor for the Dominion government in London. Presented 22nd April, 1897.—*Mr. Foster*..... *Not printed.*
- 38.** Return to an address of the House of Commons to his excellency the Governor General, dated 28th September, 1896, for copies of despatches, minutes of council, and correspondence relating to the formation of an international customs bureau for Brussels. Presented 26th April, 1897.—*Sir C. Hilbert Tupper*..... *Not printed.*
- 39.** Tariff of fees and expenses for holding elections in the North-west Territories and British Columbia, fixed by the governor in council, under section 121 of the Dominion Elections Act, and amendments to the said tariff. Presented 26th April, 1897, by Hon. W. S. Fielding. *Not printed.*
- 40.** Return to an order of the House of Commons, dated 30th April, 1897, for copies of instructions to customs collectors *re* tariff resolutions and reciprocal tariff. Presented 30th April, 1897.—Hon. W. Paterson..... *Not printed.*
- 41.** Return to an order of the House of Commons dated 5th April, 1897, for copies of all calls for tenders and specifications for the same and detailed answers thereto made since the last session of parliament in respect of the printing of government notes, stamps, etc., of all correspondence in connection therewith had with the government or any member thereof and with the minister of finance or the officers of his department, copies of all reports made thereon to the minister of finance and to council, together with all minutes to council passed in relation thereto, and a copy of the contract entered into between the government and the successful tenderer. Presented 3rd May, 1897.—*Mr. Foster*..... *Printed for distribution only.*
- 42.** Return to an address of the House of Commons to his excellency the Governor General, dated 5th April, 1897, for a return showing how many convicts were liberated from the different penitentiaries in Canada since the month of July, 1896; giving their names and the dates when they were convicted, and showing why they were liberated, and the names of those who obtained their pardon for them; also the names of those whose sentences were commuted. Presented 5th May, 1897.—*Mr. Bergeron*..... *Not printed.*
- 43.** Return to an order of the House of Commons, dated 28th September, 1896, for copies of all correspondence which has passed between the government and party or parties in reference to the "Montreal, Ottawa, Georgian Bay Canal" scheme; also all papers in connection with any application for financial aid towards this project. Presented 5th May, 1897.—*Mr. Poupore*..... *Not printed.*
- 44.** Return to an order of the House of Commons, dated 28th September, 1896, for copy of all reports, valuations and all other papers relating to lands in the township of South Monagan, county of Peterboro', flooded by reason of the construction of a dam at Hastings, Ontario, and owned by Joseph Clarke and others. Presented 5th May, 1897.—*Mr. Kendry*..... *Not printed*

CONTENTS OF VOLUME 13—*Continued.*

45. Return to an order of the House of Commons, dated 2nd September, 1896, for copies of all memorials, reports, correspondence, plans and papers in relation to the construction of a bridge in front of Quebec, or in the vicinity, to connect the Intercolonial Railway with the Canadian Pacific Railway. Presented 5th May, 1897.—*Mr. Langehier* *Not printed.*
46. Return to an order of the House of Commons, dated 3rd May, 1897, for copies of all correspondence between the department of Indian affairs at Ottawa and the officers of the Indian department at Regina and at Winnipeg, respecting the furnishing supplies to the St. Paul Industrial School; also the correspondence between the department at Ottawa and the Hudson Bay Company at Winnipeg. Presented 10th May, 1897.—*Mr. Davin* *Not printed.*
47. Return to an order of the House of Commons, dated 11th May, 1897, for a copy of the opinion of the minister of justice with respect to statutory increases. Presented 11th May, 1897.—*Hon. L. H. Davies* *Printed for sessional papers.*
48. Return to an order of the House of Commons, dated 21st April, 1897, for copies of all documents, correspondence, reports, etc., having reference to the appointment of Thomas E. Anderson to the position of collector of customs in the town of Napanee. Presented 11th May, 1897.—*Mr. Wilson* *Not printed.*
49. Report of the commissioners to examine into the affairs of the Kingston penitentiary. Presented 17th May, 1897, by Sir Richard Cartwright *Printed for distribution.*
50. Statement in pursuance of section 17 of the Civil Service Insurance Act, for the year ending 30th June, 1896. Presented 20th May, 1897, by Hon. W. S. Fielding *Not printed.*
51. Extract from a report of the committee of the honourable the privy council, approved by his excellency on the 23rd January, 1897, referring to the delimitation of the Alaskan boundary. Presented 26th May, 1897, by Hon. C. Sifton *See No. 77.*
52. Contract with Messrs. Petersen, Tate and Company, of Newcastle-on-Tyne, England, for a fast weekly steanship service between Canada and the United Kingdom. Presented 28th May, 1897, by Sir Richard Cartwright *See "Votes and Proceedings," page 393.*
53. Return to an address of the Senate to his excellency the Governor General, dated 13th May, 1897, for copies of all telegrams sent between the 15th and 27th of April last, by the minister of marine and fisheries, to Bernard D. McLellan, or any other person in West Prince, Prince Edward Island, promising grants for harbours, piers or breakwaters in that constituency, different from or in addition to, amounts stated in the Estimates now before Parliament. Presented 1st June, 1897.—*Hon. Mr. Ferguson* *Not printed.*
54. Return to an address of the Senate to his excellency the Governor General, dated 19th May, 1897, for a tabulated statement showing the effects which the commercial treaty between Canada and France has had upon the trade and revenue of the Dominion, as compared with the three years preceding the date upon which the treaty came into force, in so far as relates to the various articles covered by said treaty. Presented 1st June, 1897.—*Hon. Sir Mackenzie Bowell* *Printed for sessional papers.*
- 54a. Return to an address of the Senate to his excellency the Governor General, dated 9th June, 1897, for a detailed statement showing the character, quantity and value of the different articles exported from Canada to France, for the years ending 30th June, 1893, 1894, 1895 and 1896. Presented 17th June, 1897.—*Hon. Sir Mackenzie Bowell* *Printed for sessional papers.*
55. Return to an address of the Senate to his excellency the Governor General, dated 5th May, 1897, for a copy of the contract or charter by which the steamer "Petrel" has been employed for winter navigation between Prince Edward Island and the mainland during the present year, and all correspondence between the department of marine and fisheries, or any officer thereof, and the owners of the said steamer "Petrel" relative to the said contract or charter. Also a statement of all expenses incurred by the government of Canada, in the outfit, repair and maintenance of the said steamer, and in the payment of wages to her officers and men, giving the name of each employee, and the amount paid or to be paid each. Also a statement showing the number of round trips made by the said steamer, between Cape Tormentine and Cape Traverse, or any other port in Prince Edward Island, from the 1st of December, 1896, to the 1st of May of the present year, with the date of such trips. Also a statement of the number of passengers, and the quantity

• CONTENTS OF VOLUME 13—*Continued.*

- of freight carried by the said steamer between the ports aforesaid, and the amount received for carrying such freight and passengers, for the above-mentioned period. And also a statement of number of mails carried by the said steamer, during the same period. Presented 1st June, 1897.—*Hon. Mr. Ferguson*..... *Not printed.*
- 56.** Return to an address of the Senate to his excellency the Governor General, dated 5th May, 1897, for all correspondence which has taken place since the 13th July last between the government of the Dominion and the provincial government of Prince Edward Island regarding certain financial claims of that province upon the federal government.—Presented 1st June, 1897.—*Hon. Mr. Ferguson*..... *Printed for sessional papers.*
- 57.** Return to an order of the House of Commons, dated 3rd May, 1897, for copies of all letters, papers, correspondence, petitions, etc., relating to the dismissal of J. Albert Verge, fishery officer for the river Restigouche and its tributaries and the waters of the Baie des Chaleurs, and the appointment of Charles Brown in his place. Presented 3rd June, 1897.—*Mr. McAlister*..... *Not printed.*
- 57a.** Return to an order of the House of Commons, dated 5th April, 1897, for copies of all correspondence, papers, petitions, &c., in connection with the dismissal of Angus McPhee as postmaster at Hopefield, in the province of Prince Edward Island. Presented 3rd June, 1897.—*Mr. Martin*..... *Not printed.*
- 57b.** Return to an order of the House of Commons, dated 3rd May, 1897, for copies of all papers, letters, documents, petitions, etc., relating to the dismissal of A. J. McNeill as postmaster at Stanley Bridge, in Prince Edward Island. Presented 3rd June, 1897.—*Mr. Martin*..... *Not printed.*
- 57c.** Return to an order of the House of Commons, dated 3rd May, 1897, for copies of all letters, telegrams and papers that have passed between the government and any person or persons in connection with the dismissal of Dr. George Duncan, late quarantine superintendent at Williams Head Station, B.C.—Presented 4th June, 1897.—*Hon. E. G. Prior*..... *Not printed.*
- 57d.** Return to an order of the House of Commons, dated 17th May, 1897, for copies of all documents, reports, affidavits, declarations, papers and correspondence in relation to dismissal of F. X. Smith, late lighthouse keeper at Cape Gaspé. Presented 8th June, 1897.—*Mr. Casgrain*..... *Not printed.*
- 57e.** Return to an address of the House of Commons, to his excellency the Governor General, dated 14th September, 1896, for copies of all orders in council, reports and correspondence respecting the appointment and dismissal of the sub-agents of the department of marine and fisheries at the port of Pictou.—Presented 8th June, 1897.—*Sir C. Hibbert Tupper*..... *Not printed.*
- 57f.** Return to an order of the House of Commons, dated 3rd May, 1897, for a return showing the names of all persons dismissed from the service of the inland revenue department since the first day of July, 1896; also the names of all persons appointed to the service of said department since the first day of July, 1896. Presented 14th June, 1897.—*Mr. Wood (Brockville)*..... *Not printed.*
- 57g.** Return to an order of the House of Commons, dated 17th May, 1897, showing the names and offices or employment of all persons superannuated, dismissed or superceded in the service of the Canadian government under the present administration, giving the reason for superannuation, dismissal or supercession in each case, and the name and age of the officer or employee appointed to the vacancy in each case, and showing whether any inquiry or formal investigation took place in each case and the nature of it, and whether the party affected was given an opportunity of being heard before dismissal or supercession. Presented 15th June, 1897.—*Sir Charles Tupper*..... *See No. 57t.*
- 57h.** Return to an order of the House of Commons, dated 21st April, 1897, showing the names of all persons appointed to the department of customs since the first day of July, 1896, also the names of the offices respectively to which they were appointed and the salaries thereto attached; also the names of all persons in the service of the department of customs whose services have been dispensed with since the first day of July, 1896, with the names of the offices and the salaries attached thereto respectively. Presented 15th June, 1897.—*Mr. Wood (Brockville)*..... *Not printed.*
- 57i.** Supplementary return to 57g. Presented 16th June, 1897.—*Sir Charles Tupper*..... *See No. 57t.*
- 57j.** Return to an order of the House of Commons, dated 6th May, 1897, for copies of all letters and correspondence between the government or any members thereof referring in any way to the dismissal of Mr. W. D. Fairbrother as postmaster at Beamsville, with a copy of the charges and by whom such were made. Presented 18th June, 1897.—*Mr. McCleary*..... *Not printed.*

 CONTENTS OF VOLUME 13—*Continued.*

- 57k.** Return to an order of the House of Commons, dated 3rd May, 1897, for copies of all letters, telegrams, petitions, reports and other communications with respect to the appointment and dismissal of David H. Price, postmaster of Aylmer West, and the appointment of his successor, Frederick Ashbaugh. Presented 18th June, 1897.—*Mr. Ingram*.....*Not printed.*
- 57l.** Return to an order of the House of Commons, dated 3rd May, 1897, for copies of all correspondence, petitions and reports relative to the dismissal of T. P. Shields, postmaster of Upper Maugerville, and the appointment of Emery Sewel in his place, and in reference to any changes proposed in the location of said post office since 1891. Presented 18th June, 1897.—*Mr. Foster*.....*Not printed.*
- 57m.** Return to an order of the House of Commons, dated 12th April, 1897, for copies of all papers, correspondence, petitions, etc., connected with the dismissal of Alexis Doutre as postmaster at Beauharnois. Presented 18th June, 1897.—*Mr. Bergeron*.....*Not printed.*
- 57n.** Return to an order of the House of Commons, dated 5th April, 1897, for a return giving the names of all postmasters and other persons in the employ of the government in the counties of Kings and York, New Brunswick, who have been dismissed since July, 1896, and all correspondence in connection therewith. Presented 18th June, 1897.—*Mr. Foster*.....*Not printed.*
- 57o.** Return to an order of the House of Commons, dated 17th May, 1897, for a copy of the investigation held in connection with the postmaster's office in Valleyfield, by Mr. Wilfrid Mercier. Presented 18th June, 1897.—*Mr. Bergeron*.....*Not printed.*
- 57p.** Return to an order of the House of Commons, dated 17th May, 1897, for any reports or correspondence, not already brought down, and the reasons for the dismissal of Roderick McLeod and Robert McKay, bridge tenders on the Intercolonial Railway bridge, Pictou, Nova Scotia, and the appointment of Thomas Fraser and A. Thomas in their place and stead. Presented 24th June, 1897.—*Sir C. Hibbert Tupper*.....*Not printed.*
- 57q.** Return to an order of the House of Commons, dated 17th May, 1897, for copies of all papers and documents connected with the dismissal of Mr. John L. Smith as fishery overseer for the district of New Carlisle, extending from Grand Cascapeia river to Paspebiac East; also any recommendations made to any member of the government by letter or otherwise for his dismissal and the recommendation in favour of his successor. Presented 25th June, 1897.—*Sir A. P. Caron*.
Not printed.
- 57r.** Return to an order of the House of Commons, dated 3rd May, 1897, giving all correspondence, evidence, reports and papers respecting the dismissal of the car inspector and car oiler at Stellarton, Nova Scotia, under instructions of the mechanical superintendent, Intercolonial Railway at Moncton, 5th February, 1897. Presented 25th June, 1897.—*Sir C. H. Tupper*.....*Not printed.*
- 57s.** Return to an order of the House of Commons, dated 21st April, 1897, for copies of all papers, petitions, evidence, reports and documents of every nature connected with the dismissal of Andrew Carmichael, postmaster, Spencerville, Ont. Presented 28th June, 1897.—*Mr. Reid*.....*Not printed.*
- 57t.** A partial return to an address of the Senate to his excellency the Governor General, dated 9th April, 1897, for a statement showing for each department of the civil service, the names, ages, offices and salaries of such persons employed either in the inside or outside divisions thereof; and of such persons not in the civil service employed by the government in any department, who, since the 13th July, 1896, and in cases where no commission of investigation was appointed, have been removed from office by dismissal, superannuation or otherwise, specifying in each case the manner of, and grounds for such removal, and the length of notice given to the persons removed, and the amount of superannuation or gratuity granted, if any; also showing the name, age, office and salary or remuneration of any and every person appointed to the civil service in the place of, or as a consequence of any such removal. Presented 26th June, 1897.—*Hon. Mr. Kirchhoffer*.
Printed for sessional papers.
- 58.** Return to an order of House of Commons, dated 28th September, 1896, for copies of the contract awarded to Mr. Gédéon Beaulieu, contractor for the building of the post office at Rimouski, of all correspondence between the said contractor and the government, and all other documents in relation thereto. Presented 4th June, 1897.—*Mr. Fiset*.....*Not printed.*

 CONTENTS OF VOLUME 13—*Continued.*

59. Return to an order of the House of Commons, dated 17th May, 1897, for copies of the report made by Mr. Gourdeau, deputy minister of marine and fisheries, on the conference held last November between the steamship companies and shippers of cattle and horses. Presented 4th June, 1897. *Mr. Maclean*. *Printed for sessional papers.*
60. Return to an order of the House of Commons, dated 17th May, 1897, for copies of all correspondence since the 20th July last between the department of marine and fisheries at Ottawa and the officers thereof or others, respecting supplies and repairs of vessels and steamers under the control of that department which are in the habit of visiting the ports of Charlottetown, Georgetown and Pictou, or which are employed either in the protection of the coast fisheries or in the supervision and maintenance of lights, or in the winter steam service between Prince Edward Island and the mainland. Presented 4th June, 1897.—*Sir C. Hibbert Tupper*. *Not printed.*
61. Return to an order of the House of Commons, dated 21st April, 1897, for copies of all letters, petitions, memorials and suggestions received by the government, or any member thereof, since the 23rd June, 1896, to amend the North-west Territories Act with a view of enlarging the powers of the executive of the North-west Territories, and to increase the subsidy of the North-west Territories. Presented 4th June, 1897.—*Mr. Davin*. *Not printed.*
62. Return to an order of the House of Commons, dated 3rd May, 1897, for a copy of returns for Weller Bay while an outpost, *i.e.*, about eleven years: 1. The value of dutiable goods and duty collected. 2. Value of free goods. 3. Total number of vessels entered and cleared. 4. Total salary paid. Presented 8th June, 1897.—*Mr. Corby*. *Not printed.*
63. Return to an order of the House of Commons, dated 10th May, 1897, for a return of all correspondence between officers of the militia and others with the minister of militia and the major-general commanding relating to brevet promotion and General Order 73, 1896. Presented 8th June, 1897.—*Mr. Bain*. *Not printed.*
64. Return to an order of the House of Commons, dated 17th May, 1897, for copies of all correspondence, plans and reports of engineers having reference to making North Harbour, Aspy Bay, Victoria county, N.S., a harbour of refuge. Presented 9th June, 1897.—*Mr. Bethune*. *Not printed.*
65. Return to an address of the House of Commons to his excellency the Governor General, dated 3rd May, 1897, for copies of all papers relating to the release of Daniel Brien Sullivan, committed to jail at Toronto on the 18th November, 1896, including the reports of the police magistrate of the 21st and 27th November, 1896. Presented 9th June, 1897.—*Sir C. Hibbert Tupper*. *Not printed.*
66. Return to an order of the House of Commons, dated 28th September, 1896, for a statement showing the amount of money expended by the Dominion government since the 1st day of July, 1873, for constructing, equipping and subsidizing railways in Canada, with the number of acres of land granted as subsidies, and their estimate value. Also a statement showing separately the part of such expenditure made on railways in each province of the Dominion and the North-west Territory, deducting any sums that may have been charged against any of the provinces of the North-west Territory in their debt account with the Dominion. Presented 10th June, 1897.—*Mr. Martin*. *Printed for sessional papers.*
67. Return to an order of the House of Commons, dated 28th September, 1896, for copies of all letters, correspondence and tenders, the names of the parties tendering, the amounts of their tender, and the names of the parties awarded the contracts for the historical monuments at Lundy's Lane, Chrysler's Farm and Chateauguay. Presented 10th June, 1897.—*Mr. Gibson*. *Not printed.*
68. Return to an order of the House of Commons, dated 17th May, 1897, showing a comparative schedule of prices paid in connection with the military camp at Aldershot, King's county, Nova Scotia, for the seasons of 1895 and 1896 respectively; also all papers, correspondence and instructions respecting the securing of supplies for the said camp in 1897. Presented 10th June, 1897.—*Sir C. Hibbert Tupper*. *Not printed.*
69. Return to an order of the House of Commons, dated 17th May, 1897, for a return showing (under the announced change of organization at the Royal Military College of Canada): 1. A detail of the intended superior and subordinate staffs, their respective emoluments and the conditions of their engagements, inclusive of periods of service and duties to be performed by them respectively. 2. The intended number of classes of cadets in attendance at one time. 3. The allotment and distri-

CONTENTS OF VOLUME 13—*Continued.*

- bution of time to class instruction, drills, military and athletic exercises, meals, recreation, etc., specifying subjects and the professors and instructors respectively employed in the several subjects in each class. 4. The amount of deposit to be made by cadets to meet personal charges for a period of three years respectively under the reorganized system and the system hitherto in force. 5. The surplus revenue derived from fees from each cadet, after deduction of messing charges respectively under the reorganized system and the system hitherto in force. 6. A detail of items in the reorganized system and in that hitherto in force in the cases involving either increase or reduction, and the amounts of these differences. 7. The number of eligible applications made prior to the announcement of the reorganization to compete for entrance into the Royal Military College next September. Presented 10th June, 1897.—*Mr. Tyrwhitt* *Not printed.*
- 69a.** Supplementary return to No. 69. Presented 23rd June, 1897.—*Mr. Tyrwhitt* *Not printed.*
- 70.** Return to an address of the House of Commons to his excellency the Governor General, dated 28th September, 1896, for copies of despatches, minutes of council and correspondence relating to the London International Railway Congress, 1895. Presented 14th June, 1897.—*Sir C. Hibbert Tupper* *Not printed.*
- 70a.** Return to an address of the House of Commons to his excellency the Governor General, dated 28th September, 1896, for copies of despatches, minutes of council and other documents relating to the meeting of the International Railway Congress, St. Petersburg, with a copy of papers submitted by the high commissioner for Canada to that congress. Presented 14th June, 1897.—*Sir C. Hibbert Tupper* *Not printed.*
- 71.** Return to an order of the House of Commons, dated 17th May, 1897, for copies of tenders opened the 16th day of March, 1897, for works on section 12 of the Soulanges canal, showing the prices of different tenderers for each item and the approximate quantities upon which the tenders were extended, also the lump sum of each tender. Presented 14th June, 1897.—*M. Clancy*.
Printed for sessional papers.
- 71a.** Return to an order of the House of Commons, dated 17th May, 1897, for copies of tenders opened the 16th day of March, 1897, for works on sections 4, 5, 6 and 7 of the Soulanges canal, showing the prices of different tenderers for each item and the approximate quantities upon which the tenders were extended, also the lump sum of each tender. Presented 14th June, 1897.—*Mr. Clancy* *Printed for sessional papers.*
- 71b.** Return to an order of the House of Commons, dated 17th May, 1897, for copies of tenders opened the 20th day of March for works on the Grenville canal enlargement, showing the prices of different tenderers for each item and the approximate quantities upon which the tenders were extended, also the lump sum of each tender. Presented 14th June, 1897.—*Mr. Clancy*.
Printed for sessional papers.
- 71c.** Return to an order of the House of Commons, dated 7th June, 1897, for a statement of all tenders opened the 7th day of May, 1897, for works on the north channel of St. Lawrence river, showing the prices of different tenderers for each item and the approximate quantities upon which the tenders were extended, also the lump sum of each tender. Presented 25th June, 1897.—*Mr. Clancy* *Printed for sessional papers.*
- 71d.** Return to an order of the House of Commons, dated 7th June, 1897, for a statement of all tenders opened the 30th day of April, 1897, for works on the Iroquois section, Galops canal, showing the prices of different tenderers for each item and the approximate quantities upon which the tenders were extended, also the lump sum of each tender. Presented 25th June, 1897.—*Mr. Clancy*.
Printed for sessional papers.
- 71e.** Return to an order of the House of Commons, dated 7th June, 1897, for a statement of all tenders opened the 24th day of April, 1897, for works on the Cardinal section, Galops canal, showing the prices of different tenderers for each item and the approximate quantities upon which the tenders were extended, also the lump sum of each tender. Presented 25th June, 1897.—*Mr. Clancy*.
Printed for sessional papers.
- 72.** Return to an order of the House of Commons, dated 9th September, 1896, for: 1. A copy of all reports of the engineers of the department of public works as to the conditions and requirements of the Port Albert harbour made within the last ten years. 2. A statement in detail, with dates, showing all amounts voted by parliament for the improvement of said harbour. 3. A statement showing how much of said sums were expended under contract, and how much otherwise and how; when expended and to whom paid.—Presented 15th June, 1897.—*Mr. Cameron* *Not printed.*

 CONTENTS OF VOLUME 13—*Continued.*

- 72a.** Return to an order of the House of Commons, dated 28th September, 1896, for: 1. Copy of all reports made by the engineers of the public works department since the 1st day of January, 1890, as to the condition and requirements of the Goderich harbour and of the North breakwater. 2. Statement in detail of all amounts voted for the construction and improvement of said harbour. 3. Statement showing how much has been expended on said harbour since the government of Canada undertook the work as a harbour of refuge. Presented 15th June, 1897.—*Mr. Cameron.*
Not printed.
- 72b.** Return to an order of the House of Commons, dated 17th May, 1897, for copies of all correspondence, telegrams, engineers' reports, etc., relating to the extension of the breakwater at Belle river, in Prince Edward Island. Presented 15th June, 1897.—*Mr. Martin.*..... *Not printed.*
- 73.** Return, in part (departments of the interior and Indian affairs), to an order of the House of Commons, dated 5th April, 1897, giving the names of all commissioners appointed by the government or any of the ministers to hear charges and make investigations into the conduct of civil servants and employees of the government or any of the departments since July, 1896, together with the rate of pay and allowances of each and the length of time each has been employed, and the full amount paid; also copies of all reports made by them to the government, or any member thereof, and copies of the authorization and instructions under which they acted. Presented 16th June, 1897.—*Mr. Foster.*..... *Not printed.*
- 73a.** Supplementary return to No. 73 (department of marine and fisheries). Presented 17th June, 1897.
Mr. Foster...... *Not printed.*
- 74.** Copies of contracts for cold storage accommodation on steamships from Montreal to Great Britain, between the minister of agriculture and various steamship companies. Presented 17th June, 1897, by Hon. S. A. Fisher..... *Not printed.*
- 75.** Return to an order of the House of Commons, dated 3rd May, 1897, for copies of all letters, papers and correspondence relating to the closing in March last of the post office at Oak Bay Mills, Quebec. Presented 18th June, 1897.—*Mr. McAlister.*..... *Not printed.*
- 76.** Return to an order of the House of Commons, dated 3rd May, 1897, for: 1. Copies of all correspondence and other documents relating to the creation of post office inspectorships at Stratford, Barrie and Kingston and the appointment of inspectors and other officials connected with such inspectorships. 2. The number of employees connected with each such office and the salaries paid, and all other expenses of each office. Presented 18th June, 1897.—*Mr. Cameron.*
Printed for sessional papers.
- 77.** Report of Major General Cameron on the proposed convention in reference to a portion of the Alaskan boundary, and memorandum thereon. Presented 19th June, 1897, by Hon. L. H. Davies.
Printed for sessional papers.
- 78.** Return to an address of the House of Commons to his excellency the Governor General, dated 7th June, 1897, showing the correspondence, if any, between this government and the government of the United States in reference to an equalization or readjustment of the coasting laws, rules and regulations in force in the two countries; and in reference to any arrangement or proposal for any arrangement under which Canadian vessels shall be granted by the American government and officials the same privileges as those accorded to American vessels by the Canadian authorities under the laws, rules and regulations now in force. Presented 25th June, 1897.—*Mr. Britton.*
Printed for sessional papers.
- 79.** Return to an order of the House of Commons, dated 7th June, 1897, for copies of all telegrams and letters between the Hon. Clifford Sifton, minister of the interior, and Mr. Charles B. Heyd, M.P., for South Brant, and Mr. Davis, of the county of Haldimand, relating to the appointment or otherwise of Mr. Daniel Lynch, of the village of Hagersville, or Dr. Stuart of the same place, as Indian agent in the room and stead of Dr. Jones of Hagersville. Presented 25th June, 1897.—*Mr. Clancy.*..... *Not printed.*
- 80.** Return to an order of the House of Commons, dated 10th May, 1897, for copies of all papers, correspondence and telegrams relating to charges made affecting the quality of British Columbia salmon sold in the British market. Presented 25th June, 1897.—*Mr. Maxwell.*..... *Not printed.*

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81. Return to an order of the House of Commons, dated 7th June, 1897, for a copy of the advertisement recently published calling for tenders for the carrying of the mail between Danville, in the county of Richmond and St. Camille, in the county of Wolfe, province of Quebec, and of all tenders sent in, giving the names of the tenderers and amount of the tender in each case, the name of the successful tenderer, and the amount at which the contract was let. Presented 28th June, 1897.—*Mr. Ives* *Not printed.*
- 81a. Return to an order of the House of Commons, dated 7th June, 1897, for copies of correspondence and papers cancelling the contract with S. E. Turner, for carrying the mail between Tottenham and Athlone, in the county of Simcoe, province of Ontario. Presented 28th June, 1897.—*Mr. Tyrwhitt* *Not printed.*
- 81b. Return to an order of the House of Commons, dated 17th May, 1897, showing the different mail routes and mail contracts now existing between the town of Annapolis Royal and the town of Liverpool, in the counties of Annapolis and Queen's respectively. The name of each contractor and his bondsmen. The length of each route. The contract price, and whether daily, semi-weekly or tri-weekly. Presented 28th June, 1897.—*Mr. Mills* *Not printed.*
82. Return to an address of the Senate to his excellency the Governor General, dated 21st May, 1897, for a copy of the resignation of S. I. Jones, Esquire, late judge of the county court of the county of Brant, together with all correspondence with any department of the government, in reference to, or in connection therewith; also a copy of all petitions sent to the government praying for the appointment of A. D. Hardy to the position made vacant by the resignation and superannuation of the said Judge Jones. Presented 2nd June, 1897.—*Hon. Sir Mackenzie Bowell* . . . *Not printed.*
83. Return to an address of the Senate to his excellency the Governor General, dated 20th May, 1897, showing the names of all persons who filed claims for fishery bounty, before Stanislaus F. Perry, acting inspector of fisheries for Prince Edward Island, up to the 20th day of April last; also the names of all persons who filed similar claims before James F. White, bounty officer, up to the same date, And also showing the names of all persons who received fishery bounty in the west riding of Prince county, in the months of March and April last. Presented 25th June, 1897.—*Hon. Mr. Ferguson* *Not printed.*

TWENTY-NINTH ANNUAL REPORT

OF THE

DEPARTMENT OF MARINE AND FISHERIES

1896

MARINE

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

PRINTED BY S. E. DAWSON, PRINTER TO THE QUEEN'S MOST
EXCELLENT MAJESTY

1897

[No. 11—1897.]

Marine and Fisheries—Marine Branch.

*To His Excellency the Right Honourable SIR JOHN CAMPBELL HAMILTON-GORDON, EARL
OF ABERDEEN, Governor General of Canada, etc., etc.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Legislature of Canada, the Twenty-Ninth Annual Report of the Department of Marine and Fisheries, Marine Branch.

I have the honour to be,
Your Excellency's most obedient servant,

LOUIS HENRY DAVIES,
Minister of Marine and Fisheries.

DEPARTMENT OF MARINE AND FISHERIES,

OTTAWA, 31st December, 1896.

Marine and Fisheries—Marine Branch.

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REPORT OF THE DEPUTY-MINISTER.

To the Honourable

LOUIS H. DAVIES,

Minister of Marine and Fisheries.

SIR,—I have the honour to report on the transactions of the Marine Branch of this department for the fiscal year ended 30th June last, and to give an account of a portion of the business up to date.

In the appendices to this report will be found reports from the Chairman of the Board of Steamboat Inspection, Chairman of Board of Examiners of Masters and Mates, the reports from the Chief Engineer, the Inspectors of Live Stock Shipments, the Director of the Meteorological and Magnetic Service, the Inspector of Signal Service, and reports on the Life-boat Stations, Messenger Pigeon Service, Rewards for Humane Service, together with statements of Revenue, Expenditure, Sick Mariners' Dues, Wharfage, and Wrecks and Casualties.

The amount expended on the various branches of the public service comprised in this department during the fiscal year ended 30th June last was \$792,213.81. The expenditure for civil government, including marine and fisheries, amounted to \$62,476.73, and for civil government contingencies, \$8,226.98.

The amount voted by Parliament for the various branches, not including the departmental salaries, was \$835,640.71. It will thus be seen that during the fiscal year the expenditure was \$43,426.90 less than the amount voted by Parliament.

The whole number of persons in the outside service of the Marine Branch at the date of the report is 1,736.

During the past fiscal year the expenditure for maintenance of lighthouse and coast service amounted to \$448,395.27, and for construction of lights \$17,662.28, total for maintenance and construction \$466,057.55, while for the previous year the expenditure for lighthouse and coast service, including construction was \$475,903.22, showing a decrease of expenditure for the year ending 30th June last of \$9,845.67. The appropriation for this service was \$481,510, the expenditure being \$15,432.45 less than the appropriation of Parliament for the fiscal year.

LIGHTHOUSE SERVICE.

The lighthouse service of the Dominion is divided as follows:—The Ontario division, embracing all lights from Montreal westward to the North-west Territories; the Quebec division, extending below Montreal and including the River and Gulf of St. Lawrence and Strait of Belle Isle; the Nova Scotia division, including St. Paul's Island, Cape Breton, Sable Island and Cape Race, Newfoundland; the New Brunswick division, the Prince Edward Island division, and the British Columbia division,

each including lights within the provincial boundaries. The total number of light stations, light-ships and fog-alarm stations in the Dominion on the 30th of June, 1896, was 629, and lights shown 770, the number of steam-whistles and fog-horns 82, the number of light-keepers and engineers of fog-alarms with masters of light-ships, was 710. Appendix No. 16 contains the number of stations, lights, fog-alarms and steamers in each agency in detail.

ONTARIO LIGHTHOUSE DIVISION.

This division includes the lighthouses and other aids to navigation in that part of the province of Quebec lying west of Montreal, all the lights in the province of Ontario, lights above Montreal, embracing the lights on the Ottawa River, the Great Lakes, and some of the smaller inland lakes, as well as the lights on Lake Winnipeg in the province of Manitoba.

The number of lighthouses, lighted beacons and lightships maintained by the Dominion in the Ontario division, as above described, is 232, located at 184 different stations.

The number of light-keepers in this division paid directly by the Government is 174, but in several cases assistants are employed by keepers, and paid by them out of the allowance made by the Government for that purpose.

There are in Ontario, 2 fog whistles, 11 steam foghorns and 2 fog bells operated by machinery, all located at light stations, as well as 5 bell buoys and 2 gas buoys.

Besides the lights maintained by this department, as above described, there are in Ontario the following aids to navigation: 2 lights on swing bridges, a system of lights on the Murray Canal, maintained by the Department of Railways and Canals, 4 pairs of range lights on the Detroit and St. Clair rivers, maintained by the American vessel owners principally interested, 13 wharf lights maintained by the municipalities or corporations to which the wharfs belong, and 2 range lights maintained by the local interests at Pine Tree harbour.

Eight of these last described stations are aided by this department to the extent of being furnished with the necessary oil for their maintenance.

The lights in this division with the exception of those on the Bay of Quinté, the Ottawa River, and the small lakes were inspected during the months of July and August, by Mr. Patrick Harty, Superintendent of Lights, and supplied with the necessary stores for annual maintenance. It was found impossible, this season, to make a regular inspection of the lights in the Ottawa River.

NEW AIDS TO NAVIGATION.

Cabot Head Light and Fog Alarm.

Mention was made in last year's report of the beginning of the erection of a lighthouse and fog alarm on Cabot Head in Georgian Bay. The construction was completed early in the spring and the lighthouse and fog alarm were put in operation on the 18th of May last.

The lighthouse stands on top of the cliff, about $\frac{1}{3}$ mile eastward from the entrance to Wingfield Basin, at the point of Cabot Head which projects farthest north, on the ordinary course of vessels.

Marine and Fisheries—Marine Branch.

The site is level and elevated 35 feet above water. The light building consists of a tower and dwelling house combined, built of wood, painted white. The square tower rises from the east corner of the building, and is surmounted by an iron lantern painted red. The height of the building from the ground to the vane on the lantern is 54 feet.

The light is a group revolving white light, showing three bright flashes with intervals of twenty seconds between their points of greatest brilliancy, followed by an interval of forty seconds during the greater part of which the light is obscured, the light completing a revolution in 80 seconds. It is elevated 80 feet above the level of the bay and should be visible 14 miles from all points of approach by water. The illuminating apparatus is catoptric.

The fog-alarm building is located on the beach, about 200 feet eastwardly from the lighthouse. It is a square wooden building, painted white, with duplicate horns projecting from a gable in the north-easterly front of the building. These horns are elevated 20 feet above the water.

The fog-alarm consists of blasts of a horn operated by steam and compressed air of 8 seconds' duration with intervals of 40 seconds between them.

The boiler and machinery are in duplicate, so that in case of an accident happening to one part it may be promptly replaced by its duplicate part.

The total cost of construction in connection with the establishment of these buildings has been \$7,473.59.

Assumption of Port Elgin lights.

Since 1884, the municipality had maintained lights in Port Elgin Harbour, Lake Huron, and on the opening of navigation last year the maintenance of the two pairs of range lights then in operation was assumed by the Government of Canada, and Mr. Robert M. Lowry, the lightkeeper, was maintained in charge at a salary of \$60 per annum.

Light on Hilton Wharf.—An arrangement was made last season by this department with Mr. S. T. Bowker, owner of the wharf at Hilton, on the north coast of St. Joseph Island, in St. Joseph Channel, district of Algoma, Ontario, by which he maintains for the purposes of navigation, a light upon the wharf.

The light is a fixed white light shown from a square lantern with glass reflector, suspended from a pole 60 feet back from the outer end of the wharf. It is elevated 25 feet above the level of the water and should be visible three miles from the approaches to the wharf.

A mechanical fog-horn, worked by hand, was also supplied, and is used in answer to signals from vessels.

Canadian Canal Sault Ste. Marie Lights.

The range lights referred to in last year's report to mark the dredged approaches to the new Canadian canal were duly established in position by the canal authorities, the expense of maintenance being borne by this department.

The front range light of the pair marking the approach to the canal from the eastward is an electric red light elevated 37 feet above the level of the river and visible 3 miles from all points of approach by water. The lantern is elevated on a pole standing near the outer end of the Lake Superior Power Co.'s jetty, the pole rendered more conspicuous by a target.

The rear light is a similar light elevated 59 feet above the water and standing 1,300 feet N.W. $\frac{3}{4}$ N. from the front light.

The two lights in one lead from the American channel up the middle of the dredged approach between the red and black buoys to the piers at the east end of the canal.

The front range light of the pair marking the approach to the canal from the westward consists of a group of incandescent electric white lights placed in a wooden lantern erected on top of the cribwork beacon at the turn in the west approach to the canal, described in the above notice.

The light is elevated 39 feet above the level of the river and should be visible up the river to Pointe aux Pins as well as into the canal.

The back light of this range is a fixed white incandescent electric light elevated 61 feet above the river, and visible to the south shore in the line of range. It is shown from a wooden lantern surmounting a square open framed wooden tower, the whole painted white and 65 feet high, erected on the east extremity of Davignon Point, 2,100 feet N.E. $\frac{1}{3}$ E. from the front light. The two lights in one N.E. $\frac{1}{3}$ E. (N. $46^{\circ} 25'$ E. true) lead in from the American channel past Vidal Shoal, between the red and black buoys, to the turn at the front light.

On the 1st September the electric arc light maintained by the Department of Railways and Canals on the upper end of the north pier of the canal, and the similar light on the upper end of the south pier, were changed in colour from bright or white to red, so as to more conspicuously mark the extremities of the two piers at the western end of the canal.

The two lights changed in colour are respectively the most westerly light of each of the two rows of arc lights illuminating the canal bank and cribwork approaches.

Gas Buoys in Lake Erie.

The vicinity of Pelée Point, in Lake Erie, is rendered difficult of navigation, especially for the vessels of large tonnage now navigating the great lakes, by numerous shoals, and in compliance with urgent requests from the vessel interests two gas buoys on the Pintsch system were, on the 2nd of October last, established at critical points on this route. One of the buoys is moored in 30 feet water, immediately south of the 20 foot patch at the south extremity of South-East shoal, $3\frac{1}{2}$ miles south-east by south $\frac{1}{2}$ south from Pelée Point light.

The buoy is painted red, with the words "South East Shoal" in white letters on the sides. It is surmounted by a red conical slatwork, bearing a red lantern, from which a fixed white gas light is shown, elevated $8\frac{3}{4}$ feet above water. The light should be visible four miles from all points of approach.

Marine and Fisheries—Marine Branch.

The other buoy was moored in 30 feet water off the north-east point of the Middle Ground, west by south $\frac{1}{2}$ south $3\frac{1}{4}$ miles from Pelée Point Light.

The buoy is painted black, with the words "Middle Ground" in white letters on the sides. It is surmounted by a black can shaped slatwork cage, bearing a red lantern from which an occulting white gas light is shown, elevated $7\frac{1}{2}$ feet above the water. The light should be visible four miles from all points of approach. It is cut off automatically for a short time at intervals of about 10 seconds.

These buoys are supplied with a special make of compressed gas which is procured from the Detroit Gas Works, and carry a sufficient quantity to burn for six weeks without attendance. The buoys were set out and taken up in the fall by the Dominion steamer "Petrel" and have proved a great success. That they are appreciated by the owners of the large fleet passing Pelée Point is indicated by the following extract from the Annual Report of the Lake Carriers' Association, representing the greatest shipping interests on the great lakes:—

"Your attention is especially called to the fact that the Canadian government has established two gas buoys at Point au Pelée Passage, which have given great satisfaction to vessel owners. The prompt response which the Canadian authorities made to the request of our American vessel owners for additional aids to navigation at this dangerous point on the Canadian side of the international boundary lines where our Government was powerless to protect our vessels, deserves the thanks of the association. With a comparatively small tonnage on the great lakes and with a vast coast to light on the ocean and St. Lawrence river, where the Canadian marine interests are large, the Canadian authorities needed little urging to induce a prompt response to our request for assistance on Lake Erie. This was a gracious act not to be forgotten."

Spar Buoy on Grecian Shoal.

A large spar buoy was on the 2nd of October, 1896, established off Grecian Shoal lying off Little's Point, north-west of Colchester Reef light, Lake Erie. The buoy is painted red and is moored in 20 feet of water immediately south of a spot with 10 feet water. It was established in consequence of the tendency of vessels to run Little's Point too close aboard. Mariners have been warned that the direct course between Colchester Reef light and the United States light off Bar Point falls over a mile to the southern end of this shoal.

The change in Buoys at mouth of River Detroit.

The Canadian buoys on the east side of the dredge channel at the mouth of River Detroit, Lake Erie, were last season re-arranged and increased in number. The channel has been dredged by the American Government to a width of 800 feet, its axis being a straight line joining Detroit River Lighthouse (American) and Bois Blanc Island Lighthouse (Canadian).

The Canadian buoys marking the east edge of this dredged cut are now seven red wooden spars. They are situated approximately 400 feet east of the centre line of the above dredged channel, and are respectively 4462, 5632, 6927 (approximately), 8221, 10,029, 11,365 and 13,525 feet above Detroit River Lighthouse. This last most northerly buoy is about 18,600 feet below Bois Blanc Lighthouse.

CHANGES AND IMPROVEMENTS AT EXISTING STATIONS.

Ste. Placide.—Approach to Ste. Placide, Lake of Two Mountains, Ottawa River, has always been difficult in consequence of the existence of a bar or shoal extending roughly parallel to the shore and about a mile distant therefrom. Through this shoal two channels, 80 to 100 feet wide have been dredged, one leading to the village wharf N. E. by E. $\frac{1}{4}$ E. from up stream, the other leading to the wharf N. W. from down stream.

Two range lights have since 1874 been maintained to mark the axis of the up-stream channel.

The front tower of this range has recently been moved to a new site at the point where the axes of the two channels intersect, a distance of 130 feet S. W. by W. $\frac{1}{4}$ W. from its former position. It now stands on the beach at the inner end of the wharf, on a cribwork block, and is 5 feet lower than in its old position, which makes the light 15 feet above the summer level of the lake. It is a fixed white light strengthened by a pressed glass lens. In other respects the old range of lights has not been changed.

In this front tower an additional light was arranged to mark the down-stream cut. It is a fixed catoptric light elevated 15 feet above the water, and visible two miles, showing a narrow bright or white beam of light in the channel, with a red sector on the upper, or port, side of the channel in entering, and a green sector on the starboard side. To enter and keep the channel, a vessel must get the white light open its full brilliancy, bearing N. W. and steer directly for it, keeping the bright light open.

To mark this lower cut in daytime a day beacon, consisting of a mast carrying a slatted diamond-shaped target is erected on top of the bank, east of the parish church, 340 feet N. W. from the front tower. It is painted white with a black diamond in the middle of the slatwork. The front tower and beacon in one N. W. are in the alignment of the outer end of the lower dredged channel.

The cost of these changes was \$100.26.

Arnprior Island.—The mast from which a light was shown on an islet opposite the town of Arnprior, Chats Lake, Upper Ottawa River, has been replaced by a new mast 10 feet higher than the old one, and the pressed lens lantern has been replaced by a 7th order dioptric lantern.

The colour of the light has also been changed from white to red. The light in future will be fixed *red*, elevated 40 feet above the ordinary level of the water, and should be visible 8 miles from all points of approach by water.

The light was raised so that it could be visible over an intervening point up the lake, and was changed in colour to distinguish it from the lights in the town of Arnprior. The cost of raising the mast was \$40.31 and the new lantern is worth \$98.

Kingston Harbour Buoys.—On the opening of navigation in 1896 the three platform buoys previously maintained on Penitentiary shoal, Myles shoal and Bolivia shoal respectively, in Kingston Harbour, Lake Ontario, were replaced by wooden spar buoys surmounted by slat work globes or spheres.

Marine and Fisheries—Marine Branch.

The buoys are painted as heretofore, viz., in red and black bands, and are moored as near the middle of the shoals as possible, in 12 to 14 feet water. Vessels should give the buoys a good berth as the shoals extend some distance.

This change in the form of the buoys was made in consequence of complaints that large and heavy platform buoys would have proved dangerous if struck by light draught vessels. During the summer the position of the buoys on the harbour shoals was surveyed and the result of the survey forwarded to the Hydrographer of the Admiralty for insertion in the official charts.

Port Dalhousie.—In response to requests from owners of steamers entering Port Dalhousie a large bell, furnished by the Lakeside Navigation Company, has been attached to the platform to the range light tower near the outer end of the East pier and is rung by hand by the light keeper as a fog signal in reply to fog signals from vessels desiring to make the canal. This bell replaces the less powerful, hand fog-horn previously used for the same purpose.

Western Islands.—In accordance with the intention expressed in last year's report the temporary illuminating apparatus of the new lighthouse on Western Islands was replaced on the 12th of October last by a 4th order dioptric apparatus procured from Messrs. Chance Brothers & Co., Birmingham. The light shown from it is a fixed bright light varied by bright flashes at intervals of 30 seconds. It should be visible 14 miles. The installation was made by Mr. W. H. Noble, foreman of works, who also erected at the station a boathouse, a derrick for landing supplies, and a platform extending from the landing to the several buildings, all designed to resist the action of waves. The cost of the illuminating apparatus was \$1,399.10 and of the improvements made by Mr. Noble \$507.79.

Bamford Island.—A mechanical fog-horn, to be worked by hand, has been supplied to the light station at Bamford Island, St. Joseph Channel, and will be used to answer signals made by vessels.

Rains Wharf Range.—Prior to the opening of navigation in 1896 the masts from which the range lights at Rains wharf, in the River St. Mary, Ont., are exhibited, were moved to an alignment about 80 feet northward of the old alignment, so that they might be in the same alignment as the American range lights at Point of Woods, and mark the axis of the channel which was widened by the United State government.

The front range light now stands on the shore north of Rains wharf. The lantern is elevated 21 feet above water.

The rear light mast stands 436 feet S.E. $\frac{1}{4}$ E. from the front light. The lantern is elevated 26 feet above water.

In other respects the range is unchanged, and the two lights in one guide through Dark Hole Passage as before.

PRINCIPAL REPAIRS TO EXISTING AIDS.

Pointe Claire.—The lighthouse on the pier at Pointe Claire was destroyed by fire on the 14th Nov., 1895, from sparks from a passing steamer which got under the sills of the building. Fortunately the cribwork foundation had the previous year been replaced by a concrete pier and remained almost intact. A temporary light

has since been maintained on the pier. The pier has been thoroughly repaired and a new tower will be built upon it ready for navigation in the spring of 1897. The work has been put in charge of Mr. W. H. Noble, foreman of works.

L'Original.—The lighthouse at L'Original, on the Ottawa River, which was an open-framed structure built in 1871, was blown down in 1893, and since that time a mast-light has been maintained. This mast-light not being sufficiently powerful or reliable to give satisfaction, the department proposed to replace it by a light shown from an inclosed tower and invited tenders for the necessary building in September, 1896. The lowest tender received was \$799, and this being considerably above the Chief Engineer's estimate, the department now intend to erect the building before the opening of navigation next year, by day's labour, under the superintendence of Mr. W. H. Noble, foreman of works.

Gibraltar Point.—The small vertical boiler used to operate the steam fog-horn at Gibraltar Point station since 1886, being in bad order, was replaced last year by a larger horizontal boiler manufactured by Messrs. Carrier, Lainé & Co., of Lévis, under contract, for \$400. The boiler was erected under the superintendence of Mr. W. H. Noble, foreman of works, and it was necessary to enlarge the engine room in consequence of the difference between its size and that of the old boiler. At the same time, the old fog bell building which had not been used for some years, was removed and some repairs made to the verandah of the dwelling, the whole work costing \$276.81. The stone work of the lighthouse was pointed and whitewashed under contract by Mr. R. Clayton of Toronto, at a cost of \$90.00. The old displaced boiler was sold on the ground to the highest tenderor, for \$36.00.

Port Dalhousie.—During the coming season the Department of Railways and Canals proposes to remove the decayed cribwork top of the East pier at Port Dalhousie, and to replace the portion above water by concrete. They have asked this department to replace the timber block on which the outer range light stands by a similar substantial foundation and steps have been taken to have this work completed ready for the pier work before the opening of navigation next season.

Cove Island and Mississauga Strait Fog-alarms.—For the purpose of duplicating the fog-alarm machinery at Cove Island and Mississauga Strait stations, new boilers have been made under contract by John Inglis & Sons of Toronto, delivered at the stations at a cost of \$1,990. These will be placed in position next year.

Lone Rock Bell Buoy.—The large ballast ball used on Lone Rock bell buoy was found to have become detached when the buoy was raised for the winter and a new ballast ball has been applied and the buoy repaired.

Corbay Point.—The lighthouse on Corbay Point, Batchewana Bay, Lake Superior, was extensively repaired, the tower, the roof and the walls of the dwelling having been shingled and the building generally overhauled, at a cost of \$484.53. This work was done under the supervision of Mr. Noble, foreman of works.

Lamb Island.—The lighthouse and keeper's dwelling on Lamb Island, Lake Superior, built in 1877, was found to be in a bad state of repair mainly in consequence of leakage through the outside covering, and was practically rebuilt during the past summer, under the supervision of Mr. Noble. The cost of this work was \$818.46, being sensibly increased in consequence of the difficulty of transporting materials to the site and the scarcity of workmen in the locality.

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Rainy River.—The range lights established at the mouth of Rainy River, as described in last year's report, proved of great assistance in the navigation of the Lake of the Woods, but the pile foundations were found to be unsatisfactory, especially for resisting the shove of ice which occurred in the spring. It has therefore been decided to replace the pile foundations by cribwork piers filled with ballast and the work will be done by contract.

QUEBEC LIGHTHOUSE DIVISION.

The Quebec division extends from Montreal to the end of the Straits of Belle Isle, covering a coast and river service of over 1,200 miles, comprising all the lighthouses in the Richelieu River, Lake Memphremagog, as also all the lighthouses, lightships, gas buoys, and beacons from Montreal to Quebec; and below Quebec, all lighthouses, lightships, gas buoys, wooden buoys, beacons and fog alarms in the River St. Lawrence, Saguenay River, Baie des Chaleurs, Gulf of St. Lawrence, Straits of Belle Isle, north and west coast of Newfoundland and Labrador. This division is under the control of J. U. Gregory, agent of the Department of Marine and Fisheries at Quebec.

The agent attends to any other duties required by the department for the Marine and Fisheries at Quebec, and is also shipping master, attends to the requirements of the British Board of Trade in connection with shipwrecks and distressed seamen, casualties at sea, and is receiver of wrecks and supervisor of wharfingers in the province of Quebec; as also a fisheries officer for that province.

The agent's staff at Quebec consists of Mr. L. A. Blanchet, chief clerk and accountant, also deputy shipping master; Mr. Alphonse Hamel, clerk; Mr. N. Fitzhenry, storekeeper, and Mr. G. D. O'Farrell, lighthouse inspector.

The workshops, in which are employed reliable and skilled workmen, are under Mr. Ernest Roy, master carpenter, and Mr. G. Vezina, master shipsmith, and the gas works are under Mr. G. Belanger, with such assistance as may be required from time to time.

The steamer at the disposal of this agency during the past year was the "Druid" which supplied lights between Quebec and Father Point, and attended to gas and other buoys, as well as beacon service below Quebec. The steamer "Aberdeen" came from Halifax to supply the lights below Father Point, in the Gulf of St. Lawrence, Strait of Belle Isle, Anticosti, Magdalen Islands and Baie des Chaleurs. The service between Quebec and Montreal was by passenger boats, hired tugs or by rail.

There are in this division 15½ lights at 117 stations; 8 lightships, 3 of which are supplied with powerful steam fog whistles; 9 explosive bomb signal stations in connection with lights; 2 steam fog-whistles and 9 steam fog-horns; 10 gas buoys, 4 of which are supplied with bells; 140 wooden buoys not under contract, and 59 day beacons.

IMPROVEMENTS TO LIGHTS.

Isle aux Prunes.—On the opening of navigation in the spring of 1896, the wooden lighthouse tower formerly used at Isle aux Prunes light station, was replaced by a skeleton steel structure, square in plan, with sloping sides, surmounted by a

square galvanized iron lantern. The vane on the lantern is elevated 31 feet above the deck of the timber work pier to which the building is bolted.

Both framework and lantern are painted red. The tower is made most conspicuous as a day mark by having a target of wooden slats attached to the upper half of the down-stream face. This target is painted white on both the up and down stream faces. No change has been made in the height or character of the light.

Lavaltrie.—A similar steel tower was at the same time erected in place of the old wooden tower from which the back range light at Lavaltrie was displayed.

The framework and lantern are painted red, and the wooden slatwork target is painted white, with a vertical red stripe down its middle.

The height and character of the light are unchanged.

PRINCIPAL REPAIRS AT EXISTING STATIONS.

The following is a statement of the more extensive repairs and improvements made at the several stations during the past year. In addition to those mentioned, ordinary repairs were made, supplies kept up, and painting done wherever required.

Amherst Island.—The extensive repairs begun at this station, as stated in the previous annual report, were carried out and a new oil shed¹ was also built. The work was done by carpenters sent from Quebec—and the station is now in very good order. The total cost amounted to \$592.76.

Anticosti, Heath Point.—The lower portion of the tower, lantern gallery and windows had their clapboarding repaired, as also the refuge for the shipwrecked, and the store-house and barn also received attention. All the repairs were performed by workmen sent from Quebec. All the necessary painting was, however, done by the keeper with local assistance, the department supplying all material.

Anticosti, South Point.—The tower at this station, which leaked all over, has been made staunch, and the plaster of the ceiling which was falling off has been repaired. Forty-five feet of the breakwater in front of the buildings had its planking renewed and the back filled with stone. The fog-horn building which was opening in the centre on the top, had its stone foundation facing the beach raised and the roof repaired. The whole work was performed by mechanics sent from Quebec. The total cost of the repairs at this station amounted to \$353.50.

Anticosti, West Point.—Repairs were carried out to the stone and wooden breakwaters, and a small extension built to the latter. The tower and dwelling also repaired. The whole of the work was carried out by workmen sent from Quebec at a total cost of \$1,215.80.

Belle Isle.—A new landing place was built at this station and necessary repairs made to the buildings, at a total cost of \$589.13. The men and material had been sent from Quebec by the supply steamer.

Cape Salmon.—A portion of the landing slip at this station having been carried away by a storm, men and material were sent from Quebec to make the repairs, and the work was attended to satisfactorily. A boat shelter was also provided at this station. The total cost of repairs amounted to \$214.10.

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Cape Charles.—The back light at this station was much improved by the erection of a higher pole, thus raising the lantern 10 feet. A locomotive headlight lantern sent from the stores of the agency at Quebec was substituted for the one formerly in use. The small building at the base of the pole was enlarged. The front tower also received some repairs.

Cape Despair.—A new chimney top was put on by local workmen at a cost of \$8.00.

Cape Gaspé.—The chimney on the north-east side of the lighthouse formed an obstruction to the light seaward, and was consequently taken down and rebuilt on the landward side of the building. The chimney was built by local workmen at a total cost of \$187.15. Repairs were also made to the fence around the government property, at a cost of \$6.00, the work being done by the keeper with local assistance.

Cape Norman.—This station being without a duplicate foghorn, a boiler was sent down from Quebec as a spare one in case of accident.

Contrecoeur.—The front tower which was carried away by the ice on the 19th April and landed in the middle of a field some 500 feet distant, was found not to have been much damaged and was therefore replaced in position. It was repaired, and the platform was renewed. Slight repairs were also made to the metal roof and the tower was painted by the keeper with local assistance. A new ventilator was also put in the back tower. The total expenditure incurred at this station was \$64.61.

Egg Island.—The gallery around the lantern was renewed. The chimney was also repaired, 200 fire-bricks having been sent from Quebec for that purpose, and a new chimney top was supplied. The work was done by local workmen under the supervision of the keeper.

Ile à la Pierre.—The light-house on a cribwork pier at this station was carried away by the unusually heavy ice-shove of last spring. As the pier had reached the limit of the life of a wooden pier, and as the lighthouse was in need of extensive repairs the loss by the accident was inconsiderable. During the season of navigation a temporary pole light was maintained and a new pier and lighthouse are now being built by Mr. W. H. Noble. The wooden pier is being replaced by a concrete monolith in a cylindrical steel casing.

Forteau.—Extensive repairs are required at this station and two workmen sent from Quebec are engaged in making new floors, &c., and erecting a new coal shed to hold 100 tons. The sum of \$234.19 has been spent for lumber and other materials.

Lark Islet.—The horizontal boilers at this station being in need of repairs a boiler maker was sent from Quebec. Some old and defective valves were replaced and other steam connections renewed. An iron tank for an additional water supply for the fog alarm was sent down by the supply steamer. The tower was painted by the keeper with local assistance, and small repairs made to the boat. The amount expended on these repairs was \$36.90.

L'Islet Richelieu.—Considerable damage was done at this station by the ice in the spring. The coal oil shed was completely carried away even to its stone foundation, as well as the door steps and small platform. In view of the fact that the Department of Public Works are dredging Barre à Boulard to the uniform depth of the ship channel and that the new channel will necessitate a removal of this

light, a temporary oil shed was erected, which can be taken down in the fall and stored on the mainland. The cost of this work amounted to \$45.60.

Lower Traverse Lightship.—This lightship underwent repairs, the cost of which with the general outfitting amounted to \$481.61.

Maquereau Point.—The foundation of the tower, which was in bad order was repaired by a local mason. Two rooms were ceiled, and the flooring in kitchen and passage way was renewed. This work was also done by local assistance at a total cost of \$70.90.

The Pillars.—The breakwater built at this station last year was completed by the keeper. Owing to the action of the sea, a displacement of the stone portion took place, and the keeper was obliged to change the plan of the wharf, and build it further in the gully where he keeps his boat. The landing slip, the lower end of which was broken by the ice last spring, and the platform and steps were also put in good repairs. Some changes having been made in the revolving apparatus, to give increase in speed, the machinery proved too weak for the heavy weights necessary for rapid revolving and the light stopped revolving. A machinist was sent down from Quebec several times to remedy the trouble, and after considerable difficulty, the gearing was put in good working order.

The total cost of the repairs effected at this station was \$531.28.

Pointe aux Citrouilles.—Considerable damage was done to the lighthouse last spring. The tower and part of the pier were carried several acres. The oil shed had to be renewed and a temporary pole erected at a cost of \$41.96.

The lighthouse tower has been brought back to its old position on the pier, and now shows a light similar in all respects to that shown before the tower was displaced.

Point Rich.—The storehouse and barn being in very bad order, a new one is to be erected. The building was made in Quebec, ready to be put together at the station by the keeper. An expenditure of \$108.46 has been incurred so far for lumber.

Red Island Lightship.—The boiler and machinery of this vessel were thoroughly repaired last winter. Leaks at the bottom seams and in bottom of furnace were stopped and a one-inch injector fitted in. The repairs as well as the general outfitting in the spring cost \$725.05.

Richelieu River lights.—The stations at Ash Island, Lacolle, and north of Halfway Point were visited by Mr. Noble this autumn, and the buildings, which required repairs, were put in good order.

Upper Traverse Lightship.—This vessel was docked during last winter and thoroughly caulked. Other repairs were also carried out, which, including general spring outfitting, amounted to the sum of \$493.40.

White Island Reef Lightship.—This vessel was docked last fall to have her bottom scraped and painted. The boiler and machinery were also extensively repaired. The side valve of operating engine, the valve chest on steam cylinder of donkey pump and three globe valves were renewed, and a new whistle pipe also put in. The total cost of repairs and docking amounted to the sum of \$1,599.85.

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FOG ALARMS, STEAM WHISTLES, COMPRESSED AIR HORNS, AND GUN COTTON
EXPLOSIVE BOMBS AND CARTRIDGES.

This very important part of the service is much interfered with by atmospheric influences in all weather, especially in a dead calm when fogs are the most dense.

Enquiry into complaints against fog alarms not being properly attended to have thus far resulted in establishing that there had been neither neglect nor incompetency on the part of the operators, but the defect was owing to the sound not being distinguished on account of atmospheric influences, even when vessels were but a comparatively short distance away.

BUOY SERVICE.

Gas Buoys.

The Quebec district has in operation 10 gas buoys, 4 of which are supplied with bells operated by four hammers put in motion by the action of the waters. Each of these buoys has the name of its respective station painted on its side.

There are two spare spherical gas buoys on the Queen's Wharf at Quebec, where are also situated the gas works, supply tanks, &c.

The total cost of this service for last year amounted to \$2,769.33.

Wooden, Can and Spar Buoys and Beacons.

The buoy and beacon service under the Quebec Agency comprises all those situated in the River Richelieu, Saguenay, St. Lawrence, Baie des Chaleurs, Gaspé Coast and Magdalen Islands harbours.

The buoys in the ship channel between Quebec and Montreal are maintained under a contract with the Sincennes-McNaughton Line.

Some improvements in the disposition of the buoys, to suit increased widths, etc., were made as required.

The total cost of this extensive service, including contracts for the wintering, repairing, replacing, taking up and renewing buoys and beacons, for the last fiscal year, was \$3,502.69, not including the buoys between Quebec and Montreal.

The usual number of buoys and beacons were repaired, painted and renewed.

Spar Buoys.

The eight spar buoys to enable belated vessels to pass the eight principal points outwards and inwards below Quebec were built as usual and placed in position after all other buoys had been taken away for the winter.

These buoys have now become a necessity and are much appreciated by navigators.

NOVA SCOTIA LIGHTHOUSE DIVISION.

This division, in charge of Mr. J. Parsons, agent of the department for the province, comprises 180 lighthouses, exhibiting 192 lights, 1 light vessel, 16 steam fog alarms; 1 signal bomb station; 20 hand fog horns; 2 fog bells; 17 automatic whistling buoys; 13 automatic bell buoys; 101 iron can buoys; about 700 spar and other small buoys; 8 stationary beacons; 16 life-saving stations; 3 humane establishments and 4 signal stations. The steamers "Newfield" and "Aberdeen" are also under the control of this agency.

The light and fog alarm stations have been inspected by Mr. C. H. Hutchins, superintendent of Lights; the boilers and machinery at the fog alarm stations, for the most part by Mr. D. Stevens, inspector of government steamboats, and the life-saving stations by Mr. Alfred Ogden.

CHANGES AND ALTERATIONS.

Glasgow Point.

A small tower, with keeper's dwelling attached, has been erected at Glasgow Point to take the place of the inferior pole light hitherto in operation at that station. An acre of land has been acquired and enclosed with a wire paling fence.

The new tower is erected on the site of the old light mast, on the north and west extremity of the Point, on ground about 39 feet above high water mark. It is a square wooden building, painted white, surmounted by a hexagonal iron lantern painted red, and attached to its south side is a small white wooden dwelling. The height of the tower, from its base to the vane on the lantern, is 32 feet.

The light is fixed red, elevated 65 feet above high water mark and should be visible 8 miles from all points of approach by water. The illuminating apparatus is dioptric, of the 7th order. Materials were sent by the "Aberdeen" and the work done by Mr. John Chisholm, foreman of works, with local help at a cost of \$1,374.38, including \$246.79 for iron lantern and \$91.74 for illuminating apparatus.

Point Tupper.—The tower has been extended ten feet in height in order to clear obstructions to light on southerly bearings by the railway buildings on the point. The tower was secured by four wire rope guys. Materials were procured locally and the work done under the superintendence of Mr. McLellan, who employed local help.

Cheticamp.—A new tower was constructed on the north side of dwelling. This was necessitated by the insecure nature of the building on which the lantern was erected. Materials were sent by the "Aberdeen" and the work done by Mr. John Chisholm, who employed local workmen.

Westhaver Island Light.—The light on Westhaver Island, at the entrance to Mahone Harbour, Mahone Bay, Atlantic Coast of Nova Scotia, was improved by the substitution for the mast formerly maintained, a more powerful light in an enclosed tower.

The new tower is erected on the summit of the island, near its south-east end, on a site about 30 feet above high water mark. It is a square wooden building painted white, surmounted by a hexagonal iron lantern painted red, and attached to its North-

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west side is a small white wooden dwelling. The height of the tower from its base to the vane on the lantern is 27 feet.

The light is a fixed white light elevated 54 feet above high water mark, and visible 12 miles from all points of approach. The illuminating apparatus is dioptric of the seventh order.

The change from the mast to the tower was made on the 15th January, 1896, when the mast was removed.

Pictou Range Lights.—It was decided to replace the unsatisfactory mast lights at Fraser's Farm, entrance to Pictou Harbour, by more powerful lights shown from enclosed towers, and plans and specifications were prepared and tenders invited for the work. Only one tender was received amounting to \$826. On the recommendation of the Chief Engineer this tender was not accepted, but the two buildings were erected under the superintendence of Mr. John Chisholm, foreman of works for the Agency, who purchased materials locally and employed local labour. The total cost of the two towers was \$660.22.

The tower in each case is a square wooden building with inclined sides, surmounted by a square wooden lantern, the whole painted white. The front range tower stands immediately behind the site of the old front mast, 600 feet back from the shore, on ground 49 feet above high water mark, and is 30 feet high from its base to the vane on the lantern.

The light shown from it is a fixed red catoptric light, elevated 66 feet above high water mark, and should be visible 8 miles in, and over a small arc on each side of, the line of range.

The back tower, which stands on land 46 feet above high water mark, 384 feet N. W. by W. $\frac{1}{4}$ W. from the front light, is 38 feet high. From it is shown a fixed red catoptric light elevated 78 feet above high water mark and visible 8 miles in, and over a small arc on each side of, the line of range.

The two lights in range are to be used as heretofore, but are more powerful and reliable than the former lights.

Removal of Abbot Harbour Light.—In consequence of representations from the fishermen interested, it is intended to remove the pole light on the south extremity of Abbot Island early in 1897 to a new site on the main land about $\frac{1}{3}$ mile east of its present position, and at the entrance from the southward to the harbour, and also to extend the time during which the light will be kept in operation to cover the whole fishing and lobster seasons. It is thought that in its new position a more certain attendance will be secured.

Improvement in Carter Island Light.—On the 7th December 1896, the light shown from the lighthouse in Carter Island, in Lockeport Harbour, was improved by replacing the catoptric apparatus formerly used and replacing it by a seventh order dioptric apparatus manufactured by Messrs. Chance Bros. & Co., of Birmingham. The light remains as heretofore a fixed red light elevated 66 feet above high water mark and should be visible eight miles from all points of approach by water.

Additional light on Grand Narrows bridge.

When the swing of the railway bridge over Grand Narrows, Cape Breton, was marked by lights and a new lighthouse established on Gillis Point, it was considered that the lighthouse heretofore maintained at Iona, at the east end of the bridge, was superfluous, and the light was accordingly extinguished. Complaints having been made by mariners that the red and green lights on the bridge swing were not sufficiently conspicuous to lead to the passage in bad weather an additional fixed white light is now exhibited by the railways management, from a lens lantern, hoisted on an iron frame directly over the red and green lights. This light should be visible 7 miles from all points of approach by water.

REPAIRS AND IMPROVEMENTS.

The following repairs and improvements, in addition to ordinary and small repairs and painting, have been made to various stations, viz.:—

EAST OF HALIFAX.

George Island.—Eight new lamps were furnished and a new boat supplied.

Meagher's Beach.—The walls of room in keeper's dwelling were sheathed, a new floor was laid, a new sink and dresser fitted in kitchen, and the building painted.

Point Tupper.—In addition to increasing the height of the tower as already described, the keeper's dwelling was stripped of old clapboards and shingled. The sills and floors of porch and kitchen were renewed, and new stairs were built and part of a room was lined. New storm doors to porch and cellar, new roof on passage way from dwelling to tower. The barn had its sills, joists and floors renewed and the roof was re-shingled. The work was all done under Mr. McLellan, the foreman carpenter, who employed local help and procured the materials locally.

Petit De Grat.—A new cribwork landing slip was constructed at this station, and new sills placed under the lantern. A new floor was laid in kitchen, and minor repairs done to sill and the outside of building.

Louisburg.—Two new lamp fountains were supplied, the cellar wall pointed and the plaster in two rooms was repaired.

Scattarie.—The kitchen porch was re-shingled, two new doors fitted to dwelling and thirteen storm sashes furnished.

Point Aconi.—The breakwater of landing was repaired.

Amet Island.—New blocks and fall were supplied for capstan. The kitchen floor was re-covered, the chimney was rebuilt from roof and the boat slip was repaired.

Pugwash.—A well was bored to supply fresh water.

St. Paul's Island.—A new surf boat was supplied to main station and a small boat to the S. W. Lights. Three new spouts were placed to superintendent's dwelling.

WEST OF HALIFAX.

Sambro.—Materials were landed to repair keeper's dwelling. Four broken panes of glass in lantern were replaced and all the other panes re-gazed. One beam and

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part of floor in lantern, one sill under old whistle house were removed and old clapboards removed and west end of building shingled. The chimney of dwelling was taken down to roof and rebuilt.

Dover Harbour.—A new boathouse has been built at landing under contract by Mr. Martin Fader, of Shad Bay, for \$100. New boat furnished and two ladders for painting buildings.

Croucher's Island.—The landing slip was recovered with plank, and new hinges and a latch were fitted to boathouse doors.

Quaker Island.—The foundation walls were pointed, and 60 ft. of earthen pipe supplied for drain from cellar.

West Ironbound.—A new Chanteloup clock has been set up in place of the old worn one which was taken down and brought off for repairs. New iron blocks for weight chain were supplied, as also four copper smoke pipes, and two lamps were repaired. A new sill was fitted under west end of store.

La Have.—A cribwork protection wall has been built along the face of bank in front of lighthouse to prevent encroachment of the sea. The structure is 100 feet long, 6 feet wide and 3 logs high, and the work was done under contract. A new floor was laid in cellar.

Port Mouton.—The cellar floor was concreted, and a new drain pipe laid from cellar. The foundation walls were repaired, as also the platform, and new steps fitted to entrance.

Barrington Lightship.—The vessel was taken off her station and hauled ashore to have her bottom cleaned and painted, and top sides and deck caulked. A new boat and a caboose stove were supplied. A new bolt to pump was furnished. A small schooner was hired to take her place while off the station.

Bon Portage.—New sills were placed under the oil store, and new doors to cellar and lock to store at landing.

Fish Island.—The oil store was shingled on four sides, and side of roof was re-shingled. An addition for kitchen 18 x 15 feet has been built on east side of dwelling.

Sissiboo.—Four sills, part of studs, one beam and part of two corner posts were renewed; two sides of tower were reboarded, old clapboards stripped off and shingled all over. New steps were placed to entrance door, and one broken pane of glass in lantern was replaced. The foundation wall was repaired and the building painted. The work was done under Mr. McLellan, who employed local help.

Isle Haute.—Twenty dollars were expended in repairing roof from landing to lighthouse. The plaster in rooms was repaired and the cistern in cellar re-coated with cement.

Kingsport.—Two of the wooden corner posts of lantern, which obstructed the light seaward, were removed and replaced with iron, which also changed the size of glass to larger dimensions. The glass panels in entrance door were replaced.

Hand fog-horns have been placed at the following additional light stations in this agency, viz.: Canso Harbour, Marache Point, Arichat, Jerseyman Island, Quaker Island, and will be sounded by the keepers during thick and foggy weather, in answer to signals from vessels.

FOG-ALARMS.

Mauger's Beach.—The exhaust pipe box was repaired and refitted and the water conductors around tower were repaired.

Scattarie.—A new boiler was placed in the whistle house, the old one having been condemned. The old corrugated galvanized iron roofing has been stripped off, and the roof recovered with McAvity's spark proof felt. The walls of building were stripped of clapboard and shingled. The engine room was lined with 3 inch spruce sheathing and the floor concreted. A new time-piece was supplied to the engine room, and the conductors and spouts leading to cistern renewed.

Cranberry Head.—The boiler was retubed.

St. Paul's Island.—The old boiler being considered unreliable, a new one is in course of construction by Messrs. Matheson of New Glasgow, under contract for \$952.00. When finished it will be sent to the station and set up alongside the old one; the latter will then undergo repairs and be used as a duplicate. New brasses were fitted to crank shaft and a new pipe to reservoir.

Cape Race.—200 new tubes were supplied for boiler and a new set of furnace bars. The old Crosby automatic machine has been brought off and a new one set up in its place.

Chebucto Head.—The seams and legs of the boiler were caulked and cement placed around legs inside. New steam pipe was fitted to connect both boilers with the Crosby machine. Two new globe valves were fitted.

Seal Island.—Guy rods were fitted to plates in coal shed to prevent building from spreading.

Yarmouth.—Set of grate bars furnished and new pipe fitted to injector. New whistle pipes fitted to change position of whistle.

Brier Island.—On the 28th March last, the old whistle house was completely destroyed by fire, which was probably originated by the fire under furnace coming in contact with the wooden beams of floor. The boiler was damaged, fittings nearly all destroyed and the donkey pump rendered useless. Immediate steps were taken to re-erect the old boiler, and a temporary shed was erected and the alarm put in operation again on the 1st day of May. It has been determined to make this important station first-class in every respect. Plans and specifications have been prepared for a new building, and a new boiler is being built by Messrs. Matheson, of New Glasgow. When ready, the new boiler will be sent to the station and set up alongside the old one, so that in future, there will be no occasion to stop operations, pending repairs. It is proposed to erect the new building by day's labour during the coming season.

Cape D'Or.—The new boiler sent last year has been put in position and is now in use.

Sable Island.—The telephone was put in good repair during July and August, mostly by the labour of the staff.

The locusts on the island devoured much of the vegetation, and 50 tons of hay was sent to the stations in the autumn to carry over the cattle and the wild ponies through the winter.

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In the spring only four ponies were reported as having died since the autumn.

The six pony shelters built in localities where the ponies are likely to congregate in stormy weather are great protection—the racks at these shelters are kept supplied with hay.

Wild horses.—One hundred and sixteen ponies were shipped off the island and sold, at Halifax.

Cranberries.—Only two or three barrels gathered and brought to Halifax.

The Chief Signal Station.

At Halifax Citadel and Camperdown.—At the latter place a new signal staff was erected larger than the old one, and with better appliances. Some repairs to the staff and yards at the citadel and the usual quantity of bunting for new flags constitute our chief expenditure.

The old code of signals has been changed and greatly simplified by Captain H. V. Kent, R.E., Superintendent of Signals.

This new code has been printed and a lithograph of the chart made which shows the signals for warships, mail and other steamboats, government ships entering Halifax Harbour, as well as for sailing vessels of all grades both by day and by night. A classified return of ships signalled at Halifax for the year shows 2,230 as against 2,078 for the preceding twelve months, a gain of 152.

Beacons in Atlantic Cove, St. Paul's Island.

A tidal gauge house, painted white, erected about 40 feet above high water mark in the bight of Atlantic Cove, St. Paul's Island, in the entrance to the Gulf of St. Lawrence, now forms a conspicuous land mark on the coast of the island.

A circular white beacon has been placed on the side of the hill above the gauge; these two objects in line, bearing N. W. $\frac{1}{4}$ N. lead clear to the southward of "Big Dick," a dangerous detached rock on which the sea breaks very heavily off the north-east horn of the cove.

The above alignment affords a good guide to vessels anchoring off the cove in 15 fathoms.

BUOY SERVICE.

Additional Buoys.

A spar buoy painted white, to be maintained throughout each season of navigation, was placed on the eastern extremity of the shoal near the government wharf that exists in the cove between Cossett Point and McAdam Point on the north side of East Bay, Big Bras d'Or Lake, in the county of Cape Breton, to render the approach to the wharf safer.

A wooden spar-buoy was established to mark the western extremity of the one-fathom patch between Cossett Point and McAdam Point, on the north side of East Bay, Big Bras d'Or Lake.

This buoy, which is painted red, will be maintained throughout each season of navigation.

A wooden spar-buoy painted black is moored in five fathoms water, on the eastern edge of Purcell Cove Shoal, which lies on the western side of the entrance to the North-west Arm, Halifax Harbour.

A red iron can-buoy was on the 13th May last established on the south side of Pollock Shoal, lying south of Point Enragé, in the county of Lunenburg, on the southern coast of Nova Scotia, and is moored in 7 fathoms water about $\frac{3}{4}$ mile south of the extremity of Point Enragé.

The red spar-buoy heretofore marking the eastern extremity of "The Bar" or shoal extending about $2\frac{1}{2}$ miles easterly from Carey Point, on the northern side of the entrance to Great Bras d'Or, has been replaced by an iron can-buoy painted red.

A red wooden spar-buoy has been moored on the south edge of the shoal midway between the iron can-buoy and Carey Point light.

The black cask-buoy marking the position of the ballast ground off Tidnish, N. S., in Bay Verte, between the counties of Cumberland, N. S., and Westmoreland, N. B., was moored last spring in a new position, $\frac{1}{2}$ mile N.W. from the entrance channel to the ship railway dock, and any vessels discharging ballast in Tidnish Harbour must discharge it between the buoy described and Tidnish Head. No ballast is on any account to be discharged to the eastward of the buoy.

Four spar-buoys have been placed at intervals between Thrum Cap Shoal and the Eastern Passage, at a distance of 3,000 yards from the stop butts of the Government Rifle Range on McNab's Island, Halifax Harbour, to mark the extreme limits of the danger zone, owing to the annual target practice of the troops on the island. These spars were painted red and are surmounted by cross heads painted red and white.

On the 10th July, 1896, a number of submarine mines were laid off George's Island, Halifax Harbour, and the dangerous area was marked by buoys consisting of green barrels with the word "Torpedo" painted on them in white letters, and vessels were accordingly warned not to anchor or pass within the area so buoyed, and these buoys were to be left out until the 31st December, 1896.

It has been decided to reserve the area containing these mines permanently for submarine mining purposes, and it is not to be encroached on by vessels.

An iron can-buoy painted black with "Point Aconi" in white letters on top, was established on Point Aconi Shoals, in the county of Victoria, on the eastern coast of the Island of Cape Breton, on the 15th July, 1896.

The buoy is moored in 7 fathoms water $\frac{3}{4}$ mile E. by N. $\frac{1}{2}$ N. from the extreme of Point Aconi.

St. John's Ledge bell-buoy, marking the ledge, near Pubnico, in the Bay of Chaleurs, which went adrift or sank at its moorings in April last, was replaced by a new buoy on the 2nd May last.

The automatic whistling-buoy maintained on the Lurcher Shoal, in the Bay of Fundy, off the coast of Yarmouth County, was incorrectly described in the Canadian List of Lights and Fog Signals. It is painted in red and black horizontal bands, with "Lurcher Shoal" in white letters. It is surmounted by a 10-inch whistle.

Marine and Fisheries—Fisheries Branch.

Roaring Bull Can Buoy.

The buoy was removed by the "Lansdowne," and replaced by another one in November, 1895, and also in May, 1896.

Trinity Ledge Bell Buoy.

This buoy was removed by the steamer "Lansdowne" in November, 1895, and also in June, 1896.

Yarmouth Buoys.

These buoys were looked after by the steamer "Lansdowne" and are removed twice a year. The buoys were out of position in April last, and were replaced in proper position by the "Aberdeen."

Blond Rock Automatic Buoy.

The buoy at this place broke from its moorings on or about the 22nd of November, 1895, and was picked up by the schooner "Speculator," Captain McDonald. Owing to the difficulty of holding a buoy at this place, for any length of time, it is lifted now every three months.

NEW BRUNSWICK LIGHTHOUSE DIVISION.

This division comprises all the lighthouses and other aids to navigation within the boundaries of this province, both on the Bay of Fundy and on the Gulf of St. Lawrence side. The large buoys maintained by the government on the Nova Scotia coast of the Bay of Fundy are also attended to by the steamer "Lansdowne" under the direction of the New Brunswick agent but are otherwise under the control of the Nova Scotia agent.

This division is under the charge of Mr. F. J. Harding, agent of the department at St. John, N.B., throughout this division.

The lights, &c., were inspected by Mr. John Kelly, inspector of lights.

There are in this agency, 120 lighthouses, 1 lightship and 12 steam fog alarms.

The number of keepers and engineers in connection with the lighthouses and fog-alarms is as follows:—86 lightkeepers, 7 lightkeepers and engineers of fog-alarms, 5 engineers and 5 assistant engineers—in all 103 persons.

NEW AIDS TO NAVIGATION AND IMPROVEMENTS IN EXISTING AIDS.

Green Head, St. John River.

A new lighthouse has been erected at Green Head, 24 feet east of the site formerly occupied by the old light on a mast, which is now discontinued.

The lighthouse is a white, square wooden building 50 feet high, situated 105 feet above high water mark. The illuminating apparatus is dioptric, the light being fixed white, elevated 150 feet above the surface of the water and visible 10 miles from all points of approach by water.

The work was done under contract by Mr. G. W. Palmer, the lowest bidder, his contract price being \$579.

Change in Lighthouse at Palmer's Landing.

A lighthouse tower was erected on the new government wharf at Palmer's Landing, on the River St. John, and the light put in operation on the 6th August, 1895.

The tower stands near the end of the pier, 1,200 feet north from the position of the temporary light on the old pier.

The tower is a white, square, wooden building, 28 feet high from the base to the vane on the lantern. The deck of the wharf is 13 feet above low water.

The illuminating apparatus is dioptric and the light is fixed white, elevated 34 feet above high water mark, and is visible 11 miles from all points of approach.

The work of erecting the new building was done under contract by Messrs G W. and B. R. Palmer, the lowest tenders being \$249.

A temporary light on the old wharf was discontinued when this light was put in operation.

Reed's Point Beacon Lights.

The luminant in the three lights shown from a lamp post on Reed's Point in the city of St. John, N.B., has been changed from gas to electricity. A 64-candle power incandescent lamp has been placed in each of the three street lanterns heretofore used. In case of any accident happening to the electric supply, illumination by gas will be temporarily resumed.

The lights have given good satisfaction since the change. The cost of maintaining these lights is \$115.00 per annum.

Shediac Harbour Range Lights.

The positions of the range lights on Pointe du Chêne wharf have been changed to suit a change in the channel, caused by recent dredging.

The front range light, mast and shed, have been moved from the position on the extremity of Point du Chêne North Railway wharf to the north-west corner of the government breakwater, a distance of 358 feet N. E. $\frac{3}{8}$ N. from the former position, and the back range light mast and shed on the extremity of the South Railway Wharf, moved $23\frac{1}{2}$ feet S. E. $\frac{3}{8}$ E., or at right angles to the line of range, from the former position.

The southern building was raised some 2 feet 6 inches, and the northern was raised about 3 feet, and a new foundation, as also an ice break, built to protect them from the ice flow.

Two new range lights were erected during the year, on lands owned by Jude Landry and Thaddy Gould, about a mile and a half from Point du Chêne Wharf towards Cape Brulé.

Marine and Fisheries—Fisheries Branch.

On vessels crossing the range of these new lights, it is safe to stand in towards the Shediac Island Beacons, to clear the Zephyr Rock, which was the object in placing them there.

The masts and sheds at the base were built by Dossity White, at a cost of \$63.

Change in Front Range Light at Neguac.—The front range light at Neguac wharf was removed from the mast and shed on the north-west of the old block at the outer end of the public wharf to a new mast and shed erected beside the roadway of the wharf 45 feet south-west from the old one.

The light is shown from a height of 25 feet above high water mark.

Range Light at Neguac Gully.

Owing to the shifting of the channel at Neguac Gully, it was found desirable to re-light the former front range light, which was discontinued in 1894, on the 28th October, 1896.

It is a fixed red light, hoisted on a mast, with a white shed at its base. The illuminating apparatus is catoptric.

The mast stands 900 feet south by west from the main light and the alignment guides to the buoy marking the crossing of the outer bar, also gives the middle of the channel and clears south and north bars.

Change in arrangement of Lights at North Tracadie Gully.

The channel over the bar at North Tracadie Gully which was indicated by range lights on the south side of the gully, made south last summer to such an extent that it was necessary to remove the range light to the north side of the channel.

The main light is now established in a cribwork block on a low sand flat about 1,200 feet inside the north beach and the front light mast and shed on piles 203 feet S. 41° E. from the main light. The two lights in one lead over the bar at the best crossing.

South Tracadie Gully.

The channel over the bar at South Tracadie Gully has been changed by the action of the sea and is about 300 feet south of its former position.

As the range lights could not be placed so that they would lead through the new channel, the outer range light has been extinguished and the fixed red light which was formerly the back range light continues to be maintained as a coast light.

The outer end of the government wharf at Hillsborough, on the Petitcodiac River, was so badly damaged that the small frame lighthouse tower upon it could no longer be used.

The fixed white light shown therefrom has in consequence been discontinued.

CHANGE IN COLOURS OF HARBOUR LIGHTS AT ST. JOHN.

On the 1st May, 1896, the beacon light on the point of the bar, on the west side of the channel in St. John Harbour, was changed from fixed white to fixed red, and the light on the end of the government breakwater at Negro Point was changed from fixed red to fixed white.

In other respects, the lights remained unaltered.

This change was made owing to the difficulty of distinguishing the beacon light from the electric lights about the city of St. John.

REPAIRS TO EXISTING STATIONS.

St. John Beacon Light.

The southern side of the roof of the dwelling was re-shingled; new lead placed in the angle of roof; a number of planks were also placed in the block and a few planks on the deck.

Beaver Harbour Light.

Two of the reflectors in use and two extra reflectors were re-silvered at this station at a cost of \$30. The lamps were repaired at a cost of \$30.

Repairs amounting to \$26.88 were also made during the year.

Big Duck Island Fog-alarm.

A new boiler was placed at this station in June last. It was made by Messrs. Carrier, Lainé & Co., at a cost of \$1,386.17. A new set of tubes was put in old boiler in January last.

A small addition was attached to dwelling house for keeper, 21 feet with 16 feet posts, pitched roof, shingled and plastered, two stories high, and containing 5 rooms, at a cost of \$400.

Bliss Island Light.

The lantern and deck were painted. The chimneys in dwelling were re-topped and one of the ceilings in dwelling plastered.

Cape Enragé Fog-alarm and Light.

The pump was repaired. A new roof has been put on north side of the barn, the same having been blown off in a heavy gale.

Cape Jourmain Light.

The clockwork has been repaired by Mr. Alfred Thériault, who was sent from Ottawa. The lantern was also painted.

Cassie's Point Light

The clockwork of revolving light has been repaired and all made good by Mr. Alfred Thériault.

Marine and Fisheries—Fisheries Branch.

Escuminac Light and Fog-alarm.

Considerable repairs were made to the tower, it having been found to be rotten.

Five pieces of timber 4 feet long, 14 inches square were placed in the tower, also two pieces of new sills, and the building was thoroughly painted.

The fog-alarm station was re-shingled and painted outside.

The barns and outhouses were re-shingled, thoroughly repaired and white-washed.

An iron pipe $2\frac{1}{2}$ inches was laid further up the marsh, some 120 feet, in order to make the supply to the reservoir more complete, the engineer doing most of the work.

Gannet Rock Light.

Two new ladders were placed on the western side, and a small blacksmith shop 17 feet square built.

The building for the electrical battery being found too small, it was enlarged four feet each way. The platform around the dwelling was also enlarged, by building an abutment 32 ft. by 27 ft. and planked over with two-inch spruce deals.

The dwelling had new floors laid, in two of the rooms the ceilings were sheathed and repairs made on two of the tower rooms.

The tramway was replanked and new railing was partly built around the platform. The stonework was pointed up, and all the buildings whitewashed.

Goose Lake Light.

The revolving apparatus was overhauled by Mr. A. Thériault of Ottawa. A new canvas deck was placed on lantern landing. A new floor was laid in dwelling. The yard and adjoining buildings were bushed to keep sand from blowing away and undermining the buildings.

Grand Harbour Light.

The stone walls of the building were found to be much decayed and broken and were repaired by Robert Bell, the cost for labour, three casks of cement being used in the repairs, was \$21.75.

Grand Manan Fog-alarm Station.

A new set of tubes was placed in large boiler. The reservoir at the fog station as also that at the dwelling house have been renewed with brick. The work was performed by Robert Bell, the cost of mason and helpers amounting to \$51.25.

A new wooden spout was placed around the dwelling.

Hay Island Light.

A new dwelling for the keeper has been erected at this station at a cost of \$100.49.

The building is 20 feet by 14 feet with 8 ft. posts and pitch roof. The work was done by the keeper.

Head Harbour Light and Fog-alarm.

The wooden tramway at the light station carried away by the storm last fall was repaired by the keeper and his assistant, the labour costing \$10.00. The boathouse on the wharf was removed some 20 feet and placed in a more secure position. One tier of timber was placed on same and the planking renewed with two-inch spruce planks, and the stairs leading up to the same repaired.

The tramway at the fog-alarm station had for some 94 feet been carried away. The keeper and his assistant renewed it at a cost of \$10. The boathouse was carried away from the posts, and new posts had to be put in, as also one sill. The roof was shingled in part, and the old shingles renailed. The material for these repairs was on hand.

New timber and planking were laid on the wharf and breakwater, and new ballast placed therein to make them more substantial.

New tubes were placed in one of the boilers.

A new coal shed, 20 by 16 feet, with 12 ft. posts was built.

All the work at this station was performed by the keeper and his assistant.

Lightship "Jennie" Miramichi Bay.

This vessel was painted red from rail to water-line, and the inside of bulwarks painted white, as also the boat's masts. The house had two coats of white paint.

The bottom was scraped and caulked where necessary and then painted with copper paint. New water ways, fifty feet long were placed on the port side. Fifteen fathoms of chain was supplied and twenty fathoms of rope for lantern halyards. Four new lanterns were supplied the ship.

Machias Seal Island Light and Fog-alarm.

The old tramway made of 8 by 10 inch timber with cross pieces every 6 feet having been carried away during the winter, an iron tramway was built, 210 feet long, with a width of 5 feet 1 inch between the rails, and 42 clasps 5½ inches wide rivetted with six ½ bolts in each clasp, and bolts in rock of various sizes and lengths with eyes on end to receive the clasps. The whole cost of the work was \$558.41. The work was all done by day's work under the supervision of the inspector of lights. A blacksmith shop was built at the station 18 feet by 13 feet for doing the work.

The western lighthouse tower had two knees placed on inside of southern face, and a part of the floor was also renewed. The porch received new sills and floor.

The engine house had new sills placed under the door and cap. One of the reservoirs was deepened. The machinery was repaired, cleaned and painted. The dwelling was repaired and a new drain was laid from the dwelling to the bank. About 36 rods of new fencing was erected, and the barn was re-shingled. A new boat was also furnished at a cost of \$50.

Miscou Fog-alarm and Light.

The revolving apparatus was repaired by Mr. Thériault, of Ottawa.

One new sill was placed under the coal shed, and new blocking placed under the sills.

Marine and Fisheries—Fisheries Branch.

Partridge Island Light, Signal Station and Fog-alarm.

At the lighthouse a new floor of spruce planed boards was laid, and an oil rack and coal bin made.

At the signal station the old railing and platform around the flag staff was removed. A new platform 10 ft. long by 6 ft. wide and 7 ft. high above the ground was rebuilt, fastening it to sides of signal station with scantling and deal, and a board floor laid and a railing put around same.

At the dwelling a new floor of spruce planed boards was laid in kitchen and sheathing placed around the walls. Made a drain from kitchen sink to bank, and removed rock from side of roadway to allow team to pass. The whole cost including stock and labour, amounted to \$185.57.

At the fog-alarm, removed the railing on the top of the roof of the engine house, covered the hip of same with zinc 7 inches wide and 60 feet in length, repaired the lead flashings around steam pipe on roof leading to whistle, and new coverings to hatchway in roof of building, with the hanging of four new doors leading to the boiler room.

Built new shed 12 by 18 feet at opening of large door of boiler room.

A new boiler was placed this year by Messrs. D. McLachlan & Sons, boiler makers.

Removed the old covering and sides of the reservoir at the whistle house, and placed 6 new stringers 27 feet long 8 by 7 inches; removed the earth to receive the same on bank, and covered it with 2,000 feet of 3-inch spruce deal.

All the buildings were painted.

Passamaquoddy Bay Light.

The stairs at the landing having been carried away during last winter, new iron ladders were built 27 feet long 3 feet 1 inch wide, with iron sides $5\frac{1}{2}$ inches thick, with steps in same to the first landing, securely bolted and fastened to the block; and then, proceeding to the upper landing, had an iron ladder from upper to lower landing. The deck was newly planked and a new railing placed around same. Iron hand-rails were placed on the ladders. The carpenter work was all done by the keeper.

The block trestle-work and all the rooms in the dwelling house were white-washed and two rooms papered.

Pea Point Light.

Two of the reflectors were re-silvered.

The cellar floor was cemented and a drain made from cellar.

Point Lepreau Fog-alarm.

The boilers and machinery have been thoroughly overhauled.

Pokemouche Light.

New sills were placed on the range light and the walk replanked, and a new railing placed on same.

Quaco fog alarm and light.

The roof of the dwelling house has been partly shingled and new lead laid in the gutter. The lead on the lantern has been raised and replaced partly with new lead.

The dwelling house and the lighthouse have been painted. The roof of the lantern was repaired at a cost of \$36.45.

The fog-alarm has been painted. A new boiler made by Carrier, Lainé & Co. of Quebec, has been placed in this station. 20 new tubes have been placed in the old boiler.

The floor of the landing of the derrick has been relaid with new material, the deals and one of the davits being replaced. A new pair of ladders was placed from lower to upper landing.

A new coal shed was built at a cost of \$65.

South-west Head Light.

The sum of \$25 was paid for the repairing of the road leading to the station from Seal Cove.

A new top or inside covering of iron was placed on inside of the top of lantern by Mr. Gideon Hevenor. The flag pole was destroyed during a storm and \$10 was allowed for repairing it.

Five new lantern glasses were placed in lantern. A new platform was laid in front of premises and new steps leading to dwelling; also a new floor in the barn.

Spruce Point Light.

This station has been painted and new canvas placed on roof of tower. The bridge leading to the light has been put in good repair.

Swallow Tail Light.

A new pump was supplied and placed in kitchen of the dwelling house. New planking has been placed around the premises, also new water spouts made, and new sills on southern and western sides of building.

The tranway has been repaired, new sills 8 by 6 inches, and new deals laid to the derrick platform for a distance of about 100 feet.

New sills and posts have been placed under the boathouse. The cost of the above repairs was \$82.50 on labour and \$51.54 for lumber.

In addition to these repairs, ordinary repairs and replacing of supplies were made and painting done wherever required.

BUOY SERVICE.

The buoys in the several ports under the control of the New Brunswick agency have been very satisfactorily maintained, the work in most all the ports being done by contract, under the supervision of the harbour masters.

The coast buoys of both the Nova Scotia and New Brunswick districts were attended to by the steamer "Lansdowne".

Marine and Fisheries—Fisheries Branch.

List of Coast Buoys.

Blond Rock.....	Automatic.....	Nova Scotia.....	Black.
John's Ledge.....	Bell.....	do	Red.
Old Woman.....	Can.....	do	Red.
Old Man.....	Can.....	do	Black.
Pease's Ledge.....	Can.....	do	Red.
Yarmouth Fairway, S. W.	Automatic.....	do	Black and White.
Yarmouth Fairway, N. W.	Automatic.....	do	Red.
Yarmouth Fairway.....	Bell.....	do	Red.
Roaring Bull.....	Can.....	do	Red.
Trinity Rock.....	Bell.....	do	Red.
North-west Ledge.....	Bell.....	do	Red and Black.
Chebogue.....	Can.....	do	Black.
South Wolf.....	Automatic.....	New Brunswick.....	Black.
Point Lepreaux.....	Automatic.....	do	Black and White.
Split Rock.....	Automatic.....	do	Black.
Black Point.....	Automatic.....	do	Black.
Partridge Island.....	Bell Boat.....	do	Black.
Quaco Reef.....	Bell.....	do	Black.
Quaco Ledge.....	Bell.....	do	Red.
Quaco Shoal.....	Can.....	do	Red.

Bell Buoy Boat off Partridge Island.

The bell buoy boat was brought up to St. John, in November last for repairs, and a bell buoy of the Trinity pattern anchored off Partridge Island in its place.

The buoy was found to be in a very bad state, and only such repairs were made on it to make it last another six months, when it will be given a good overhauling.

Black Point Automatic Buoy.

This buoy was removed and replaced by the steamer "Lansdowne" in the fall of 1895, and on the 3rd June, 1896, the buoy was scraped and painted and the moorings overhauled.

Belle Isle Buoys.

Two spar buoys and two barrel buoys are maintained in the Belle Isle Bay by Mr. G. W. Palmer, under contract. The amount of the contract is \$45 per annum, and expires 1st May next.

One cask buoy and fourteen bush buoys are also maintained by Mr. Israel Nobles, at this place, at a cost of \$20 per annum.

Buctouche Buoys.

Mr. Jacob Babineau who had the contract for placing fifteen buoys left the country last fall. The buoys were placed this spring under the supervision of Mr. John Smith, Mr. Babineau's sureties having authorized him to have the work performed. The amount of contract is \$42.

Mr. Frank LeBlanc's contract, amounting to \$18 per annum, for placing and maintaining about 200 bushes from the bridge at St. Mary's expires on the 28th of June, 1898.

Bathurst Buoys.

Mr. E. D. Chase is the contractor for maintaining twenty-five buoys at this place for the sum of \$150 per annum.

The work has been satisfactorily performed. The contract expires on the 1st of May, 1897.

Beaver and Black's Harbour Buoys.

Nine buoys are maintained at these places by Mr. Philip Hutten at a cost of \$120 per annum. The contract expires on the 1st May, 1898.

Bay du Vin Buoys.

Mr. F. B. Williston maintains four spar buoys at this place, at a cost of \$15 per annum, his contract expires on the 13th of April, 1897.

Bay Verte Buoys.

Mr. Jared S. Silliker is the contractor for maintaining five cask buoys and twenty-five small spar buoys. The amount paid the contractor is \$19 per annum.

The contract expires on the 13th May, 1898.

Chebogue Ledge Can Buoy.

The buoy and moorings were overhauled by the steamer "Lansdowne" on the 30th of November, 1895, and on the 20th May, 1896.

Jemseg Buoys.

Mr. Joshua Colwell who had the contract for this district having left the country, his contract was cancelled on the 22nd of April last and the work of staking the dredge track this season was done under the supervision of the inspector of lights.

Careful attention to replacing the bushes from time to time is required as the track is quite narrow, and bushes and stakes are taken out daily by the rafts, making it necessary to replace them immediately.

Lepreaux Automatic Buoy.

This buoy is removed twice a year by the steamer "Lansdowne." It was removed on the 23rd of May last and another buoy with new moorings anchored in its place.

Old Proprietor Spindle.

An iron spindle marks this dangerous place in the Bay of Fundy.

The American (four-masted) schooner "Gypsum Prince" became a total wreck by striking this ledge.

Marine and Fisheries—Fisheries Branch.

Quaco Buoys.

Three buoys are maintained at this place, two bell and one can buoy. They are lifted every fall, about the 1st December and replaced in the spring about the 1st April.

The work is done by the steamer "Lansdowne."

Richibucto Buoys.

A contract was entered into on the 24th April, 1896, for three years with James L. Legooof for maintaining 28 buoys at this place for the sum of \$200 per annum.

Mr. James Lawson is the contractor for maintaining 30 buoys from Brown's Yard to Kingston Bridge. The amount of the contract is \$90 per annum, and expires 28th April, 1899.

Shediac Buoys.

The work of maintaining the buoys at this place is done under the direction of the harbour master, Mr. D. P. White's contract expiring in May, 1894.

Split Rock Automatic Buoys.

This buoy is removed every fall and spring by the steamer "Lansdowne," and another buoy moored in its place.

Southern Wolf Automatic Buoy.

This buoy was removed last fall and this spring by the "Lansdowne," and another buoy anchored in its place.

The work in connection with the buoys at Caraquette, Cocagne, Head Harbour, Dalhousie, Grand Manan, Grande Anse, Grindstone Island, Kouchibouguac, Letête, Musquash River, Miramichi River, Magaguadavic, Neguac, Napan, Oromocto, Petit Rocher, Pisarinco, Pokemouche, St. John River, Shippegan, St. Andrews, Ste. Croix River, Big Shemogue, Little Shemogue, North and South Tracadie, Washademoak Lake, West Isles and Tynemouth, was all done under contract.

PRINCE EDWARD ISLAND LIGHTHOUSE DIVISION.

This division is under the charge of Mr. Artemus Lord, who is agent of the department at Charlottetown, assisted by Mr. Milton Walsh as foreman of works and warehouseman.

There are in this division 56 lights and 35 stations and 1 steam fog-horn under the charge of 41 keepers. There are 3 automatic whistling buoys and 1 bell buoy. The majority of the lights are situated on headlands and serve the general purposes of navigation, the remainder being harbour lights intended particularly for the benefit of fishermen, 35 harbours in this province are buoyed by the department under contract; the buoys being under the general supervision of the agent.

The work of special inspection and supply of the several lighthouses was done by the agent by the aid of the government schooner "Prince Edward" who on one of his trips was accompanied by Mr. W. P. Anderson, chief engineer of the department.

All the minor repairs and renewing of supplies were done as required at the several stations and the usual painting of the buildings was carried out.

Souris East Breakwater Light,

During a heavy south-west gale in the autumn of 1895, the mast light on the end of the breakwater was carried away, the mast broken, shed demolished and lantern destroyed. On the 4th May last a small light on a low mast was put in operation, but as soon as the new block now being built at the outer end of the breakwater is finished, a more permanent and satisfactory light will be established.

St. Peter's Harbour Lights.

During the past summer the front range light on the government wharf or breakwater was moved from the outer end 18 feet south-westwardly, or shoreward. The outer end of the sloping nose projects into the harbour 40 feet beyond the middle of the tower.

The back range tower was moved north-westwardly along the flat sand beach, and now stands 1,458 feet S. by W. from the front light. In other respects, the two lights have not been changed.

The work of removal was done by Mr. Sennott at a cost of \$70.

Savage Harbour.

The inner range was renewed, the cost for repairs amounting to \$44.45

Summerside Harbour.

The range light in Summerside Harbour put in operation on the 5th September, 1895, was erected, under the personal supervision of Mr. M. Walsh, by day's work, at a total cost of \$225, and considering the height, character of the work and material, it has cost less than others which have been erected by contract. This light, which is fixed red forms a back range for the Summerside wharf light and was erected principally for the use of the mail and passenger steamer "Northumberland," whose captain states the light is all that could be desired, and that the ship is brought in at full speed, irrespective of the condition of the night. The site of this light was purchased from Messrs. John & George Stavart for \$25.

Upon the opening of the back range light, the Summerside wharf light was changed from fixed white to fixed red, and forms with the back range light a direct course from inside Indian Point light, to anchorage off Holman's wharf.

Wright's Range, Crapaud Harbour.

This station is reported to suit admirably for the purpose for which it was erected, that is leading vessels from the eastern end of the basin (inside Tryon Shoal), to anchorage off end of dredged cut to wharf, where a small red light on Palmer's wharf takes up the continuation of the course by being brought in one with the main tower, leading direct up the cut to wharf.

Marine and Fisheries—Marine Branch.

Cascumpec Harbour.

The range lights at Cascumpec Harbour, on the Gulf of St. Lawrence coast of Prince Edward Island, were, on the 11th November, 1896, discontinued, and will not be re-lit until further notice, as they no longer mark the channel through the bar at the mouth of the harbour.

The channel has shifted about $\frac{1}{4}$ mile northwardly from its previous position, and a black spar buoy has been moored on the outer bar in 10 feet water at the new crossing. From this buoy to a red cask buoy off Malones Point the course is about south-west; from Malones Point buoy the course is west, in the alignment of the range light buildings.

Strangers should not attempt to enter Cascumpec Harbour without a pilot, as the depth over the bar in the range of the extinguished lights is only six feet.

Removal of Whistling Buoy from North Point to West Point.

The whistling buoy formerly maintained off North Point was, on the 13th May last, removed to West Point.

The buoy is painted red, with "West Point Buoy, Canada," in white, and is located $\frac{3}{4}$ mile west of the middle of the outer shoal, in 13 fathoms of water.

From the buoy, West Point light bears S. E. by S. $\frac{3}{4}$ mile, and Wolfe Point, E. by S. 5 miles.

The automatic whistling buoy moored off Indian Rocks, in the Straits of Northumberland, which was moved in 1893 to about a mile and a half south-westwardly from its original position, is found to give a better berth to vessels making it from Prim reef buoy or Cape Bear.

BRITISH COLUMBIA LIGHTHOUSE DIVISION.

This division comprises all Canadian waters on the Pacific coast, and is under the charge of Captain James Gaudin, agent of the department at Victoria, who also acts as inspector of lights.

There are in this province 14 light stations, 6 of which are steam fog-alarms, and at 4 others, bells rung by machinery. There are also two beacon lights in Victoria Harbour, and two similar lights in Nanaimo Harbour, which as aids to navigation are highly appreciated.

The lights are in charge of sixteen lightkeepers, some of whom supply assistance out of the salaries allowed.

The lights were supplied by the Dominion steamer "Quadra," Captain J. T. Walbran, master—and the fog-alarm machinery at the several stations receive the annual inspection of the chief of the "Quadra."

NEW AIDS TO NAVIGATION AND IMPROVEMENTS IN EXISTING AIDS.

Carmanah Light, Fog-alarm, Telegraph and Signal Station.

In order to increase the efficiency of the station, a steam whistle was on the 1st July last attached to the fog-alarm boiler at Carmanah Station, to be used in addition to the horn, which will be operated as before, for communicating, in foggy weather, with passing steamers. A private code has been arranged with several steamers. Strangers may communicate with the station by whistle sounds, using the "Morse" or "Continental" telegraphic codes.

Lightkeeper Daykin and his assistants were instrumental in rescuing thirteen men from the wreck of the British SS. "Janet Cowan" last winter and cared for them at the light-house until opportunity offered to take them to Victoria. They also buried the bodies of the master and three seamen, who had been left where they fell by their shipmates.

Race Rocks.

From the 1st July, 1896, in addition to the regular fog-signal, which consists of single blasts of a whistle of five seconds' duration, with intervals of seventy-two seconds between them, a signal of four short blasts in answer to the fog-signal of any steamer enveloped in fog in Juan de Fuca Strait, denotes that the northern portion of the strait is free from fog, it often happening that when there is thick fog in the southern part of the strait, the northern portion is perfectly clear, and in such circumstances, the special signal now arranged enables steamers to clear the fog readily.

Active Pass.

From the 1st June, 1896, the fog-horn was arranged to give blasts of eight seconds' duration, with intervals of 52 seconds between them, that is, one blast per minute.

Portlock Point.

The fog-bell used at Active Pass previously to the establishment of the storm fog-alarm, has been removed to Portlock Point Light Station, where it has been in operation since the 1st September, 1896.

The bell is suspended in a small wooden tower, painted white, located on a low point, 900 feet S. E. from the lighthouse.

The bell is struck by a hammer operated by machinery, and regulated to give one stroke every 15 seconds.

Sand Heads.

Two clumps of piles placed to protect the iron pile foundation from driftwood, and to replace others which disappeared last winter, were driven by the crew of the Dominion steamer "Quadra."

The Sturgeon Bank beacons, off the mouth of the Fraser River, were kept in position by the "Quadra," and replaced, when necessary, the piles for this purpose being supplied by Mr. George Georgeson, of Mayne Island, at five cents per foot, this being the lowest tender.

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North Arm and Canoe Pass channels, leading to the Fraser river, have been marked with piles, and these beacons are a distinct benefit to small local craft.

Mud Bay.

The channels leading from Boundary or Mud Bay to the Serpentine and Nicomekl Rivers, and to Big Slough, have been marked with 39 piles by the crew of the government steamer. This work has given great satisfaction to the farmers of the delta of the Fraser, who, in previous years, had suffered many losses through the unsafe navigation of the channels.

A wooden pile beacon, surmounted by a red ball made of lattice work, and showing 12 feet above high water, has been established at the extreme northern edge of Spanish Bank, at the entrance to Burrard Inlet, replacing the wooden buoy previously moored off the edge of Spanish Bank, which has been withdrawn.

Four beacons, composed of three piles each, braced together at the head, showing 7 to 9 feet above high water, have been erected in Sooke Harbour, on the south coast of Vancouver Island to mark the fairway.

Three pile beacons have been erected at the entrance to Somass River, Alberni Canal, west coast of Vancouver Island, to replace a corresponding number of spar buoys heretofore marking this channel.

Two wooden platform buoys have been placed in Colburne Passage, off the south-east coast of Vancouver Island, one on either side of the fairway between Piers Island and Saanich Peninsula on the route to Cowichan Harbour.

An iron platform buoy, surmounted by a framework of wood in the shape of a cone has been moored on the east side of Governor Rock, Trincomalee Channel.

The No. 1 red buoy marking the western extremity of Robert's Bank, entrance to Fraser River, Strait of Georgia, has been replaced by a wooden beacon composed of three stout piles braced together at the head, painted black and surmounted by a lattice work ball.

The following changes and improvements were made in the buoyage at Baynes Sound :—

The red spar buoy moored off Reef Bluff was replaced by an iron nun buoy.

An additional new iron nun buoy was placed off the West Spit of Reef Bluff.

The west beacon marking the crossing over Kelp Bar, at the north entrance to Baynes Sound was replaced and the two beacons were changed in colour from black to red to conform with the rules governing buoys and beacons.

Notice boards have been established at intervals along the south coast of Vancouver Island between Cape Beale Lighthouse and San Juan Harbour. These boards contain information for the use of shipwrecked mariners on the Pacific coast of Canada, respecting the direction and distance of the nearest lighthouse and also of the nearest Indian village where assistance can be obtained.

The following is a synopsis of the principal repairs and improvements effected at the lighthouse stations in this division during the past season :—

Cape Beale.

Some trees were cleared away at the station for the preservation of the tramway, at a cost of \$40.

Carmanah.

A new set of tubes was put in the boiler of the fog-alarm, and a few minor repairs effected.

Two men were employed for ten days removing large boulders deposited during the winter's gales in the landing, as also some trees, which menaced the safety of some out-buildings, at a cost of \$50.

Race Rocks.

The boat landing which had become blocked up last winter was cleared away at a cost of \$20, one labourer being supplied to the keeper for a period of ten days.

East Point.

Owing to the difficulty in obtaining water for domestic purposes, and to the slight rainfall at this point, it was found necessary to build a tank shed for storing a supply. The necessary material was furnished the keeper, who put up the shed. New boats' ways have been laid to replace the old ones eaten away by teredo.

Point Atkinson Light and Fog-Alarm.

The foundations of the cylinders of the fog-alarm which were completely rotted away, were replaced last spring by the engineer of the "Quadra."

BUOYS AND BEACONS.

There are about 300 harbours, bays and sections of rivers buoyed in the Dominion of Canada. In most cases contracts for a period of three years are entered into to maintain the buoy service. In some instances the buoys are placed by the harbour masters, who furnish accounts to the department for the work done and material supplied.

The large whistling and bell buoys maintained off the coast of Nova Scotia, New Brunswick, British Columbia and Prince Edward Island are attended to by Dominion steamers. The gas and other buoys above and below Quebec in the Quebec agency are also maintained by government steamers, but occasionally tugs are employed when the steamers are not available. The large coast buoys maintained by the government steamers are specially referred to under the heading of each lighthouse division.

The expenditure in connection with the buoy service for the year ended 30th June, 1896, was as follows:—

For the province of Quebec, including port of Montreal....	\$18,434 41
Above Montreal, including Ontario.....	7,200 82
New Brunswick.....	7,996 64
Nova Scotia.....	8,204 87
British Columbia.....	4,774 22
Prince Edward Island.....	2,684 84
Total.....	\$49,295 80

This includes the expenditure incurred in the construction of new automatic buoys.

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OIL FOR THE USE OF LIGHTHOUSES.

The oil for lighthouse purposes has been purchased from the Imperial Oil Company of Petrolia, by contract, which was entered into on the 23rd March, 1896, for a period of one year.

The quantity of oil supplied to the lights above Montreal by the Imperial Oil Company during the year 1896 was 24,897 gallons, imperial measure, which cost \$4,444.46; to the lights in the Quebec district 26,019 gallons, which cost \$4,711.98; to the Nova Scotia district 31,050 gallons, costing \$6,986.25; to the New Brunswick district 5,400 gallons, costing \$1,201.50; to the Prince Edward Island district 6,300 gallons, which cost \$1,464.75, making the total quantity purchased from the Imperial Oil Company 93,966 gallons, and the total cost \$18,808.94. In addition to this the department purchased from the Standard Oil Company of New York 1,600 gallons of American oil for the New Brunswick district at a cost of 18½ cents per gallon; in New York, for the Nova Scotia district 5,000 gallons, at a cost of 18½ cents per gallon; for the district above Montreal 1,300 gallons, at the same price, in New York. The freight was paid by the department.

The total quantity of American oil purchased was 7,900 gallons, wine measure. The quantity purchased for British Columbia to date is 4,500 gallons of American oil at 22 cents per gallon.

The list of prices according to contract with the Imperial Oil Company is as follows:—

Delivered at	Per gallon in barrels.	Per gallon in cases.
	Cents.	Cents.
Sarnia.....	15½	20
Hamilton.....	16½	21½
Kingston.....	16½	21½
Montreal.....	17	21½
Quebec.....	17½	22½
St. John, N.B.....	17½	22½
Pictou, N.S.....	18½	23½
Halifax.....	17½	22½
Charlottetown.....	18½	23½

COST OF MAINTAINING LIGHTHOUSES AND DOMINION STEAMERS.

The following comparative statement shows the expenditure on account of maintenance of lighthouses and steam fog-whistles from the years 1883-84 to 1895-96, both inclusive. The method of auditing all accounts in the department before payment has been followed of late years:—

Year.	Number of Lights.	Number of Fog-whistles.	Number of Fog-horns, Bells and Bombs.	Cost of Maintenance.
				\$ cts.
1883-84.....	579	23	10	456,868 33
1884-85.....	617	23	12	478,064 04
1885-86.....	625	23	16	505,929 27
1886-87.....	658	23	24	476,514 44
1887-88.....	664	23	27	464,471 76
1888-89.....	675	24	29	459,423 80
1889-90.....	705	23	32	434,802 10
1890-91.....	710	23	31	455,254 42
1891-92.....	741	22	56	445,140 16
1892-93.....	747	22	56	480,553 52
1893-94.....	755	22	58	470,549 27
1894-95.....	769	22	59	457,547 81
1895-96.....	766	22	60	442,701 96

DOMINION STEAMERS.

"NEWFIELD."

The "Newfield" was employed from the 1st of July to the 2nd of September, 1895, in lighthouse and buoy work. On the 2nd September, a load of ponies was taken on board at Sable Island and landed at Halifax on the 4th of the same month. It is usual for this steamer to be employed in laying cable for the Public Works Department, and on the 6th of September, the steamer took on board cable and gear and proceeded to lay the cable, and was engaged in this work until the 25th of November. Stores were placed on board and the vessel proceeded to Sable Island. The "Newfield" remained in commission during the winter and was engaged in overhauling and repairing coast buoys and delivering coal to fog-alarms. In April the steamer was laid up at the wharf at Halifax for general repairs, which were made by the crew assisted by mechanics. On the 6th May, the "Newfield" again took on board supplies for Sable Island and was afterward engaged in lighthouse and buoy-work, while at intervals, painting and other work was done at Halifax and the usual work resumed until the end of the fiscal year.

"ABERDEEN."

This steamer from the 1st of July, 1895, was engaged in the Quebec agency for two months in supplying light and fog-alarm stations in the River and Gulf of St. Lawrence, including the Straits of Belle Isle. After her return to Halifax, lighthouse supply work was performed and a trip made to Sable Island. The steamer proceeded on the 25th of September to Quebec for the purpose of delivering supplies to various lighthouses in the Quebec agency, calling on her way at Miscou, on the north

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shore of New Brunswick, to land materials. The "Aberdeen" returned to Halifax in November, and was employed in lighthouse inspection service till put out of commission in the latter part of December. Repairs were made to the machinery during the winter months under the inspection of Mr. Douglas Stevens. The vessel was again put into commission and entered the fishery protection service about the 18th May. Several weeks protection work was done by this steamer of a valuable nature, and she again was employed in lighthouse and buoy service until late in June, when she proceeded to Quebec for the St. Lawrence River and Gulf work.

"STANLEY."

This steamer was engaged in fishery protection service during the summer of 1895, and was relieved from that work in November in order to make repairs as usual, before entering upon the winter service. In November the large buoys near Cape Tormentine and on the coast of Prince Edward Island were lifted and conveyed to Charlottetown, to be stored for winter. The "Stanley" entered upon the winter mail service as usual on the 1st of December, 1895, between Charlottetown and Pictou, and remained on that route until the 6th of January, 1896. The vessel entered upon the Georgetown-Pictou route on the 6th of January, 1896, and continued up to the 25th of February, when she was laid up to clean her boilers, having made from date of starting 47 round trips.

On the 9th March the "Stanley" resumed her trips between Georgetown and Pictou, and continued until the 11th April when she returned to Charlottetown and remained on the route between that port and Pictou until the 30th of April, having made during the winter 81 round trips. Her earnings for the season were \$11,039.94.

"LANSDOWNE."

The "Lansdowne" for a length of time was engaged in lighthouse and coast buoy service, then she entered upon tidal survey service which was ended in October, 1895. The steamer was then engaged in lighthouse inspection and buoy service, and went into winter quarters on the 7th December, 1895. During the winter the "Lansdowne" was extensively repaired. The vessel was thoroughly caulked and her bottom received two coats of copper paint. The cabin, state-rooms, mess-room, square and dardanelles were all painted and also the hull of the ship inside and outside. Repairs were also made to the machinery under the superintendence of the chief engineer.

On the 13th May the steamer took on board supplies for Machias Seal Island, and was engaged in lighthouse inspection and delivery of supplies until the 22nd of June, 1896, when supplies were placed on board for the tidal survey. This service was entered upon on the 24th June, 1896.

"QUADRA."

This vessel was continuously employed in lighthouse and buoy work until the 25th of October when an accident occurred. When coming down Haro channel in foggy weather she ran on Fulford Reef for upwards of half her length. The vessel was pulled off the reef by tugs employed by the department with considerable difficulty. Fortunately the vessel did not sustain injury of a nature to prevent her from

continuing the work of placing buoys. The "Quadra" was docked on the 12th of December, and tenders were invited for repairs. These repairs were effected for the sum of \$5,000, the cost of taking the steamer off of the reef formed a separate charge. On the 9th February the "Quadra" was sent in search of two missing vessels reported wrecked, but the search was not successful. The "Quadra," from the beginning of March, was employed in attending to aids to navigation in Colborne passage, the channels leading to the Serpentine and Nicomekl Rivers from Boundary Bay, Canoe Pass and North Arm channels to the Fraser River. The vessel made a cruise lasting eleven days in connection with protection of Canadian sealing vessels. The "Quadra" was despatched to Queen Charlotte Sound, to inquire into alleged infraction of fishery and revenue regulations, and on return was placed in the fishery service for the purpose of planting eastern oysters.

" DRUID."

On the 1st July, 1895, the steamer was engaged in attending to gas buoys which need replenishing occasionally with gas. The "Druid" was employed in various kinds of work, consisting of towing lightships to their positions and in delivering supplies to lighthouses in the River St. Lawrence until the 9th of November, 1895, when the vessel was despatched to raise the gas and other buoys. On the 23rd of November the crew was paid off. The crew was again shipped in April, 1896, and were set at work to make repairs and paint the ship. The vessel entered upon her work on the 29th April, and was engaged in placing lightships and delivering supplies until the 10th June. His Excellency the Governor General and Lady Aberdeen were taken on board and the vessel proceeded around the harbour of Quebec. The vessel was next sent to St. Anne, having on board His Excellency's family. On the 17th the "Druid" resumed her regular work until the 29th June, 1896.

STATEMENT showing cost of maintaining Dominion Steamers from 1884 to 1896.

Year.	Cost of Maintenance.	
	\$	cts.
1883-84.	122,816	25
1884-85.	148,864	26
1885-86.	130,759	83
1886-87.	141,424	42
1887-88.	150,659	19
1888-89.	126,629	33
1889-90.	114,959	20
1890-91.	111,437	03
1891-92.	127,406	28
1892-93.	146,521	77
1893-94.	142,487	42
1894-95.	129,899	80
1895-96.	150,519	41

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The following statement shows the expenditure for maintenance and repairs and the receipts for the fiscal year ended 30th June, 1896 :—

Name.	Repairs.	Mainten- ance.	Total.	Receipts.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
General account.....			810 76	
"Alert".....			4 25	
"Druid".....	5,903 90	9,899 41	15,803 31	
"Newfield".....	4,187 97	21,852 73	26,040 70	5,000 00
"Lansdowne".....	1,910 08	24,636 86	26,546 94	
"Stanley".....	1,883 60	27,537 88	29,421 48	11,039 94
"Quadra".....	5,760 52	23,605 06	29,365 58	
"Aberdeen".....	932 31	21,226 37	22,158 68	
"La Canadienne".....			251 78	
"Sir James Douglas".....			115 93	
			150,519 41	

The expenditure for maintenance of the "La Canadienne" is paid out of the Fishery Protection Service.

Receipts are already deducted from expenditure in connection with "Newfield."

ICE BOAT MAIL SERVICE.

This service began on the 24th January, 1896, when the "Stanley" ceased to make daily trips, and was continued up to the 5th April, 1896, resumed on the 11th April and ended on the 18th of the same month, during which time the following work was performed :—

Number of mail bags carried	4,316,	as against 3,497 in 1895.
Excise baggage carried.	1,019	do 458 do
Express goods carried.....	12	do 67 do
Number of passengers hauled in the boats.	12	do 9 do
Number of strap passengers carried	145	do 77 do

The expenditure for this service was \$7,779.69, and the total earnings amounted to \$357.08.

CERTIFICATES TO MASTERS AND MATES FOREIGN SEA-GOING.

The report of the Chairman of the Board of Examiners of Masters and Mates of sea-going ships for the twelve months ending the 30th June, 1896, will appear as an appendix to this report.

During the fiscal year, it will be seen by reference to the report in the appendix, the Board of Examiners have held meetings for the examination of candidates at the ports of Halifax, N.S., St. John, N.B., Quebec, and Yarmouth, N.S. Seventy-nine candidates presented themselves for examination at the ports named; 71 succeeded in passing, while 8 failed. Of the 71 that passed, 35 received certificates as master and 36 as mate.

The number of candidates who have passed and obtained certificates of competency as master or mate since the Act went into operation, viz.: 16th September, 1871, to the 30th of June, 1896, is 3,213, and the fees paid for these certificates amounted to \$64,432.71.

The amount received for the renewal of certificates during the twelve months ended 30th June, 1896, was \$108.50, and the number renewed 30.

In an appendix to this report will be found a list of all who have obtained certificates of competency and service either as master or mate, during the year ended 30th June, 1896.

INLAND AND COASTING CERTIFICATES.

During the twelve months ended 30th June, 1896, the number of candidates in the Dominion who have passed and obtained masters' certificates of service is 24, and 4 certificates of service have been issued to mates; the amount paid for these certificates was \$102.

The number of certificates of competency as master was 137, as mate 77, and the amount paid for these certificates was \$1,404. The amount received for renewed certificates of competency and service was \$78.50, making a total of \$1,482.50 received from masters' and mates' inland and coasting certificates.

A list of certificates issued during the twelve months ended 30th June, 1896, will be found in the supplement to this report.

The total amount of fees received on account of certificates of competency and service, sea-going and inland and coasting, during the fiscal year ended 30th June, 1896, amounted to \$2,307.50, and the amount in detail expended on account of the service will be seen by reference to Appendix No. 1 to this report was \$4,062.82. The vote for this service was \$5,000, and the sum expended to the 30th June, 1896, \$4,062.82, leaving an unexpended balance of \$937.18.

The following statement shows the total receipts and expenditure on account of masters and mates since 1871 :—

	Expenditure.		Receipts.	
	\$	cts.	\$	cts.
For the fiscal year ended 30th June, 1871	1,410	45		
do do 1872	4,312	07	1,344	00
do do 1873	6,466	18	4,963	00
do do 1874	4,520	19	2,995	00
do do 1875	5,696	62	2,715	00
do do 1876	4,672	08	2,021	87
do do 1877	4,050	00	1,740	50
do do 1878	4,249	76	1,296	50
do do 1879	4,250	12	1,334	50
do do 1880	4,253	43	1,547	00
do do 1881	3,888	41	1,333	50
do do 1882	3,965	19	1,152	50
do do 1883	4,021	20	1,314	00
do do 1884	3,909	59	9,437	50
do do 1885	4,324	15	2,897	00
do do 1886	5,245	28	2,152	00
do do 1887	4,855	98	2,172	00
do do 1888	5,060	96	3,220	80
do do 1889	4,381	04	2,202	00
do do 1890	4,117	83	2,186	00
do do 1891	4,255	24	2,586	00
do do 1892	4,363	88	2,194	00
do do 1893	4,116	99	2,484	00
do do 1894	3,721	33	2,907	04
do do 1895	3,758	29	3,974	50
do do 1896	4,062	82	2,307	50
Expenditure	111,929	08	64,432	71
Receipts	64,432	71		
Excess of expenditure over receipts	47,496	37		

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WRECKS AND CASUALTIES.

The total number of casualties to British and Canadian sea-going vessels reported to the department, as having occurred in Canadian waters and to Canadian sea-going vessels in waters other than those of Canada, during the twelve months ended 30th June, 1896, was 273, representing a tonnage of 98,424 tons register, and the amount of loss both partial and total, to vessel and cargoes as far as ascertained, was \$1,236,761. The number of casualties to inland vessels was 21, tonnage 5,408, loss \$105,320.

The number of lives reported lost in connection with these casualties was 43. A statement of the wrecks and casualties forms an appendix to this report.

SICK AND DISTRESSED MARINERS.

Under the provisions of chapter 76, Revised Statutes, a duty of two cents per ton register is levied on every vessel arriving in any port in the province of Quebec, Nova Scotia, New Brunswick, Prince Edward Island and British Columbia, the money thus collected forming the Sick Mariners' Fund. Vessels of the burden of 100 tons and less pay the duty once in each calendar year, and vessels of more than 100 tons, three times in each year.

By an amendment of this Act passed at the session of Parliament in 1886, 50-51 Victoria, chapter 40, it is provided that no vessel which is not registered in Canada and which is employed exclusively in fishing or on a fishing voyage, shall be subject to the payment of this duty.

The receipts for the fiscal year ended 30th June last amounted to \$45,751.61, being an increase of \$2,935.87 as compared with the preceding year. The increase or decrease in receipts for sick mariners' dues in the various provinces were as follows:—Nova Scotia, increase, \$97.76; Quebec, increase \$2,202.33; New Brunswick, increase \$854.58; Prince Edward Island, decrease \$170.92; British Columbia, decrease \$65.88.

The Sick Mariners' Act does not apply to the province of Ontario, and consequently no dues are collected from vessels in that province, although a small expenditure is incurred on account of sick seamen. An appropriation is made by Parliament to cover the expenditure at Kingston and St. Catharines, where general hospitals have been established and sick seamen are attended. During the fiscal year ended 30th June sick seamen were paid for at a per diem rate of 90 cents. The amount paid to St. Catharines Hospital was \$320.40 for attendance on 8 sick seamen for 356 days.

In the province of Quebec the expenditure on account of sick seamen amounted to \$6,797.92, being \$738.26 more than the previous year. The total collections for the entire province amounted to \$13,489.66, being \$2,202.33 more than the previous year.

At the port of Montreal sick seamen are cared for at the general hospital and at Notre Dame hospital, under an arrangement made by the department, by which 90 cents per diem is paid for board and medical attendance of each seaman. The number of seamen admitted to the Montreal general hospital was 122, and the number of days during which they received treatment and board was 560. The

total cost, including ambulance hire, being \$504. The amount paid the Notre Dame Hospital was \$853.20, for the treatment of 136 sick seamen, for a total number of 948 days.

Chicoutimi hospital received 14 seamen to whom medical treatment and board were given at a cost of \$561.60. The sick mariners' dues collected at the port of Montreal during the fiscal year ended 30th June amounted to \$3,370.60.

At the port of Quebec sick seamen were cared for at the Jeffery Hale and the Hotel Dieu hospitals, the sum of 90 cents per diem for each seaman is allowed in return for medical attendance and board. The sum paid the Jeffery Hale hospital was \$1,851.30, where 116 men received treatment for a total number of 2,057 days. The sum of \$363.60 was paid the Hotel Dieu hospital for attendance of 16 seamen 404 days. At the Hotel Dieu de Lévis 6 seamen were treated 366 days at a cost of \$329.40. The sick mariners' dues collected at Quebec amounted to \$7,277.38.

The expenditure on account of sick seamen in the province of New Brunswick for the fiscal year amounted to \$4,961.92, being \$2,017.50 less than the preceeding year, and the collection of dues to \$10,027.30, or \$854.58 more than the previous year. Marine hospitals have been maintained at Miramichi, Richibucto and Bathurst.

At the general public hospital at St. John, 109 seamen were treated 1,556 days at a cost of \$1,400.40.

At Miramichi 46 seamen were admitted and received treatment 990 days at a cost of \$424 72.

At Richibucto, 2 seamen were admitted and received treatment for 26 days. The cost of maintaining the hospital was \$11.14.

At Bathurst 9 seamen were in hospital 391 days. The cost of maintaining the hospital during the year was \$198.50.

The St. Andrew's hospital is in charge of a matron, who is allowed to charge \$3 per week for boarding sick seamen. No salaries are paid in connection with the maintenance of hospital. At the port of St. Andrew's the expenditure was \$100.

The Sackville hospital has been leased to Mr. Bradford Carter for a term of years from 1892, at a nominal rental. The terms of the lease require Mr. Carter to keep the buildings in repair, and if the department should require the hospital at any time, it is to be handed over on notice being given.

In the province of Nova Scotia, marine hospitals are maintained at the ports of Yarmouth, Pictou, Sydney, Lunenburg and Point Tupper. The total expenditure on account of sick seamen in the province of Nova Scotia, for the fiscal year, amounted to \$14,120.96, and the receipts to \$15,129.23.

The marine hospital at Yarmouth is located at Bunker's Island. Thirty-one seamen were admitted during the year ended 30th June, who were treated 677 days, the expenditure for this purpose being \$290.20.

At Halifax provision is made for the care of sick seamen at the Victoria general hospital, under arrangements made with the managers, by which the sum of 90 cents per diem is allowed for board and medical attendance to sick seamen. The sum paid the managers of the hospital for board and medical treatment during

Marine and Fisheries—Marine Branch.

the past fiscal year was \$3,195. The number admitted was 207, and the number of days for which treatment is charged is 3,546.

At Lunenburg, 28 seamen were admitted and received medical treatment 733 days, the cost of maintaining the hospital being \$314.55.

At Pictou 17 seamen were admitted to the hospital, their total treatment being for 319 days. The sum paid in connection with maintaining the hospital was \$136.71.

At Sydney 54 seamen received medical treatment, the total number of days being 621, and the amount expended in maintaining the hospital was \$266.18.

At Point Tupper 15 seamen were admitted to the hospital, the total number of days for which they received treatment being 201, and the amount expended in connection with keeping the hospital was \$86.15.

In the province of Prince Edward Island the amount expended on account of sick and disabled seamen during the fiscal year was \$1,705.88, and the receipts from sick mariners' dues were \$271.32.

Sick seamen are cared for at the Charlottetown and Prince Edward Island hospitals, under arrangements made with the managers of these institutions, at the same rate that is paid to the public hospitals in other parts of the Dominion.

The Charlottetown hospital admitted 22 sick seamen, giving them treatment for 1,106 days; the amount paid was \$995.40.

At Prince Edward Island hospital 7 men received medical treatment for a total number of 111 days. The sum of \$99.90 was paid to the managers for the fiscal year ended 30th June.

In the province of British Columbia the sum of \$5,803.49 was expended for sick and disabled seamen, while the receipts from the collection of sick mariners' dues amounted to \$2,429.90.

The marine hospital at Victoria has in attendance a medical superintendent with a salary of \$300 per annum, a keeper whose salary is \$500 per annum. He is also allowed a rate of \$5 per week for board and attendance of each seaman. The keeper procures fuel, light, bedding, etc., at his own expense. The number of seamen admitted to the hospital for the past year was 112, and the total number of days during which they received treatment was 1,608, and the sum expended was \$1,643.54.

At ports where no hospitals are established in the provinces of Quebec, Nova Scotia, New Brunswick, British Columbia and Prince Edward Island, sick seamen are cared for under the direction of the chief officer of customs, when the vessels to which the seamen belong have paid dues according to law. A circular to collectors of customs was issued 7th February, 1891, permitting sick seamen to be attended to at the port of arrival of a vessel, provided that the regular dues were previously paid at some port.

During the fiscal year the sum of \$3,049.79 was expended for shipwrecked and destitute seamen, under the provisions of the Sick and Distressed Mariners' Act. Of this sum \$1,718 was paid to Her Majesty's Imperial Government to reimburse expenses incurred in caring for shipwrecked and distressed Canadian seamen in foreign ports.

The total expenditure by this department on account of sick and disabled seamen amounted to \$36,683.36, and the appropriation by Parliament for this service was \$38,500. The dues collected amounted to \$45,726.11. It will be seen that the receipts exceed the expenditure \$9,068.25.

The receipts and expenditure in connection with this service from the year 1869 were as follows:—

	Receipts.	Expenditure.
	\$ cts.	\$ cts.
For the fiscal year ended 30th June, 1869.....	31,353 78	26,987 64
do do 1870.....	31,410 46	27,029 34
do do 1871.....	29,683 41	28,971 22
do do 1872.....	34,911 64	34,947 60
do do 1873.....	37,136 10	41,016 43
do do 1874.....	41,500 16	59,778 90
do do 1875.....	37,801 46	50,684 76
do do 1876.....	41,287 66	48,828 49
do do 1877.....	43,739 21	51,647 94
do do 1878.....	44,665 07	43,780 90
do do 1879.....	37,779 57	42,729 36
do do 1880.....	42,523 20	42,160 91
do do 1881.....	49,779 72	40,667 52
do do 1882.....	45,951 47	39,359 11
do do 1883.....	45,573 42	36,249 65
do do 1884.....	48,667 07	39,553 58
do do 1885.....	39,068 39	44,501 57
do do 1886.....	40,848 05	50,377 62
do do 1887.....	42,334 92	37,447 35
do do 1888.....	41,669 64	36,447 85
do do 1889.....	39,306 29	41,320 59
do do 1890.....	47,881 75	41,729 11
do do 1891.....	43,829 68	35,155 12
do do 1892.....	45,381 92	33,498 83
do do 1893.....	46,190 69	35,052 37
do do 1894.....	49,105 40	38,403 94
do do 1895.....	42,815 74	38,332 55
do do 1896.....	45,751 61	36,683 36
Total.....	1,167,947 48	1,126,350 31
Deduct expenditure from receipts.....	1,126,350 31	
Excess of expenditure over receipts.....	41,597 17	

MERCHANT SHIPPING.

The total number of vessels remaining on the register books of the Dominion on the 31st December, 1896, including old and new vessels, sailing vessels, steamers and barges, was 7,279, measuring 789,299 tons register tonnage, being an increase of 17 vessels and a decrease of 36,537 tons register, as compared with 1895. The number of steamers on the registry books on the same date was 1,762 with a gross tonnage of 251,176 tons. Assuming the average value to be \$30 per ton, the value of the registered tonnage of Canada, on the 31st December last, would be \$23,678,970.

The number of new vessels built and registered in the Dominion of Canada during the last year was 227, measuring 16,146 tons register tonnage. Estimating the value of the new tonnage at \$45 per ton, it gives a total value of \$726,570 for new vessels.

A statement follows, showing the number of vessels and number of tons on the register books at the different ports of registry in the Dominion, on the 31st

Marine and Fisheries—Marine Branch.

ber last, along with a comparative statement of the tonnage from 1873 to 1896. A statement is also published of the number of vessels built and registered in the Dominion during the last year, and a comparative statement of the number of new vessels built and registered from 1874 to 1896, both inclusive.

STATEMENT showing the number of Vessels and number of Tons on the Registry Books of the Dominion of Canada, on the 31st December, 1896.

PROVINCE OF NEW BRUNSWICK.

Name of Port.	Total Number of Sailing Ships and Steamers.	Number of Steamers.	Gross Tonnage of Steamers.	Total Net Tonnage of Sailing Ships and Steamers.
Chatham	355	36	1,689	9,940
Dorchester.....	6			3,370
Moncton	16	1	20	2,708
Richibucto.....	16	2	79	2,772
Sackville	12	2	41	1,094
St. Andrews.....	136	6	2,435	4,351
St. John.....	423	64	7,048	91,271
Total.....	964	111	11,312	115,506

NOVA SCOTIA.

Amherst.....	7			384
Annapolis.....	57	3	85	5,800
Arichat.....	124	1	66	5,196
Barrington.....	54			1,962
Canso.....	2			83
Digby.....	168	5	254	9,100
Guysboro'.....	31			1,381
Halifax.....	803	58	12,267	44,173
Liverpool.....	84	3	178	5,561
Lunenburg.....	336	7	387	27,157
Maitland.....	22	1	52	20,960
Parrsboro'.....	141	2	201	31,408
Pictou.....	67	19	1,145	13,144
Port Hawkesbury.....	85	3	43	2,915
Port Medway.....	22	1	45	1,849
Pugwash.....	8			634
Shelburne.....	104	2	83	5,835
Sydney.....	106	8	604	5,003
Truro.....	3			860
Weymouth.....	40	2	175	3,347
Windsor.....	143	11	2,388	88,805
Yarmouth.....	262	18	4,107	41,969
Total.....	2,669	144	22,080	317,526

QUEBEC.

Amherst, M. I.	19			675
Gaspé.....	38	1	709	2,189
Montreal.....	525	171	57,117	87,883
New Carlisle.....	12	2	45	242
Percé.....				
Quebec.....	875	130	19,034	67,660
Total.....	1,469	304	76,905	158,649

STATEMENT showing the Number of Vessels and Number of Tons on the Registry Books, &c.—Continued.

ONTARIO.

Name of Port.	Total Number of Sailing Ships and Steamers.	Number of Steamers.	Gross Tonnage of Steamers.	Total Net Tonnage of Sailing Ships and Steamers.
Amherstburg.....	2			121
Belleville.....	20	13	556	893
Bowmanville.....	4			752
Brockville.....	29	27	391	432
Chatham.....	28	17	873	1,511
Chippewa.....	3		263	153
Cobourg.....	4	1	15	311
Collingwood.....	66	64	7,188	5,338
Cornwall.....	2	2	172	109
Cramahe.....	2			278
Deseronto.....	18	13	1,383	1,387
Dunnville.....	2	2	204	122
Goderich.....	42	25	689	1,813
Hamilton.....	49	37	4,820	4,741
Kingston.....	197	78	11,606	26,539
Morrisburg.....	3			382
Napanee.....	3			409
Oakville.....	4			295
Ottawa.....	324	179	13,962	25,958
Owen Sound.....	33	31	5,881	4,279
Pictou.....	32	11	1,383	3,330
Port Arthur.....	7	7	2,863	1,845
Port Burwell.....	11	4	41	890
Port Colborne.....	6	2	95	681
Port Dover.....	18	6	170	976
Port Hope.....	63	37	3,032	5,992
Port Rowan.....	4	1	168	351
Port Stanley.....	12	10	1,311	1,097
Prescott.....	29	15	1,011	4,078
Sarnia.....	29	21	8,391	7,091
Saugeen.....	9	9	388	266
Sault Ste. Marie.....	15	12	477	851
St. Catharines.....	126	57	8,197	18,509
Toronto.....	242	165	15,869	16,829
Wallaceburg.....	31	17	1,058	2,024
Whitby.....	3			514
Windsor.....	53	27	6,218	5,375
Total.....	1,525	892	98,665	146,522

PRINCE EDWARD ISLAND.

Charlottetown.....	174	21	4,856	16,540
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BRITISH COLUMBIA.

New Westminster.....	90	73	11,100	8,026
Vancouver.....	52	47	3,323	2,506
Victoria.....	221	96	15,711	16,090
Total.....	363	216	30,134	26,622

Marine and Fisheries—Marine Branch.

STATEMENT showing the Number of Vessels and Number of Tons on the Registry Books, &c.—*Concluded.*

MANITOBA.

Name of Port.	Total Number of Sailing Ships and Steamers	Number of Steamers.	Gross Tonnage of Steamers.	Total Net Tonnage of Sailing Ships and Steamers.
Winnipeg.	115	74	7,224	7,934

SUMMARY.

New Brunswick.	964	111	11,312	115,506
Nova Scotia.	2,669	144	22,080	317,526
Quebec.	1,469	304	76,905	158,649
Ontario.	1,525	892	98,665	146,522
Prince Edward Island.	174	21	4,856	16,540
British Columbia.	363	216	30,134	26,622
Manitoba.	115	74	7,224	7,934
Grand total.	7,279	1,762	251,176	789,299

Marine and Fisheries—Marine Branch.

COMPARATIVE STATEMENT showing the Number of Vessels and Number of Tons on the Registry Books, &c.—Concluded.

Provinces.	1889.		1890.		1891.		1892.		1893.		1894.		1895.		1896.	
	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.
New Brunswick	1,013	218,873	981	209,460	969	193,193	946	181,779	1,010	150,086	1,003	136,237	975	122,417	964	115,505
Nova Scotia	2,856	464,431	2,793	464,194	2,778	461,758	2,731	425,690	2,715	396,263	2,710	371,432	2,683	343,356	2,669	317,526
Quebec	1,456	168,500	1,399	164,003	1,404	162,330	1,408	162,638	1,428	161,121	1,427	160,390	1,454	158,776	1,469	138,649
Ontario	1,352	141,839	1,312	138,738	1,345	138,914	1,347	141,750	1,370	146,665	1,480	148,525	1,508	148,609	1,525	146,522
P. E. Island	224	25,506	231	26,080	195	23,316	196	22,706	188	20,970	191	19,650	190	19,323	174	16,540
British Columbia	176	15,241	186	16,024	246	19,797	298	23,448	315	24,900	336	26,455	346	25,988	363	26,622
Manitoba	77	6,091	79	6,475	78	6,197	81	6,118	89	6,534	98	6,715	106	7,307	115	7,934
Total	7,153	1,040,481	6,991	1,024,374	7,015	1,005,475	7,007	964,129	7,113	912,539	7,245	869,624	7,262	825,836	7,279	789,219

LIST of Ports at which Vessels may be Registered, showing the Number of New Vessels Built and Registered in the Dominion of Canada, during the Year ended 31st December, 1896.

PROVINCE OF NEW BRUNSWICK.

Name of Port.	Total Number of Sailing Ships and Steamers.	Number of Steamers.	Gross Tonnage of Steamers.	Total Net Tonnage of Sailing Ships and Steamers.
Chatham.....	16	1	19	216
Dorchester.....				
Moncton.....				
Richibucto.....				
Sackville.....	2			164
St. Andrews.....	2			22
St. John.....	4	1	10	225
Total.....	24	2	29	627

NOVA SCOTIA.

Amherst.....	1			11
Annapolis.....	2			256
Arichat.....	1			10
Barrington.....				
Canso.....				
Digby.....	2			114
Guysboro'.....				
Halifax.....	13	1	35	203
Liverpool.....	6	1	41	570
Lunenburg.....	22			1,901
Maitland.....				
Parrsboro'.....	12			2,452
Pictou.....	2			11
Port Hawkesbury.....	5			256
Port Medway.....				
Pugwash.....	8			634
Shelburne.....	6	1	45	308
Sydney.....	1			51
Truro.....				
Weymouth.....	4			406
Windsor.....	4			246
Yarmouth.....	8	2	88	315
Total.....	97	5	209	7,704

QUEBEC.

Amherst, M. I.	1			8
Gaspe.....				
Montreal.....	15	6	1,819	3,074
New Carlisle.....	1			13
Percé.....				
Quebec.....	19			874
Total.....	36	6	1,819	3,969

ONTARIO.

Amherstburg.....	3	3	36	23
Belleville.....	1	1	13	9
Bowmanville.....				
Brockville.....	3	3	12	9
Chatham.....				
Chippewa.....				
Cobourg.....				

Marine and Fisheries—Marine Branch.

LIST of Ports at which Vessels may be Registered, showing the Number of New Vessels Built and Registered, &c.—Continued.

ONTARIO—Concluded.

Name of Port.	Total Number of Sailing Ships and Steamers.	Number of Steamers.	Gross Tonnage of Steamers.	Total Net Tonnage of Sailing Ships and Steamers.
Collingwood.....	2	2	74	50
Cornwall.....	1	1	20	13
Cramahe.....				
Deseronto.....				
Dunnville.....				
Goderich.....				
Hamilton.....	1	1	24	13
Kingston.....	2	2	230	102
Morrisburg.....				
Napanee.....				
Oakville.....				
Ottawa.....	21	16	742	804
Owen Sound.....				
Picton.....				
Port Arthur.....				
Port Burwell.....	2	1	16	56
Port Colborne.....				
Port Dover.....				
Port Hope.....				
Port Rowan.....				
Port Stanley.....				
Prescott.....				
Sarnia.....				
Saugeen.....				
Sault Ste. Marie.....				
St. Catharines.....				
Toronto.....	2	2	1,277	678
Wallaceburg.....				
Whitby.....				
Windsor.....				
Total.....	38	32	2,444	1,757
PRINCE EDWARD ISLAND.				
Charlottetown.....	3			111
BRITISH COLUMBIA.				
New Westminster.....	10	10	1,267	762
Vancouver.....	5	4	59	68
Victoria.....	7	3	634	636
Total.....	22	17	1,960	1,466
MANITOBA.				
Winnipeg.....	7	7	716	512
SUMMARY.				
New Brunswick.....	24	2	29	627
Nova Scotia.....	97	5	209	7,704
Quebec.....	36	6	1,819	3,969
Ontario.....	38	32	2,444	1,757
P. E. Island.....	3			111
British Columbia.....	22	17	1,960	1,466
Manitoba.....	7	7	716	512
Grand total.....	227	69	7,177	16,146

Marine and Fisheries—Marine Branch.

Canada during the Year ended 31st December, in each year from 1874 to 1896, inclusive.

1879.		1880.		1881.		1882.		1883.		1884.		1885.	
Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.
43	19,067	63	18,896	57	18,259	66	16,820	72	21,103	46	12,888	34	7,736
126	39,208	126	31,257	150	40,465	117	26,711	202	35,765	178	42,032	102	24,703
29	7,421	33	8,219	56	5,673	26	6,785	42	6,594	32	3,815	29	4,556
42	2,464	44	3,610	54	5,111	55	4,369	34	4,311	58	4,446	45	4,509
20	5,279	21	3,359	15	4,351	15	3,508	17	5,343	21	5,189	11	1,707
5	788	.....	.....	2	85	8	1,631	5	849	15	675	6	648
...	.....	1	100	3	116	1	289	2	125	37	3,366	13	320
265	74,227	271	65,441	336	74,060	288	60,113	374	74,090	387	72,411	240	43,179
.....	.....	.....	.....	.....	.....	1	1,029	.....	.....	.....	.....	.....	.....
.....
265	74,227	271	65,441	336	74,060	289	61,142	374	74,090	387	72,411	240	43,179

1891.		1892.		1893.		1894.		1895.		1896.			
43	6,269	21	1,873	119	2,819	40	2,534	27	714	24	627		
130	35,528	105	16,446	111	15,089	128	8,721	89	4,762	97	7,704		
46	4,200	34	2,620	53	4,220	55	4,412	49	4,335	36	3,969		
44	2,662	34	3,684	49	4,126	64	3,137	52	3,732	38	1,757		
5	1,000	9	967	3	634	3	183	1	196	3	111		
41	2,364	46	2,887	19	944	25	1,900	18	1,709	22	1,466		
3	122	6	296	8	608	11	356	14	822	7	512		
312	52,145	285	28,773	362	28,440	326	21,243	250	16,270	227	16,146		
.....
.....
312	52,145	285	28,773	362	28,440	326	21,243	250	16,270	227	16,146		

STEAMBOAT INSPECTION AND CERTIFICATES TO ENGINEERS.

The annual report for the year 1896 of the chairman of the board of inspection forms an appendix to this report. The statement showing certificates granted to engineers of steamboats, together with a list of steam vessels inspected and steam vessels not inspected, number of passengers allowed to be carried in each passenger steamboat, steam vessels added to the list, and steamers lost or laid up or rendered unfit for service during the year, will be printed in the supplement.

The amount received during the last fiscal year on account of tonnage dues, inspection of steamboats and certificate to engineers was \$23,205.67, of which the sum of \$22,488.17 was for tonnage dues and inspection fees, and \$717.50 for certificates to engineers. The expenditure for the fiscal year amounted to \$26,321.27, showing an excess of expenditure over the receipts of \$3,115.60.

The following is a comparative statement of the receipts and expenditure:—

	Receipts.		Expenditures.	
	\$	cts.	\$	cts.
For the fiscal year ended 30th June, 1870.....	12,521	29	7,379	18
do do 1871.....	10,369	96	8,321	00
do do 1872.....	11,710	43	8,500	00
do do 1873.....	15,412	75	11,205	54
do do 1874.....	15,603	19	10,291	58
do do 1875.....	15,011	90	12,199	81
do do 1876.....	13,811	24	13,081	86
do do 1877.....	15,858	42	12,073	01
do do 1878.....	12,431	25	13,228	28
do do 1879.....	12,331	16	13,076	46
do do 1880.....	15,424	02	11,854	34
do do 1881.....	16,905	49	12,211	65
do do 1882.....	15,277	78	14,835	97
do do 1883.....	12,577	36	16,209	02
do do 1884.....	15,371	79	21,893	28
do do 1885.....	13,343	66	23,235	04
do do 1886.....	14,087	76	21,775	57
do do 1887.....	12,701	20	22,837	80
do do 1888.....	12,550	14	21,430	45
do do 1889.....	12,576	18	22,313	03
do do 1890.....	19,859	18	20,989	52
do do 1891.....	21,644	72	22,183	76
do do 1892.....	20,994	84	22,736	59
do do 1893.....	25,295	35	24,386	95
do do 1894.....	24,835	47	25,961	36
do do 1895.....	24,630	56	26,385	88
do do 1896.....	24,002	32	26,321	27
	437,188	32	467,938	20
Deduct receipts from expenditure.....			437,188	32
Balance to debit of fund.....			30,749	88

Marine and Fisheries—Marine Branch.

The following list contains the names of the inspectors of boilers and machinery and hulls and equipment of steamboats, viz:—

Name.	Position.	Address.
Edward Adams.....	Chairman of Board of Steamboat Inspection.....	Ottawa.
M. P. McElhinney.....	Inspector of Hulls and Equipments.....	do
I. J. Olive.....	do do.....	St. John, N.B.
S. R. Hill.....	do do.....	Halifax, N.S.
William Evans.....	do do.....	Toronto, Ont.
Thos. Donnelly.....	do do.....	Kingston, Ont.
P. D. Brunelle.....	do do.....	Quebec.
R. Collister.....	do do.....	Victoria, B.C.
John Dodds.....	Inspector of Boilers and Machinery.....	Toronto, Ont.
J. Johnson.....	do do.....	do
T. P. Thompson.....	do do.....	Kingston, Ont.
Wm. Laurie.....	do do.....	Montreal, P.Q.
L. Arpin.....	do do.....	do
J. Sampson.....	do do.....	Quebec, P.Q.
J. P. Esdaile.....	do do.....	Halifax, N.S.
H. L. Waring.....	do do.....	St. John, N.B.
J. A. Thompson.....	do do.....	Victoria, B.C.
G. P. Phillips.....	do do.....	Rat Portage, Ont.

INSIDE SERVICE.

The following comprises the names of officials and employees, engaged in the inside service of the Department of Marine and Fisheries on the 30th June, 1896.

Name.	Rank.	Salary.
		\$ cts.
William Smith.....	Deputy Minister, 10 months.....	3,000 00
F. Gourdeau.....	do 2 months.....	533 33
John Hardie.....	Chief Clerk.....	2,400 00
F. Gourdeau.....	Accountant, 10 months.....	1,911 70
E. E. Prince.....	Commissioner of Fisheries.....	2,000 00
<i>Technical Officers.</i>		
W. P. Anderson.....	Chief Eng., General Supt. Lighthouses and Hydrographic Service.....	2,600 00
W. Bell Dawson.....	.....	2,050 00
W. J. Stewart.....	.....	1,700 00
C. F. Cox.....	.....	1,400 00
B. H. Fraser.....	.....	1,100 00
F. Anderson.....	.....	750 00
J. M. O'Hanly.....	.....	1,100 00
<i>Other Officials.</i>		
W. H. Alexander.....	First class Clerk.....	1,650 00
M. P. McElhinney.....	do.....	1,650 00
A. W. Owen.....	do.....	1,550 00
C. Stanton.....	do.....	1,550 00
J. S. Webster.....	do.....	1,400 00
M. F. Walsh.....	do.....	1,400 00
S. B. Kent.....	Second class Clerk.....	1,400 00
J. B. Halkett.....	do.....	1,400 00
A. H. Bellevue.....	do.....	1,400 00
W. W. Stumbles.....	do.....	1,350 00
V. H. Steel.....	do.....	1,350 00
A. Halkett.....	do.....	1,250 00
F. H. Cunningham.....	do.....	1,250 00
J. A. Murray.....	do.....	1,100 00
T. Aumond.....	Third class Clerk.....	1,000 00
J. McClenaghan.....	do.....	1,000 00
D. C. Campbell.....	do.....	1,000 00
R. Roy.....	do.....	980 00
B. F. Burnett.....	do.....	950 00
M. C. Doyle.....	do.....	900 00
W. A. Mackinson.....	do.....	800 00
A. H. Guion.....	do.....	850 00
J. W. Watson.....	do.....	650 00
J. M. Lalonde.....	do.....	650 00
E. W. Gilbert.....	do.....	600 00
C. W. White.....	do.....	500 00
John McCharles.....	do.....	500 00
J. J. Skelly.....	do.....	400 00
R. Beaulieu.....	do.....	400 00
J. Morin.....	Messenger.....	500 00
R. Archambault.....	do.....	500 00
E. McQuarrie.....	do.....	330 00
M. D. Kelly.....	do.....	300 00

EXTRA CLERKS.

M. Lamouche.....	\$ 2.25 per diem.
R. E. Tyrwhitt.....	600.00 per annum.
W. L. Bance.....	450.00 do

Marine and Fisheries—Marine Branch.

OUTSIDE SERVICE, MARINE BRANCH.

The number of persons employed in the outside service on the 30th June, 1896, was as follows:—

Superintendent of lights and light-keepers, etc., in Ontario and above Montreal.....	175
Officers of agency in the city of Quebec and light-keepers, fog whistle-keepers, crews of light-ships, etc., at and below Montreal, in the province of Quebec.....	173
Agent, clerk, messenger, superintendent of lights, light-keepers, fog-whistle keepers, attendants at humane establishments, etc., in Nova Scotia.....	205
Agent, clerk, messenger, superintendent of lights, light-keepers, fog-whistle keepers, etc., in New Brunswick.	107
Agent, foreman of works, messenger and light-keepers in Prince Edward Island.....	43
Agent and light-keepers in British Columbia.....	16
Officers and crews of Dominion steamers and vessels, including Fisheries Protection Service.....	360
Coxswains of life-boats.....	25
Inspectors of steamboats.....	20
do shipments of live stock.....	3
Examiners of masters and mates, and clerk to chairman of Board.....	17
Officers and servants in marine hospitals.....	23
Shipping masters.....	35
Harbour masters.....	198
Officers of observatories, meteorological observers, etc., receiving pay.....	149
Hydrographers and engineers at Ottawa.....	7
Receivers of wrecks.....	45
Wharfingers.....	135
Making a total of.....	<u>1,736</u>

For the previous year the number was 1,679. In addition to the 1,736 mentioned above there were 70 registrars of shipping, who act under the direction and control of this department, but are, at the same time, collectors of customs at various ports of registration, and receive no salary or fee in their capacity of registrars. There are 93 measurers and surveyors of shipping throughout the Dominion, who act as officers of this department, and are remunerated from their fees of office, although in addition to such office, many of them hold positions in the customs service. Also, in addition to the above, by Orders in Council of the 21st of April and 2nd of December, 1874, the chief officer of customs at each port in the provinces of Quebec, Nova Scotia, New Brunswick, British Columbia and Prince Edward Island, where no separate shipping office has been established, is to be held and deemed a shipping master, is to receive the fees, make the yearly returns to the department, and act in that capacity under its directions.

From the above statement it will be seen that there are 149 officers of observatories, etc., who receive pay for the performance of their duties, but in addition thereto there is a large number of meteorological observers throughout the Dominion who give their services gratuitously.

METEOROLOGICAL SERVICE.

Mr. Stupart, director, in his report states that the usefulness of the service has been increased in several directions. A monthly map has been published during the past year, and meteorological data supplied the director of the Tidal Survey. In addition to the publication of weather forecasts furnished to leading newspapers of the Dominion, besides being posted at about 1,500 telegraph offices in Manitoba, Ontario, Quebec and the Maritime Provinces, a bulletin has been telegraphed each morning at 10.15 to harbour masters and other persons on the lakes and Maritime Provinces. The bulletins have proved very useful and are now posted in about thirty different ports. By reference to the director's report it will be seen that seafaring men and fishermen appreciate the forecasts, and are governed by them to a large extent when storms are predicted.

The demand from persons in Toronto, and at a distance, for special forecasts continue to increase, and in all cases predictions have been furnished at once to those asking for them. Warnings of approaching storms were issued to railways.

The average number of inquiries regarding the weather, by telephone at the Toronto office, is about six per day. The number of inquiries by telegraph regarding the weather, from outside places in direct telegraphic communication with the Toronto office, is about ten per week.

Forty-four stations with voluntary observers were added during the year, making a total of 236.

No charge is made in Canada for inquiries.

The information relating to forecasts is given to the public gratuitously, and a display is made in conspicuous and public places in the various cities of the Dominion, of the forecasts.

MAGNETIC OBSERVATORIES.

The annual reports of the director of the Magnetic Observatory at Toronto, and the observatories at Quebec, Montreal, Kingston and St. John, are annexed to the report on the Meteorological Service. The sum of \$2,747 was expended in connection with the Magnetic Observatory at Toronto, and \$500 each for the observatories at Kingston and Montreal. The total amount expended on account of meteorological and magnetic services for the past fiscal year was \$66,600.29.

COASTING TRADE OF CANADA.

By the provisions of chapter 83, Consolidated Statutes of Canada, being an Act respecting the Coasting Trade of Canada, no goods or passengers can be carried by water from one port in Canada to another except in British ships, but the Governor

Marine and Fisheries—Marine Branch.

in Council may, from time to time, declare that the Act shall not apply to ships or vessels of any foreign country in which British ships are admitted to the coasting trade of such country, and to carry goods and passengers from one port or place to another in such country. The Parliament of Canada was empowered to pass the Act alluded to under the provisions of the Imperial Act, 32 Vic., chap. 11, intituled: "An Act for amending the Law relating to the Coasting Trade and Merchant Shipping in British Possessions," which came into operation in this country on its proclamation by the Governor General on the 23rd October, 1869.

It was ascertained that the following countries, viz., Italy, Germany, the Netherlands, Sweden and Norway, Austro-Hungary, Denmark, Belgium and the Argentine Republic, allowed British ships or vessels to participate in their coasting trade on the same footing as their own national vessels—the ships of Italy by Order in Council of the 13th August, 1873; those of Germany by Order in Council of the 14th May, 1874; those of the Netherlands by Order in Council of the 9th September, 1874; those of Sweden and Norway by Order in Council of the 5th November, 1874; those of Austro-Hungary by Order in Council of the 1st June, 1876; those of Denmark by Order in Council of the 25th January, 1877; those of Belgium by Order in Council of the 30th September, 1879; and those of the Argentine Republic by Order in Council of the 18th May, 1881, were admitted to the coasting trade of Canada.

INSPECTION OF SHIPMENTS OF LIVE STOCK EXPORTED FROM CANADA.

A report from the inspectors forms an appendix to this report. It will be seen that the total number of cattle shipped in 1896 is greater than for the year 1895, the figures being 96,448 cattle for 1896, and 94,972 cattle for 1895.

MESSENGER PIGEONS.

The pigeons were removed from Halifax to Hazelhill in Guysboro' County, in December of last year, and placed under the control of Mr. S. S. Dickinson, Supt. of the Commercial Cable Company. This change was made in order that the flight might be reduced for the birds between the mainland and Sable Island, and that the experiment with the birds may be conducted under the most favourable circumstances. The pigeons have increased in number by careful attention, and it has been found necessary to enlarge the pigeon loft to accommodate the young birds. No experiments in flying were made as the birds hatched at Hazelhill are too young to train this season.

REMOVAL OF OBSTRUCTIONS TO NAVIGATION.

The sum of \$5,000 was appropriated by Parliament for the removal of obstructions to navigation. The sum of \$456.38 was expended.

The schooner "Marie Rose" was sunk in the channel at the mouth of Grand Pabos Harbour, Gaspé Co., Quebec. Tenders were invited and the work of removal was done by contract in a satisfactory way.

CORRESPONDENCE.

The correspondence of the Marine branch has steadily increased from year to year. The letters received during the financial year number about 13,000, not including returns from officers and accounts. The letters sent out numbered about 13,200, not including mere acknowledgments.

LONGITUDE OF MONTREAL.

By reference to reports of previous years it will be seen that arrangements were made for determining the longitude of Montreal. The matter is one of importance and is necessary for the construction of reliable hydrographic and other charts. The report of Professor C. H. McLeod, Superintendent of McGill College Observatory, published as part of Appendix No. 4, contains information respecting the final value of the longitude of Montreal. The following is an extract from the report:

“During the past summer the Astronomer Royal visited Montreal on his way from Japan, having brought with him the completed reductions of Montreal—Greenwich longitude observations, I am able to announce the final value of the longitude of Montreal (the middle point between the two piers of the transit instruments at this observatory) as determined from the observations of Professor H. H. Turner and myself in 1892, as $4^{\text{h}} 54^{\text{m}} 18^{\text{s}}.670$. This quantity is in excess of the old value which was obtained by connection with the United States system of longitudes by $0^{\text{s}}.105$.”

I have the honour to be, sir,
Your most obedient servant,

F. GOURDEAU,
Deputy Minister of Marine and Fisheries.

DEPARTMENT OF MARINE AND FISHERIES,
April, 1896.

Marine and Fisheries—Marine Branch.

APPENDIX No. I.

GENERAL SUMMARY of Expenditure for Fiscal Year ended 30th June, 1896.

Service.	Amount.	Total.
	\$ cts.	\$ cts.
Ocean and River—		
Maintenance and repairs, Dominion steamers.....	150,519 41	
Examination masters and mates.....	4,062 82	
Rewards for saving life.....	8,004 38	
Investigations into wrecks.....	483 98	
Registry of shipping.....	517 60	
Tidal service.....	9,627 45	
Removal of obstructions in navigable rivers.....	456 38	
Winter mail service.....	7,779 69	
		181,451 71
Lighthouse and Coast—		
Salaries and allowance lightkeepers.....	199,348 61	
Agencies, rents and contingencies.....	15,372 14	
Maintenance and repairs to lights.....	225,691 07	
Construction of lights.....	17,662 28	
Signal service.....	5,338 76	
Repairs to wharfs.....	2,644 69	
		466,057 55
Scientific Institutions—		
Observatory, Toronto.....	2,747 97	
do Kingston.....	500 00	
do Montreal.....	500 00	
Meteorological service.....	62,852 32	
Hydrographic surveys.....	15,099 63	
		81,699 92
Marine Hospitals—		
St. Catharines hospital.....	320 40	
Sick and disabled seamen.....	33,313 17	
Shipwrecked and distressed seamen.....	3,049 79	
		36,683 36
St.amboat inspection.....		26,321 27
Salaries, &c., of Fisheries, Overseers and Wardens—		
Ontario.....	24,917 48	
Quebec.....	11,870 43	
New Brunswick.....	20,526 56	
Nova Scotia.....	23,049 41	
Prince Edward Island.....	3,555 87	
Manitoba.....	3,852 18	
North-west Territories.....	2,963 02	
British Columbia.....	6,226 77	
		96,961 72
Fish breeding.....		38,060 41
Fishery protection service.....		107,317 21
Miscellaneous--		
Building fishways.....	1,722 40	
Legal expenses.....	4,982 24	
Canadian fisheries exhibit.....	149 14	
Distributing bounty.....	4,951 05	
Oyster culture.....	5,143 68	
Carried forward.....	16,948 51	1,084,548 15

GENERAL SUMMARY of Expenditure for Fiscal Year ended 30th June, 1896—Continued.

Service.	Amount.	Total.
	\$ cts.	\$ cts.
Brought forward.....	16,948 51	1,034,543 15
Miscellaneous—Continued.		
International fisheries commission.....	1,945 69	
Edward Hackett.....	214 40	
W. B. Deacon.....	93 15	
Licenses to United States fishing vessels.....	278 55	
Samuel Wilnot.....	45 55	
A. L. Belyea.....	577 40	
Refund bait licenses to Newfoundland fishermen.....	1,250 00	
		21,353 25
Fishing bounty.....		163,567 99
Civil Government, salaries.....	62,476 73	
do contingencies.....	8,226 98	
		70,703 71
		1,290,168 10

Marine and Fisheries—Marine Branch.

APPENDIX No. 2.

STATEMENT of Revenue of Marine and Fisheries Department for the Fiscal Year ended 30th June, 1896.

Service.	Amount.
	\$ cts.
Casual Revenue (sale of shipping forms, \$134 ; sundries, \$5,788.19).....	5,922 19
Capes mail service.....	357 08
Dominion steamers.....	11,056 94
Examinations masters and mates.....	3,398 00
Fines and forfeitures.....	530 71
Harbours, piers and wharfs.....	7,943 24
Cattle inspection.....	4,731 49
Steamboat engineers' certificates.....	827 50
	34,762 15

F. GOURDEAU,
Deputy Minister of Marine and Fisheries.

A. W. OWEN,
Accountant.

APPENDIX No. 3.

ANNUAL REPORT OF THE CHIEF ENGINEER OF THE DEPARTMENT
OF MARINE AND FISHERIES.

Major F. GOURDEAU,
Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit a report of the work done by the various branches under my control during the past year. This includes all the technical work at the department's headquarters, embracing the construction and maintenance of lighthouses, lightships, fog-alarms, buoys and beacons, the supervision of construction and repairs to Dominion steamers, construction and repairs of life boats and life boat stations; the administration of the vote for the removal of wrecks and obstructions in navigable waters; tidal and current surveys; hydrographic surveys in Canadian waters, and the publication, examination and correction of hydrographic charts; construction and repairs to fish hatcheries; engineering points in connection with the maintenance of fish passes; supervision of surveys of oyster beds; examination of applications for foreshore, wharf and water lots as they affect the interests of navigation; preparation and publication of notices to mariners and hydrographic notes, etc.

There are special staffs appointed for the tidal observation work and for the hydrographic survey work; the remainder of the work of the branch is attended to by the general staff of the office.

AIDS TO NAVIGATION.

A large proportion of the work done by this general staff consists in the construction and maintenance of light buildings and other aids to navigation. Full details of the large quantity of work done in this connection last year are contained in the annual report of the Deputy Minister. Plans and specifications for all important new buildings and repairs are made or supervised in Ottawa.

Attention is drawn to the notices to mariners issued last year, which covered a large variety of subjects of interest to Canadian mariners, and involve considerable correspondence and office work. In consequence of our small staff it is found necessary generally to limit these notices to purely Canadian topics, though some effort is made to include improvements in contiguous waters. I should like to see the work more thoroughly done, but doubt if it can be accomplished without detailing an officer for that special duty. The list of Canadian lights and fog signals has been brought up to date, and, as revised, has been printed.

An important work which it has been impossible to attempt is the compilation and publication of a list of Canadian buoys and beacons.

Marine and Fisheries—Marine Branch.

The following table gives a synopsis of the office work accomplished during the year 1896:—

	21 Plans received.	3 Plans designed.	52 Copies made.
Land surveys	21	3	52
Lighthouse towers and dwellings.....	3	10	24
Wharfs, piers, &c.....	8	1	6
Fog-alarms.....		2	3
Outbuildings.....		2	2
Detail sheets.....		1	6
Illuminating apparatus.....	6		1
Steamers.....	2		2
Buoys and apparatus.....	8		7
Boilers and fittings.....	13	1	1
Machinery.....	2	1	2
Oyster areas.....			1
Charts.....	1	1	3
Charts under construction.....		1	
Miscellaneous.....	27	1	50
Total drawings and copies passing through office.....			275
Charts received and recorded.....			80
do entered in chart books.....			22
Photographs received and recorded.....			22
Plans relating to foreshore applications received and made.....			44
Specifications written.....			15
Notices to mariners issued (comprising 135 subjects).....			70

As funds permit an endeavour is being made to improve the characters of the buildings and foundations by substituting more durable materials and more compact designs for those previously in use. In consequence of the progressively increasing price of square timber and deterioration in the quality of that made, timber cribwork foundations are no longer desirable, and in many instances I have been able to substitute for the old cribwork piers, steel casings filled with rough and cheap concrete and stonework. The initial cost is not much greater than that of good cribwork, while there is no comparison in the strength and durability of the two classes of structure. Where such a design proves suitable, light angle iron frame towers have been substituted for the heavy square timber framework previously used and the results of this change are satisfactory. In consequence of the extreme cheapness of steel, there is no appreciable increase of cost in making the change from wood to iron in this case.

PERSONAL INSPECTIONS.

In July last, I accompanied the agent for Prince Edward Island on his annual supply trip to light stations on the north shore of his division, and had an opportunity of seeing the difficulties to be contended with from shifting sandbars on that coast, a condition which will always make it difficult to establish successful and permanent lights.

In July and August, I accompanied the inspector on his summer supply trip to lights in the Strait of Belle Isle and made a careful inspection of all the stations in the Gulf of St. Lawrence. The lights, with very few exceptions, were exceptionally well kept and exceptionally well supplied. In the supply of coal too large a reserve was maintained, subjecting the coal to deterioration by age, and a change in the method of supplying this article is recommended. At various times I was enabled to visit and survey proposed sites for new lights, and attention is drawn to the desirability in all cases of allowing the officer who is entrusted with the preparation of plans the opportunity of inspecting the sites and locating the buildings beforehand. By so doing the proper location of the lighthouse and the proper adaptation of the plans to the site can be ensured.

TIDAL OBSERVATION WORK.

During the past summer season Mr. Dawson, C.E., continued the work of observing tides and currents in the Gulf of St. Lawrence with the assistance of the Dominion steamer "Lansdowne" as in previous years. Annexed hereto—

Inclosure B—is his report of progress for the season. It is to be regretted that the funds available for this work will necessitate a restriction of the work during the coming season. The work already done has been very satisfactory, and the results obtained have been valuable, not only from a scientific standpoint but also directly and practically to masters navigating the Gulf.

HYDROGRAPHIC SURVEYS.

The only hydrographic survey work directly under the control of the government of Canada is that done by Mr. Stewart on Lake Erie. I submit herewith—Inclosure A—Mr. Stewart's report of progress for the past year. It is hoped that the survey of the north shore of Lake Erie will be completed and connected with the American work early next season, and it is proposed that Mr. Stewart should resume the survey of Lake Huron for the remainder of the season of 1897. Besides the work done directly by this department, in hydrographic surveying, considerable additions to surveys of Canadian waters were made during the past season. The banks off Halifax were surveyed by H. M. S. "Rambler," and a resurvey of Louisbourg was made by the same vessel. The results of these surveys will be published by the Admiralty. A resurvey of the North Sydney bars was undertaken by the commissioners of that port and the results have been sent to the Admiralty for correction of the harbour chart.

From time to time the master of the Dominion steamer "Quadra" has been enabled to make some small surveys in British Columbia waters, the results of which have been embodied in Admiralty charts, and in notices to mariners issued by this department.

Respectfully submitted,

WM. P. ANDERSON,
Chief Engineer.

2nd JANUARY, 1897.

[Inclosure A.]

REPORT OF PROGRESS.

HYDROGRAPHIC SURVEY OF LAKE ERIE.

W. P. ANDERSON, Esq.,
Chief Engineer,
Department of Marine and Fisheries.

In connection with the survey under my charge I have the honour to report as follows upon the operations during the past year. Last winter was fully taken up in plotting and otherwise working up the notes of the previous season's work, as well as in the preparation of copies for the Hydrographer of the Admiralty, London, England, and also one for the Hydrographer of the United States Navy.

The first chart of the Canadian shore of Lake Erie will embrace that portion from Port Colborne to Port Rowan, including Long Point, and will probably be published on a scale of $\frac{1}{10}$ of an inch to one mile. These copies will be completed early this winter.

On May 6th the extensive repairs to the "Bayfield," having been completed at Port Dalhousie, and the errors of the vessel's compasses ascertained by "swinging" off the same place, I proceeded up the Welland Canal and started work at Port Colborne on the 7th. The whole season after that was taken up with work between

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Port Dover and Rondeau Harbour. This has been thoroughly sounded to an average distance of ten nautical miles from shore. The boat soundings were taken out one mile and the balance of the distance sounded from the deck of the steamer to a depth of about twelve fathoms. No important shoals were found in the whole area surveyed, in fact the shore was found to be free from dangers. The area surveyed was 800 square miles; number of nautical miles of shore line traversed was 100; number of miles sounded from boats 1,000, and number from the steamer 1,500.

Owing to the character of the shore, I was unable to carry on a regular triangulation from Houghton Sand Hills to Rondeau, a distance of 60 nautical miles, but had to resort to a system of buoys for the apexes of the triangles. As the sides of the triangles were from 7 to 17 miles long, the buoys moored very short and the observing done at, at least, six stations on a calm clear day, very little error crept in. As a check, a "broken base" of about six miles was measured near Rondeau, and its agreement with the same side calculated from the triangulation was satisfactory. Instead of, as hitherto, using a compass to ascertain the magnetic declination at various points on the shore of the lake, through the kindness of Mr. Stupart, of the meteorological service, who lent me a unifilar magnetometer, I was enabled to accurately ascertain the declination at Rondeau, Long Point and Port Colborne. I am much pleased that in future a similar instrument is to be available for my use and that better results will follow in this line.

A great deal of inconvenience was encountered through lack of harbours, there being really no good harbour between Long and Pelee Points. I had my headquarters at Port Stanley, which is only a very narrow cut between piers with barely enough water to allow the "Bayfield" to enter in fine weather. In foul weather the entrance is unsafe. Rondeau is only a little better, as a couple of vessels can lie with safety, but no more.

On the whole the weather was favourable for hydrographical surveying. We had some heavy gales in May, one in July and one in September, but with these exceptions the winds were moderate and the air tolerably clear.

The water on the lakes has at least not shown any inclination, during the past season, to drop lower than during its predecessor, but has rather improved, owing probably to the fact that we had far more rain in the summer of 1896 than in 1895. It is sincerely to be hoped that the improvement will continue.

I am glad to say as a result of the recent survey of Georgian Bay, the British Admiralty have just issued a complete chart of that water, on a scale of $\frac{3}{8}$ inch to one nautical mile. This should prove an extremely useful help to vessels using that bay.

On October 16th, I left Lake Erie to examine some reported dangers in the north channel of Lake Huron. These were accurately located and the results published in a notice to mariners. Any existing charts that come to hand will have these corrections inserted and the Hydrographer of the Admiralty will be able, from tracings, to have the corrections placed on all new prints.

On October 24th, I reached Collingwood and placed the "Bayfield" on dry dock for some minor necessary repairs. She is now laid up at Owen Sound.

There have been no changes in the staff of the survey, or in the officers of the "Bayfield" during the past season.

With fairly good weather the survey of the Canadian shore of Lake Erie, from Port Colborne to Pelee Point should be completed by the first of September. The balance of the Canadian shore was surveyed by the United States government about twenty years ago, and as no complaints have been made about shoals left out, there seems no necessity for a resurvey.

I have the honour to be, sir,

Your obedient servant,

WM. J. STEWART.

[Inclosure B.]

REPORT OF PROGRESS.

SURVEY OF TIDES AND CURRENTS IN CANADIAN WATERS.

OTTAWA, 26th January, 1897.

W. P. ANDERSON, Esq., C.E.,
 Chief Engineer,
 Department of Marine and Fisheries.

SIR,—I have the honour to submit the following report on the progress of the Survey of Tides and Currents in Canadian waters. During the year, substantial progress has been made in both branches of this survey. The principal tidal stations have been maintained; and they have also been utilized for the determination of tidal differences in an important region in the Gulf of St. Lawrence. A series of tidal differences for the St. Lawrence River has been worked out, and supplied with the tide tables for publication in the leading almanacs for 1897. In the other branch of the survey, an examination of the currents has been made in the north-eastern half of the Gulf of St. Lawrence from Anticosti to the Strait of Belle Isle; and for this work the SS. "Lansdowne" was again placed at my disposal for three months during last season. It may be best to describe first the progress made in the "Tidal branch" of the work; and then give the results obtained in the "Survey of the currents" this season, and also some account of the general movements of the water in the Gulf, with relation to the Gulf entrances.

THE PRINCIPAL TIDAL STATIONS.

In establishing these stations originally, a careful selection was made of the most commanding points on the Atlantic coast, at the Gulf entrances, and on the St. Lawrence. The stations, therefore are not only of direct value to our principal harbours, but they also serve as reference stations from which to determine tidal data in the regions lying between them. There are now seven stations in operation, situated at St. John, N.B., Halifax, St. Paul Island in Cabot Strait, Forteau Bay in the Strait of Belle Isle, South-west Point of Anticosti, Father Point and Quebec. The tide-gauges at these stations are so designed that they can be heated in winter to secure a continuous record of the tide throughout the year. They are provided with self-recording tidal instruments, and other necessary appliances; and the more isolated stations are also furnished with dipleidoscopes, where there is no means of obtaining the time except by telegraph from some distant observatory, which during the first two years entailed considerable expense. These stations have been in continuous operation during the past year, without any interruption of consequence, and the tidal record obtained will serve to improve the accuracy of the tide tables, as soon as the expense for the necessary calculations can be met.

The recording instrument at the station in the Strait of Belle Isle was replaced by another in September; as its driving clock required cleaning. Also at St. Paul Island, the hair-spring of the clock of the instrument broke; and with the type of tide-gauge now in use, any such accident involves the entire removal of the recording instrument, and interruption to the record. In this instance, it was imperative to avoid interruption, as the gauge was being used at the time for comparison with simultaneous observations at Pictou and Charlottetown. St. Paul Island can only be reached fortnightly, and then a landing can only be made in fine weather; it

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was fortunately possible to replace the instrument temporarily within three days, while it was sent away for repairs.

After extensive inquiry and careful consideration of the requirements, a form of recording instrument has been devised by myself, which obviates the uncertainty and expense connected with the use of the ordinary type of instrument. The essential point is to have a driving clock which can be readily detached from the rest of the instrument. This is secured by placing the driving clock inside of the revolving cylinder which carries the sheet of paper on which the tidal record is marked; as is done in some types of self-registering instruments of smaller size, used for meteorological purposes. In case of failure of the clock, a duplicate cylinder with clock inside can be substituted in less than two minutes, as it is released by a single screw. The defective clock can then be sent away for repair without interruption to the record. This new form of instrument is also provided with interchangeable gearing by which any one of four scales can be used; corresponding to a range in the tide of 9 feet, 18 feet, 27 feet or 36 feet. Our tides have such a variety in their range, that when an instrument requires to be changed to a new position, it has usually been first necessary to return it to the makers in Britain to have the gearing altered to another scale. There are also several minor improvements, especially in so arranging the carriage of the marking pencil, that the point of the pencil is readily accessible. This is important in making the comparisons on which the datum depends to which the observations have ultimately to be reduced. A recording instrument of this new type, manufactured by Messrs. A. Légé & Co., Covent Garden, London, has been in use at Pictou during last summer with very satisfactory results. This type of instrument should be substituted as soon as possible for those now in use at the more isolated stations, because of its reliable character. Its cost, including the duplicate clock, is also considerably less than the Lord Kelvin instrument, as there are no patent rights upon it.

TIDE TABLES; THEIR PREPARATION AND IMPROVEMENT.

The improvement which can be made in the tide tables each year has to depend upon the balance remaining after the charges of first importance are met. Out of the small vote available for this survey, the special appliances for deep-sea anchorage, and all current meters and other marine instruments required for the survey of the currents have to be provided; as well as the salaries of assistants and of the tidal observers, and maintenance and supplies for the tidal stations. The question of expense made it necessary to choose between these and improvement of the tide tables. The tide tables for Halifax were based upon old records obtained at the Dock Yard in 1860 and 1861; and it was found that an additional record also existed for the years 1851 and 1852. The reduction of this record to extend the basis of the Halifax tables had already been postponed. Sufficient record had also been obtained from the tide gauge at St. John, N.B., to enable tide tables to be prepared which are much needed; as such tables as are now published are based upon a fixed difference from ports on the other side of the Atlantic and are far from accurate; and they give only the time of high water without reference to the height of the tide, which at St. John is of special importance. The tide tables for Quebec were based upon observations for one complete year only, and there is now record sufficient to improve their accuracy. On considering these various claims in view of the money available, it was thought best to give the preference to the preparation of tide tables for St. John and the improvement of the Halifax tables; and to postpone the improvement of the Quebec tables.

The tide tables for Quebec for 1897 are still based therefore upon observations during one complete year obtained from the tide gauge at the dry dock at Lévis, namely, from 7th November, 1893, to 15th January, 1895. These tables are nevertheless far in advance of anything heretofore published. The basis on which the Halifax tables rest has been extended to include the four years for which the record existed; namely, 1851, 1852, 1860 and 1861. The datum to which the tides are at present referred is the one used in the old observations themselves which were

taken at the Dook Yard; but exact levels were taken in Halifax last autumn to connect the former datum with the new observations now in progress, and also with the dry dock, and when these are worked out a more definite result will be arrived at.

At St. John much difficulty has been met with, because of the want of a satisfactory datum for the reduction of the observations; as explained in a former report. It has been necessary therefore to redetermine the low water datum from the new observations themselves. This determination is being made with great care. Comparisons were made last June, with the co-operation of Mr. E. T. P. Shewen, C.E., of the Department of Public Works, to ascertain as nearly as is now possible the low water datum used in the survey of the harbour, on which the chart is based. The result when brought into relation with the present tidal observations, and the tables based upon them, will enhance the value of the chart of the harbour; and will also afford a reliable datum for future harbour works there. Tide tables for St. John are now in preparation for 1898; and they will be based upon two full years of observation in that harbour, namely, 30th April, 1894, to 18th May, 1896. They will give the height as well as the time of both high and low water.

In preparing these tide tables, the height of the tide at every hour throughout the year is taken from the record received from the tide station; and these heights are reduced to a datum as determined or selected by this survey. There are thus 8,760 actual observations of the tide obtained from any one station during the course of the year. The results thus condensed serve for the computation of future tides as given in the tide tables. This computation is made by Mr. E. Roberts, F.R.A.S., of the Nautical Almanac Office, London; by means of the latest methods of harmonic analysis and with the assistance of a tide-predicting machine, built for the government of India.

PUBLICATION OF THE TIDE TABLES.

Tide tables for Halifax and Quebec for 1896 were supplied without charge to the almanacs; and this was the first year that reliable tide tables for any Canadian ports were thus widely available. A "Notice to Mariners" drawing attention to them was issued by this department in January, 1896.

The tide tables for 1897 were again offered to all the leading British and Canadian almanacs willing to publish them; and the harmonic constants derived from the observations were also supplied to the United States Coast and Geodetic Survey, as a basis for their tables for Halifax. The tide tables for both Halifax and Quebec appear in the *Canadian Almanac*, published by the Copp, Clark Co. of Toronto; and in *Greenwood's Almanac*, published by Mr. W. N. Greenwood of Lancaster, England. The *Star Almanac* which published them last year, has not been issued for 1897. A summary of the tables for Halifax, also appears in *Belcher's Almanac*, published by the McAlpine Co.; and in *Cogswell's Almanac*, published by Mr. R. H. Cogswell of Halifax. The tide tables for Quebec are also given in a publication prepared by the Montreal Harbour Commissioners for the use of the pilot service. In all the above, due acknowledgment is made to the Tidal Survey branch of this department for the tables supplied. Three British almanacs, *Brown's*, *Jefferson's* and *Holden's*, have not yet arranged to publish them; and *McMillan's Almanac* of St. John, N.B., is only willing to publish tables for St. John itself, which will not be ready till next year. In order, therefore, to make the tide tables for this year more widely known, an arrangement was made with the Copp, Clark Co., to reprint them from the *Canadian Almanac* as an 8-page pamphlet; and copies have been sent to the agencies of this department, to collectors of customs, the secretaries of corporations of pilots and boards of trade, harbour commissioners, and the leading steamship companies; and also to thirty-six vendors of almanacs and marine publications in Great Britain, Europe, the United States and Canada.

TIDAL DIFFERENCES.

With the tide tables for Halifax and Quebec, tidal differences are given, by which the time of the tide can be found for other places along the St. Lawrence, and

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on the Atlantic coast of Nova Scotia. The tidal differences for the St. Lawrence have been extended, and now include the whole of the tidal portion of the river, from Three Rivers to Gaspé, a distance of 420 nautical miles.

The differences for the Lower St. Lawrence are based upon a comparison of the observations from the tide stations at Father Point and Anticosti, with the simultaneous observations at Quebec, throughout one year. The observations used for the purpose extend in all from 12th November, 1894, to 13th January, 1896. This comparison shows that the differences are very constant throughout the course of the lunar month; so that the tide at Father Point and Anticosti can thus be correctly deduced from Quebec. It was, therefore, justifiable to base tidal differences for intermediate places upon the differences between their establishments as given in the Admiralty list; and these will serve in the meantime until direct observations can be obtained throughout this region. This uniform progress of the tidal undulation up the estuary of the St. Lawrence from Anticosti to Quebec is in marked contrast to the great irregularity which is found elsewhere in the Gulf of St. Lawrence. It is, therefore, quite unsafe to assume that the difference in the time of the tide between one point and another is constant; unless it can be proved to be so by direct observation.

The differences between Quebec and places above, as far as Three Rivers where the tide ceases to be felt, are based upon two series of observations taken by Mr. R. Steckel, C.E., of the Department of Public Works, in October, 1887, and May, 1888. These observations were taken simultaneously at seven points along the river; and each series occupied one complete month, at the seasons of lowest and highest level of the water in the St. Lawrence river itself. These observations show that on the whole the tidal undulation travels more slowly up the river when the water is at its highest; it being then from eight to twelve minutes later on the average than when the level is lowest. The reason of this appears to be that the current in the river is stronger in the high level season, and thus keeps the tide back. The differences published are the mean values for the two seasons, and these should be practically exact. On the other hand, the high tide makes its way up the river much faster than the low tide, the difference in speed making the time of low water more than an hour late relatively to high water, as far up as Grondines and Champlain. It is, therefore, necessary in the tables, to state separately the tidal differences for high water and low water respectively, for places above Quebec. A comparison was also made between these observations, and the time of the tide as noted throughout the season of 1895, by the semaphore operator at Lotbinière.

The tide tables themselves are in Standard time for the 60th and 75th meridians respectively: and the tidal differences for the other places are computed to give the time of high and low water in Standard time also. In this way the master of a vessel can know the time of the tide directly from his chronometer, by allowing an even number of hours from Greenwich time, without the trouble of looking up his longitude. Standard time is also the most convenient for harbour purposes as it is now used all but universally on shore.

SPECIAL OBSERVATIONS FOR TIDAL DIFFERENCES.

In the Gulf of St. Lawrence there are regions in which the tides show great irregularity, and where constant differences with ports on the Atlantic will not apply. This will be better understood from the following comparison, which shows the great irregularity in the difference in the time of the tide across the open Gulf, as contrasted with the even progress of the tidal undulation up the Lower St. Lawrence, when once it has entered the mouth of the river between Gaspé and Anticosti:—

Difference in the time of high water between St. Paul Island in Cabot Strait, where the tide enters the Gulf, and South-west Point of Anticosti at the entrance to the St. Lawrence. Distance, 190 nautical miles. From simultaneous observations in six months during the years 1893 and 1894. Difference in absolute time ranges from 4 h. 30 m. to 6 h. 50 m.

Difference in the time of high water between South-west Point of Anticosti and Quebec, omitting irregularities due to wind. Distance, 360 nautical miles. From simultaneous observations during eleven months in 1894 and 1895. Difference in absolute time ranges from 5 h. 13 m. to 5 h. 39 m. Mean = 5 h. 26 m.

The wide range in the difference of time across the open Gulf, is chiefly due to an unusually great diurnal inequality in Cabot Strait itself; that is, a long interval and a short interval of time between the tides of the same day. It is remarkable, when this inequality is so great in the main entrance to the Gulf by which the tide comes in from the Atlantic, that it should so disappear that scarcely a trace of it is to be found in the tides of the Lower St. Lawrence or at Quebec. On the other hand, this inequality is very marked in Northumberland Strait and the neighbouring regions. It is probable that this is due to tidal interference, occasioned by some contrary tidal undulation which over-runs the main tide entering through Cabot Strait.

The practical results of this inequality are very evident, however. On account of the importance of St. Paul Island in the main entrance to the Gulf, many endeavours have been made to establish a constant difference between it and some port on the Atlantic coast of America or in Europe; but the inequality is there so great that these endeavours have been without result. This diurnal inequality is also very marked at Pictou and Charlottetown in the region referred to.

The diurnal inequality varies with the declination of the moon north or south of the equator; and not with the moon's phases as in the case of the ordinary change from spring tides to neaps. This change still goes on, while the other variation is superadded; and as it takes place in a different period, it is continually overrunning the former. The resulting irregularities are, therefore, very great, unless these two causes are carefully distinguished from each other.

These conditions made it necessary to obtain direct tidal comparisons between the important harbours of this region and the tides as they enter Cabot Strait. For this purpose, the tide-gauge at St. Paul Island was essential, and as it has been twice destroyed by winter storms in three years, on account of its exposed situation, it was necessary to obtain the required observations without delay. A tide-gauge had also been erected at Halifax in the previous season, and the gauge at Anticosti had been put in good order; and as any of these might prove necessary for purposes of comparison, it was advisable to obtain the new observations while they continued in good working order. It was also important to determine how far south of Gaspé in the Bay des Chaleurs and along the New Brunswick coast, the tides could be referred by constant differences to Anticosti and Quebec; and where the irregularities due to diurnal inequality first manifested themselves.

Arrangements were therefore made to take special observations in the region extending from Gaspé along the south-western side of the Gulf, through Northumberland Strait, and around Prince Edward Island. As this comprises some 580 miles of coast-line, it was necessary to select places which were reasonably accessible, to avoid undue delay in travel. The principal harbours in the region had the first claim; and consideration had also to be given to the relative importance of places from a tidal point of view, so as best to obtain tidal differences for intermediate points. The choice of the following places as temporary tidal stations was accordingly made: Carleton, as near the head of the Bay des Chaleurs as possible, while avoiding the local influence of the Restigouche River; Lower Neguac, near the mouth of Miramichi Bay, to obtain the open tide unaffected by the bars and rivers of the bay; Charlottetown, where the tide in Northumberland Strait has the greatest range; Pictou, in line with the open channel between Prince Edward Island and Cape Breton Island, up which the tides pass; and Souris, the nearest port to Cabot Strait which is readily accessible, as there is no railway communication on the west side of Cape Breton Island.

The erection of temporary tide-gauges at these places and the superintendence of the observations was entrusted to Mr. H. M. Mackay, who carried out the work very efficiently. By the use of self-registering instruments, more than twice as much information was obtained as could have been got by direct or personal observation with four to five times the expense.

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At Pictou, the recording instrument of new design, already referred to, was used. At the other stations the instruments were of a smaller type than those at the principal tidal stations; they were of the Richard pattern, supplied by Casella of London, and were made with a scale specially adapted to this region. They are strong and simple in construction, so that the manipulation presented little difficulty to inexperienced observers. The complete tide-gauge was as follows:—firstly, a vertical plank box, to serve as a tide well, which could be strapped to the side of a wharf; holes were bored in the lower end sufficient to admit the water freely, but not to allow of inconvenience from wave motion. A shelter box containing the registering instrument, was placed directly on top of the tide well. As these tide-gauges were in operation during the summer months only, they did not require to be built in the same substantial manner as when they have to withstand the severity of the winter and to be provided with heating. They could thus be set up at small expense wherever a wharf or pier was found running out beyond the low-water line.

The readings of the instrument as regards elevation were checked by comparison with a graduated staff set up beside it; and the elevation of the zero of the staff was referred to a bench mark on shore. At most of the stations, time could be obtained from railway telegraph offices; but where there were no such facilities a meridian mark was placed, and the observer was supplied with a table giving the "Sun on meridian" in 60th standard time.

The results obtained at these five stations were supplemented by observations at places which stood next in importance, in obtaining correct tidal differences. On the coast between Miramichi Bay and Pictou, short series of staff readings were taken at Richibucto, Buctouche and Pointe du Chêne; and a gauge record during two months in all, was obtained at Cape Tormentine, where the strait is narrowest. Also, on the north coast of Prince Edward Island, a short gauge record was obtained at St. Peter's Bay and at Alberton, and staff readings at Rustico.

The total amount of tidal information obtained is shown in the following list. Throughout the progress of this work, a simultaneous record of the tide was obtained at the principal stations at Halifax, St. Paul Island and Anticosti. Also, where the observations were obtained by self-registering instruments, they were continuous day and night during the time indicated. The only interruption of consequence occurred at Charlottetown, where the partial chokage of the inlet made the observations unreliable for a time.

Carleton.....	.....June	29th till Nov. 9th.	Gauge record.
Neguae.....	.....July	20th do Nov. 6th.	do
Richibucto.....	.....Aug.	5th do Aug. 8th.	Staff readings.
Buctouche.....	.....Sept.	15th.....	do
Pointe du Chêne....	.....Sept.	8th till Sept. 11th.	do
Cape Tormentine.....	.....July	25th do Aug. 10th.	Gauge record.
do.....	.....Aug.	31st do Oct. 10th.	do
Charlottetown.....	.....June	20th do June 29th.	do
do.....	.....July	18th do Nov. 25th.	do
Pictou.....	.....June	3rd do Nov. 27th.	do
Souris.....	.....June	11th do Nov. 24th.	do
St. Peters Bay.....	.....Oct.	27th do Nov. 24th.	do
Rustico.....	.....Oct.	20th do Oct. 24th.	Staff readings.
Alberton.....	.....Oct.	13th do Oct. 23rd.	Gauge record.

Such tide tables as are now published in local almanacs for ports in this region, are based on constant differences from Halifax or some other Atlantic port; and it is, therefore, evident that they must necessarily be far from correct. Their error is greatest when the moon's declination is at its maximum, north or south of the equator. The observations of this season show that the time of high water as given in the local almanacs now published, is in error by the following amounts:—At Pictou 1 h. 25 m. early or late; at Charlottetown, 1 h. 12 m. early or late. These errors correspond approximately with the half-range of diurnal inequality, which at Pictou amounts to 1 h. 15 m.; and at Charlottetown also it is nearly as great.

It has been possible to obtain from the present observations a variable difference with Halifax in terms of the moon's declination, which has enabled tide tables to be prepared for Charlottetown and Pictou in time for the season of navigation of 1897. Tables prepared in this way will be sufficiently accurate to be practically serviceable; and they will answer in the meantime until better data can be obtained from a more thorough analysis of the present records, or from a longer series of observations. The observations obtained at the other places will be used to extend the tidal differences supplied with the tide tables for next year.

The tidal differences which have been published with the tide tables up to the present time are limited to regions in which their accuracy can be depended upon, as proved by direct observation; as otherwise serious errors might be made. It is therefore, very important to extend these differences each season as far as possible; and this can now be done at a relatively small expense, while the principal tidal stations are available for comparison. Observations are now much required around Cape Breton where there are several important coaling ports; also on the southwestern coast of Nova Scotia, and throughout the Bay of Fundy; as well as along the Lower St. Lawrence at intermediate points between Quebec, Father Point and Anticosti.

The determination of tidal data for the north shore of the Gulf, from Point de Monts past the Mingan Islands and Cape Whittle to the Strait of Belle Isle, has not yet been attempted by this survey; but this is a region which is relatively of less importance.

OTHER INFORMATION AND RECORDS OBTAINED.

With a view to future work in the Bay of Fundy, copies were made last season by permission of the late H. G. C. Ketchum, C.E., of the tidal information obtained by the Chignecto Marine Railway Co. The accurate levels carried from Chignecto Basin to Bay Verte, serve to connect the mean sea level in the Gulf and in the Bay of Fundy, and the levels of high and low water on both sides of the isthmus have been obtained with reference to the marine railway datum.

The level reached by the exceptionally high tide of October 8th, 1896, was also obtained at Chignecto and Moncton, with reference to railway datum planes; and in relation to the Saxby tide of 1869. This high tide in October overflowed the dykes of the hay lands in the neighbourhood of Amherst and along the Petitcodiac River, and did much damage. If a tide of this height proves to be due to astronomical causes alone, as appears probable, its recurrence under similar conditions will be subject to prediction in future, as the level reached has now been ascertained; and warning may thus be given.

It would be of great value if warning could be given for exceptionally high tides at Quebec and St. John, which occur during storms and often do much damage. It is not impossible that the effect of meteorological conditions upon the tide may eventually be arrived at, from a careful comparison of wind and barometer with the exceptional tides recorded by the tide gauges. The necessary data for the purpose are being collected as time goes on.

A request has been received from the pilot service to prepare a tide table for the pilot station at Father Point. To save expense in printing, this has been made out in manuscript only, in time for the opening of navigation.

Copies of the tidal record for two leading points in British Columbia have been received regularly since January, 1895. These are from self-registering gauges erected by the Department of Public Works at Victoria, and at Sand Heads at the mouth of the Fraser River, in the Gulf of Georgia. Observations are also received from New Westminster, and from a point intermediate between it and the mouth of the Fraser River. These records will soon be sufficient for the preparation of tide tables for these points, when office time can be given to it, and the expense of the computations can be met.

Some tidal data for the St. John River were kindly supplied by Professor A. W. Duff, of Purdue University, LaFayette, Indiana, in exchange for information regard-

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ing secondary tidal undulations at St. John, N.B., which he is investigating. Professor Duff obtained these data last season while at his country residence on the St. John River.

Tidal information from the gauges at Quebec, Father Point and Halifax has been supplied to Mr. R. Steckel, to facilitate the work of geodetic levelling which he is carrying out for the Department of Public Works; and copies of the tide curves from those stations have been of value to him in the determination of mean sea level.

SURVEY OF THE CURRENTS.

The region examined this season was the north-eastern portion of the Gulf of St. Lawrence, from the eastern end of Anticosti to the Strait of Belle Isle. It forms an arm which lies between Newfoundland on the south-east, and Saguenay County in the province of Quebec on the north. This north shore is often termed "Labrador," which is both incorrect and misleading; as no part of the Gulf is bordered by Labrador, and it is also a territory belonging to Newfoundland and not to Canada. The length of this arm of the Gulf is 220 miles, and in area it is nearly equal to the English channel. It is traversed by all the steamship lines which use the St. Lawrence route; which makes the investigation of its currents of the first importance.

The region under consideration has a width of 100 miles between Cape St. George (Newfoundland) and East Cape (Anticosti) and runs in a north-eastward direction to the Strait of Belle Isle, where its width narrows down to 10 miles. From this main arm of the Gulf, a side channel runs off to the north-westward, between Anticosti and the north shore. This channel has a width of 60 miles between the east end of Anticosti and Natashquan Point, and narrows down to 16 miles at the Mingan Islands, in a length of 115 miles. Around the greater part of the shores which bound these areas, the water increases gradually in depth to 60 or 80 fathoms at about 20 miles from the shore; and along the middle of the main arm and the channel north of Anticosti, there is a deep channel of 100 to 150 fathoms in depth. This deep channel continues through Cabot Strait with increasing depth to the Atlantic. (See outline chart, Plate 1).

For the investigation of the currents in this region the SS. "Lansdowne," of the lighthouse and buoy service, was placed at my disposal for three months—July, August and September, 1896. From this time considerable deduction has to be made for interruption to the work in obtaining supplies, and for rough weather; and also a necessary visit to the tide-gauge in the Strait of Belle Isle. The nearest port for coal and supplies was North Sydney, C.B., but there were places along the shore where water could be obtained from the natural streams. When shelter was required it was usually necessary to make a long run to obtain it. The investigation of the currents was carried on by myself, with the assistance of Mr. G. G. Hare, who also took continuous meteorological observations. The commander of the vessel, Captain G. W. J. Bissett, and the first officer, Mr. J. B. Sutherland, gave valuable co-operation in furthering the work; and also the second and third officers, N. McKellar and A. Lane, in noting the direction of the current during the night.

As the steamship route traverses the region in question on a direct line from Heath Point, Anticosti, to the Strait of Belle Isle, it was decided to give most attention to the study of the currents met with along this route itself. It was important to ascertain whether any general set existed either with or against vessels on this route: and also whether there was any cross-set making out or in through the channel north of Anticosti. A set of either character, if found to exist, might put a vessel seriously out of position in rounding Anticosti or making the Strait of Belle Isle. Little was known with respect to what currents were likely to be met with in this region, beyond what had been already ascertained by this survey. It was thus known that the current in the Strait of Belle Isle itself was tidal in its character, with a flow nearly equal in each direction, and that the difference of flow inwards towards the Gulf was very slight; and consequently it was not to be expected that a constant current of any considerable strength would be found

to run through this region towards Cabot Strait. It had also been ascertained that the current at the other extreme angle of this region, namely, in the Mingan channel, was likewise tidal in its character, with a flow which was practically equal in the two directions. (See report of progress on this survey, 13th April, 1896; page 17.) On the Admiralty charts two currents were indicated locally, in the channel north of Anticosti; one setting to the south-east round Natashquan Point; and the other near the eastern end of Anticosti from Table Head to East Cape, setting to the southward. Such currents, if they proved to be constant in their character, might furnish a valuable indication; as they might be the shore edges of a general outward set in that channel; or on the other hand they might imply a return flow inwards up the middle of the channel. A set in either of these directions would be directly across the steamship route from the offing of Cape Whittle to Heath Point. It was, therefore, important to obtain continuous observations at the points where these currents were shown; to ascertain whether they were really constant, and for comparison with the currents as found in the open channel. For this purpose two pairs of flag-buoys were made and provided with suitable moorings; the larger buoy carried a white flag and was fastened directly to the moorings; and the other was attached to it by a line 200 feet in length and carried a red flag. As these buoys swung round on their moorings, the direction of the current could be readily observed from shore at a distance of two or three miles. Arrangements were made with two men to take these observations, and they were brought from North Sydney on the steamer. One of them was landed at East Cape, and provided with a tent and camp outfit. A pair of buoys was placed off the cape, where they were also in view of the lighthouse at Heath Point. As this observer left his post after a short time, the observations were continued from the lighthouse itself, until the buoys went adrift during a gale. The other observer was landed at Natashquan Point, and took up his quarters in a shed, the only building remaining at the abandoned Hudson Bay post. He was also provided with a boat, which could be anchored out to ascertain the direction of the current. This was very useful, especially during fog when the flags could not be seen. The time of change in the current was taken on a watch, which was regulated during the season by a table giving time of sunset. The positions of the two pairs of buoys are shown on the chart, Plate I. The results obtained will be referred to when the nature of the currents in the various localities is described.

In addition to the direct observations above referred to, information was requested from the leading steamship companies traversing this region, in reply to circulars prepared for the purpose and supplied to their captains, on which the character of the current met with on each voyage could be entered. Much useful information, especially as to the character of the currents at other seasons of the year, was obtained from fishermen and others acquainted with these waters.

GENERAL METHODS EMPLOYED.

The general method used to ascertain the nature of the currents, was to anchor the steamer at various points or stations carefully chosen. The steamer itself was thus a fixed point from which to determine the direction and velocity of the currents. As these currents are all influenced by wind and tide, it is important to have good meteorological and tidal data for comparison with the observations obtained at the various stations themselves. The only permanent meteorological stations at which continuous observations of wind and barometer could be obtained for comparison, are at the extreme ends of the region in question; namely at South-west Point, Anticosti, and on the island of Belle Isle; distant 360 miles from each other. The local wind record obtained on board, was not always satisfactory; as sometimes during the heaviest winds, the steamer lay close to the coast, or was anchored in some bay for shelter. The tidal data required are better given: as two of the principal tidal stations established by this Survey, are at South-west Point, Anticosti, and at Forteau Bay in the Strait of Belle Isle. These tide stations are within about 100

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miles of the localities where tidal influence in the current was most distinctly detected.

In addition to the regular observations of the currents, the density of the water and its temperature were taken at regular intervals along all the courses which there was occasion to run. In this way an extensive series of densities and temperatures were obtained; and some of the same lines were run twice at different dates for comparison. This method has often been found useful in tracing the direction of the movement of the water. Also, at anchorage stations where the current was found to veer widely in its direction, the temperature of the water was taken every half hour in the hope of finding some difference to accord with the varying direction of the current itself.

The depth at which it was necessary to anchor at the various stations, ranged from 30 to 150 fathoms; and the holding ground was often very poor; as the bottom was sometimes flat rock lying horizontally, or soft mud. This mud was usually met with at the greater depths. The steamer itself is too heavy for the purpose, and difficult to hold. Its sides are so high, especially towards the bow, that the wind pressure alone is often enough to make it drag anchor on such bottom; especially when the current holds it broadside to the wind. In many cases the rough weather only lasted a few hours, as the sea falls very quickly in the Gulf; and if the vessel could have been held while it lasted, much time would have been saved. On one occasion in endeavouring to do so, the mooring hawser of steel wire one inch in diameter was parted, and the best anchor for holding was lost. The available shelter was so far distant, it was usually more advantageous to "lie to" in the open and keep in the vicinity of the station, even if the heavy weather lasted a day or two. The anchorage appliances used, which are of a special character, have been described in previous reports. They were improved and re-inforced as much as possible for this season's work.

METHOD OF OBSERVING THE CURRENTS.

It soon became evident that the methods employed in previous seasons would require much modification, owing to the difference in the character of the currents. The currents examined in former seasons had considerable strength, from one to three knots, and generally a uniform direction for at least some hours at a time. Their chief variation was in velocity, which fluctuated with the tide, or fell off with the depth. But the currents in the region examined this season varied chiefly in their direction. They usually veered in direction from hour to hour, often going completely round the compass, and the direction at any depth was often different from the surface direction. Their speed was always low, seldom exceeding one knot per hour. Hence the direction of the current, both at the surface and below, was of much more importance relatively, than the accurate determination of velocity. At the first station occupied, where the depth was 155 fathoms, a number of careful measurements of the velocity were made, with a current meter, as far down as 80 fathoms. The velocity was found to vary very irregularly at different depths, and as the meter did not indicate direction, these observations proved of little value. To understand these currents, it was found quite as necessary to examine the under-current as the surface current itself, as will be more fully explained when the influences that affect them are discussed. The methods adopted to arrive at their nature were, therefore, as follows:—

The direction of the current on the surface was obtained by a float attached by a line to the stern. This float was made of a board painted white, with short pieces standing out vertically from its under side to give it a good hold in the water; and weighted with lead to bring it even with the water and prevent the wind from having any hold upon it. The direction of the current was read by taking its bearing on a dumb compass at the stern; which was set to the heading of the ship at each observation. The direction of the surface current was thus obtained every half hour, continuously, day and night. The velocity of the current was measured by a current meter, registering electrically by means of a counter on board. This meter

was placed at a depth of 18 feet (three fathoms) which is the standard depth adopted in this survey from the beginning; as it is necessary for accuracy to measure the velocity below the level of the keel of the steamer, which has a draught of 13 feet 6 inches. The direction of the current at 18 feet was readily observed during the day time, by noting the position of the meter in the water. This direction often differed as much as two points from the direction at the surface. The direction in which the current would set a vessel of ordinary draught was, therefore, better given by taking the average between the direction on the surface, and the direction at 18 feet. This average is given in the results shown in the plates, whenever the double observations were obtained, as there noted. The velocity of the current was noted from the counter attached to the meter, every half hour during the day time; but the importance of the velocity measurements did not warrant the continuance of these observations during the night; and the direction at 18 feet could not then be seen. The meter was, therefore, kept at work for 12 hours a day only.

The under-currents were examined by means of a "deep fan," consisting of two sheets of galvanized iron passing through each other at right angles, and thus forming four equal wings; and suspended in the water by patent sounding wire. This appliance was used with a Thomson sounding machine, on which the depth at any moment could be read off very conveniently. The fan was 26 inches deep, and each wing was 9 inches wide; and its area, which was practically the same in any position in the water, was 3.25 square feet. The fan itself weighed $14\frac{1}{2}$ pounds, and in these slow currents it was used without the addition of any further weight or sinker. The sounding wire by which it was supported consisted of three strands of fine wire braided over; its thickness over all being a little less than one-tenth of an inch. This simple appliance was found to afford a very delicate means of determining both the direction and strength of the under-current at any depth, where the currents themselves were so low in their velocity. The fan would swing out from the vertical in the direction of the current, and the supporting wire was so fine that the current nearer the surface had practically no hold upon it. In this way the direction could usually be found to the nearest point. The velocity could also be ascertained very closely by reading the inclination of the supporting wire to the nearest degree with a clinometer. The velocity corresponding to each inclination was determined by direct experiments, from which a table was made to reduce the observations. To obtain the correct depth, the fan was lowered to the surface of the water and the dial of the sounding machine set at zero. The reading on the dial then gave the depth below the surface correctly if the inclination of the wire did not exceed 15° from the vertical. When the angle was higher than this, additional wire was let out to allow the fan to reach the true depth. The amount required was found in a moment by means of a table of cosines of angles. This was carefully attended to in making the experimental observations for the velocity corresponding to the inclination.

For this purpose the calmest days were chosen, and the fan was lowered to 18 feet, the same depth as the meter. The meter register for the velocity and the inclination of the wire of the fan were taken at exact intervals of five minutes. In this way 43 determinations were obtained of the velocities corresponding to the various inclinations from 10° to 30° . These were first classified according to the inclinations, and the average velocity for each inclination was obtained. The velocities so found were then plotted graphically, and a mean curve drawn through the points. This curve was a parabola, for which the best form of equation is as follows:

$$v^2 = 1.067 \tan i,$$

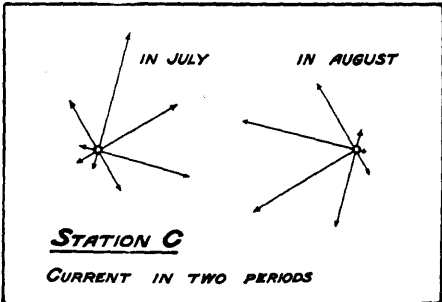
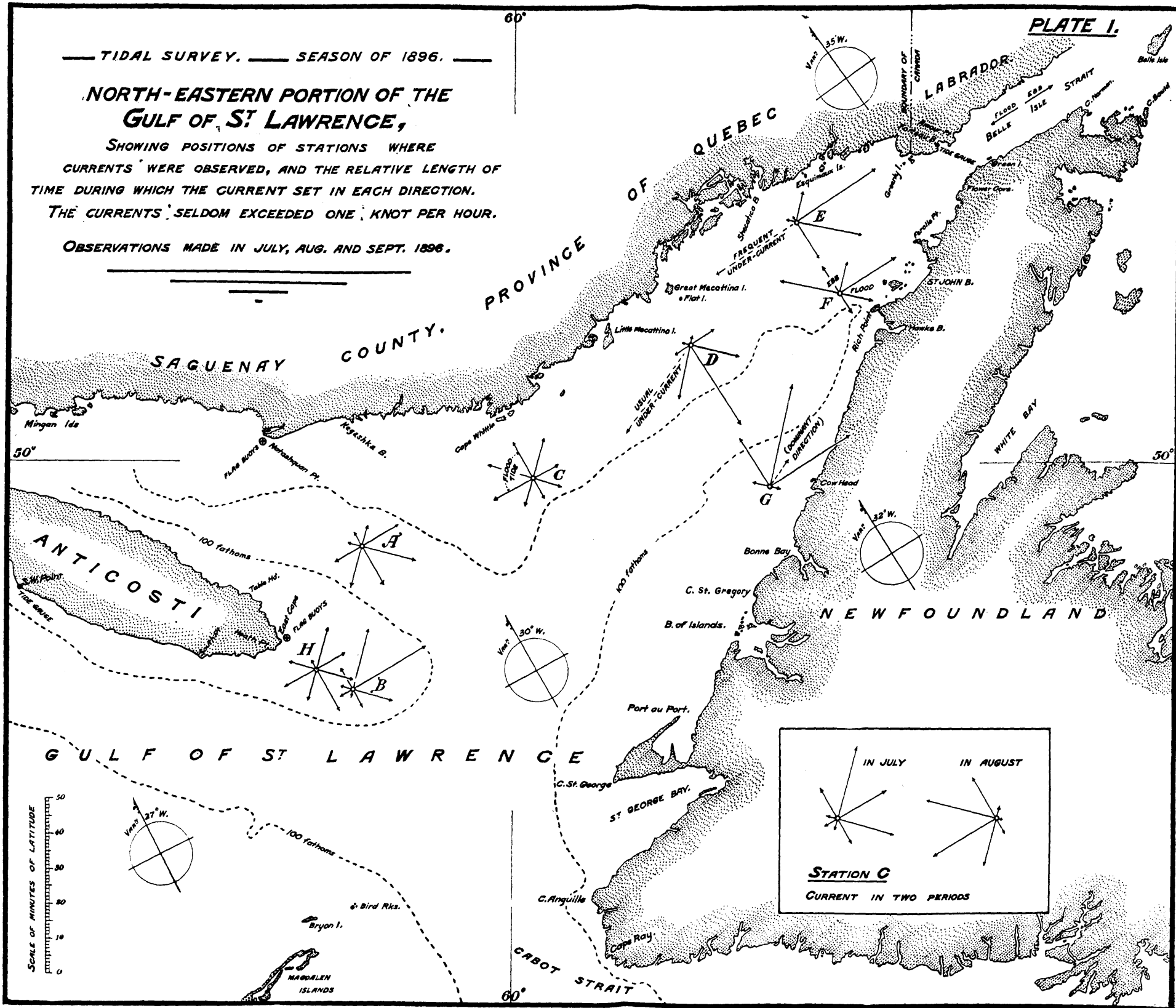
in which v is the velocity in knots per hour, and i the inclination of the wire from the vertical. The form of the curve shows also that for inclinations beyond 30° , which sometimes occurred, proportional values may be correctly used. A few values may be given as samples, from the tables thus obtained which will serve to show that the velocities of the under-current, which are given in tabular form with this report, are quite reliable to the tenth of a knot, which is as closely as they are

TIDAL SURVEY. SEASON OF 1896.

NORTH-EASTERN PORTION OF THE GULF OF ST. LAWRENCE,

SHOWING POSITIONS OF STATIONS WHERE CURRENTS WERE OBSERVED, AND THE RELATIVE LENGTH OF TIME DURING WHICH THE CURRENT SET IN EACH DIRECTION. THE CURRENTS SELDOM EXCEEDED ONE KNOT PER HOUR.

OBSERVATIONS MADE IN JULY, AUG. AND SEPT. 1896.

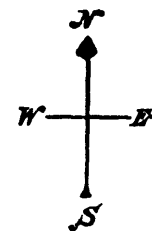


TIDAL SURVEY. SEASON OF 1896.

PLATE II.

DIRECTIONS OF SURFACE CURRENT, (AS OBSERVED.)

The directions are magnetic. The current ranges in velocity from $\frac{1}{2}$ to 1 knot per hour.

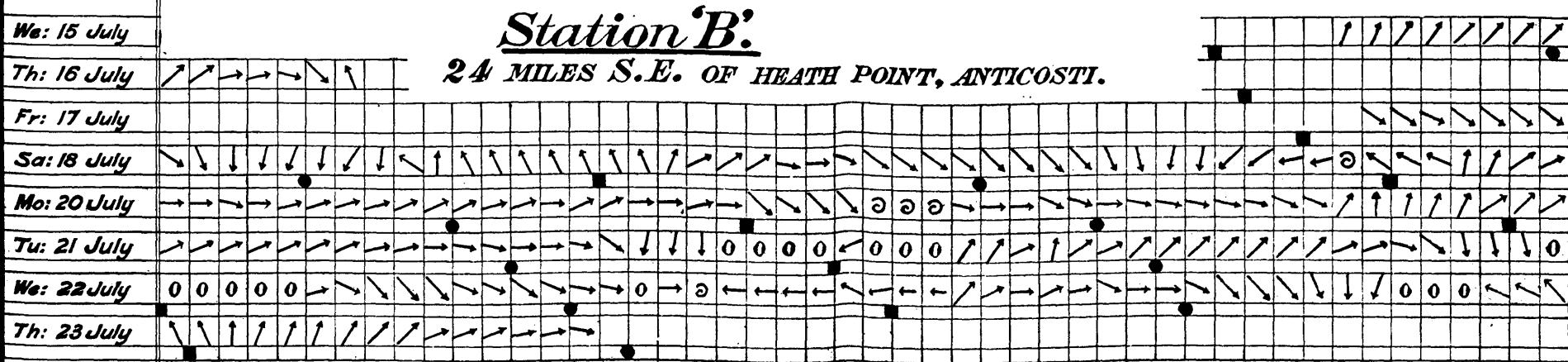
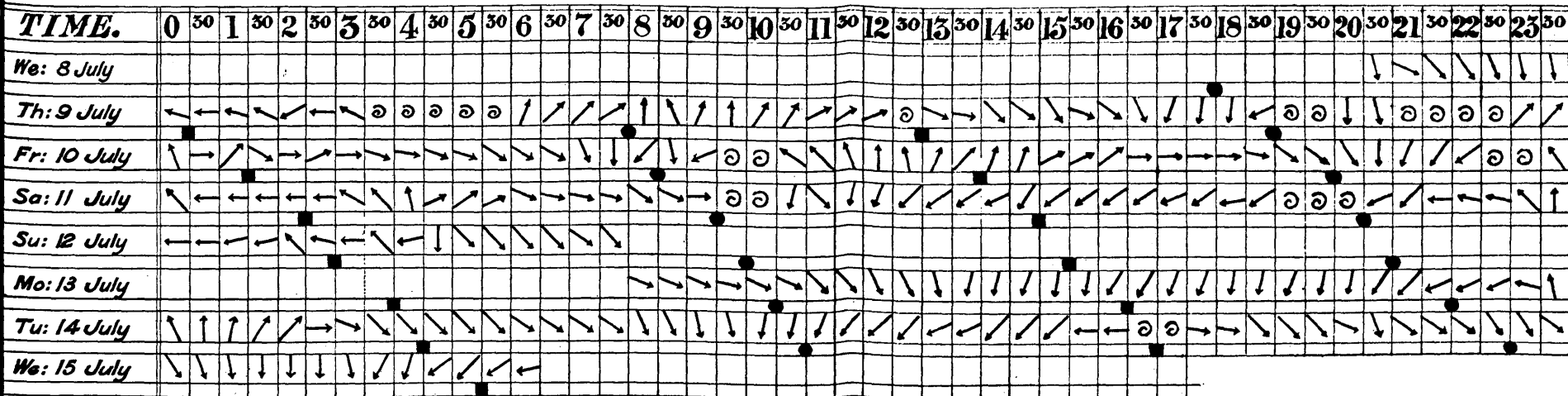


Station A' MIDWAY BETWEEN

EAST CAPE ANTICOSTI AND CAPE WHITTLE.

TIDE AT S.W. POINT, ANTICOSTI:-

High Water thus: - ■
Low Water thus: - ●



Station H. 13 MILES S.E. OF HEATH POINT, ANTICOSTI.



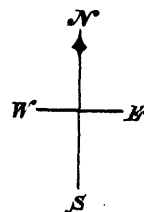
NOTE. The directions given at Station H are the mean of the directions at the surface and at a depth of 18 ft. The velocity exceeded one knot on the 21st and 24th.

DIRECTIONS OF SURFACE CURRENT, (AS OBSERVED.)

Station C.
18 MILES S. OF CAPE WHITTLE.

The directions are magnetic. The current ranges in velocity from $\frac{1}{2}$ to 1 knot per hour.

TIDE AT S.W. POINT, ANTICOSTI ISLAND. { High Water thus:— ■
Low Water thus:— ●



TIME.	0 ³⁰	1 ³⁰	2 ³⁰	3 ³⁰	4 ³⁰	5 ³⁰	6 ³⁰	7 ³⁰	8 ³⁰	9 ³⁰	10 ³⁰	11 ³⁰	12 ³⁰	13 ³⁰	14 ³⁰	15 ³⁰	16 ³⁰	17 ³⁰	18 ³⁰	19 ³⁰	20 ³⁰	21 ³⁰	22 ³⁰	23 ³⁰	
Mo: 27 July																									
Tu: 28 July	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
We: 29 July	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Th: 30 July	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Fr: 31 July	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑

After this date the directions (in the day time) are the mean of the directions at the surface and at a depth of 18 feet.

We: 12 Aug.																									
Th: 13 Aug.	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Fr: 14 Aug.	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←
Sa: 15 Aug.	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓

Station D. 15 MILES S. BY W. OF GREAT MECATTINA ISLAND.

We: 19 Aug.																									
Th: 20 Aug.	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Fr: 21 Aug.	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Sa: 22 Aug.	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑

Station E. 13 MILES S.S.E. OF SHECATICA BAY.

We: 26 Aug.																									
Th: 27 Aug.	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑

Station G. 12 MILES W.N.W. OF COW HEAD. (W. COAST OF NEWFOUNDLAND.)

Th: 3 Sept.																									
Tu: 8 Sept.																									
We: 9 Sept.	0	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	0
Th: 10 Sept.	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Fr: 11 Sept.	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓

Monday, 14 Sept.

0 0 0 0 ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑

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given. With so light a fan, flaws in the current itself were often noticeable, which gave different inclinations, especially near the surface. When this was the case a mean value was obtained, in taking the observations.

Inclination i , in degrees.	4°	6°	8°	10°	15°	20°	25°	30°
Velocity v , in knots per hour.....	0·27	0·33	0·38	0·43	0·53	0·62	0·71	0·79

In using the deep fan for the observation of the under-currents, it was generally best to lower it first to the greatest depth, where the inclination was usually nearest the vertical; and in raising it the inclination would increase towards the surface, as the current became stronger. In this way a set of observations from a depth of 30 or 40 fathoms to the surface could be obtained quickly, which was often important when the current was veering and changing.

It would have been very helpful in understanding the currents in this region, if the direction of the under-current could have been obtained at regular intervals at some standard depth, say every half hour at 30 fathoms. This was attempted, but found to be impracticable owing to the swinging of the vessel on its hawser. This swinging was the chief difficulty; and to obtain reliable results much patient watchfulness was required, to take advantage of times when the vessel was most steady. The swinging was partly due to the slowness of the currents themselves, as the vessel lay "between wind and current," and every flaw of wind drove it against the current or allowed it to swing back. When the current was strongest, it would lie the most steadily even in a stiff breeze. The trouble was largely owing to the unsuitable character of the vessel itself. With a length of 180 feet, it has an area above water on a longitudinal section of 2,980 square feet. Its high sides, especially towards the bow, give the wind a great hold upon it; and this appears to explain the worst kind of swinging that occurred, when the vessel would head first to one side and then to the other, after the manner of a kite in the air. Under certain conditions this would continue for two or three hours at a time, until a change occurred in either wind or current. The change of heading amounted to two or even four points, in a corresponding period of ten to twenty minutes; and the extent of the swing was therefore great, as the depth of anchorage usually ranged from 40 to 80 fathoms, and the length of hawser was twice to three times the depth, which gave a long radius for swing. The trouble was sometimes mitigated by hoisting a try-sail aft. But while any serious amount of swinging went on, the under-current observations by the method described were not attempted, as then also the closest attention was required to find the correct direction of the surface current itself. To obviate any uncertainty in the under-current observations, a reflector was attached to the binnacle compass which enabled it to be watched constantly while standing by the deep fan, and in this way any swinging of the vessel could at once be detected.

All directions and bearings given throughout this report, are magnetic. The variation in this region ranges from 29° to 34° west.

The methods used for accuracy in the determination of densities, and temperatures, were the same as those already described in last year's report. (See report of progress, April, 1896; pages 9 and 10.)

SELECTION OF STATIONS.

The stations for the observation of the currents were chosen to ascertain the actual nature of the currents met with on the main steamship route already referred to; and also whether there were any currents of a constant character, or any general circulation in the north-eastern portion of the Gulf of St. Lawrence. As the first

question requiring examination, was whether there was any cross-current on the route from Cape Whittle to Heath Point, the first station occupied in the early part of July, was station A between these points, and at the middle of the channel lying between Anticosti and the north shore. (See chart, Plate I). This station is at an equal distance from the nearest shores on the two sides of that channel; being 35 miles off Table Head, Anticosti; and also 35 miles off Kegashka Bay on the north shore. It is also a little within the line joining Cape Whittle and Heath Point; and is, therefore, well placed to ascertain whether there is any indraught or outflow of current along the line of this channel. The depth of water is 155 fathoms. The weather was exceptionally quiet and favourable; and as spring tides occurred while there, any tidal influence in the current should be at its maximum.

Station B is 24 miles S.E. of Heath Point, and lies on the centre line or axis of the island of Anticosti; and it is also at the intersection of lines lying tangent to the 30 fathom banks, off the south-west and north-east sides of the island at its eastern end. It is thus well situated to obtain the direction of currents which may be guided by the trend of either shore of the island, or the edges of the outlying banks. The depth of water is 52 fathoms.

It was desirable to occupy this station again in September; but as the weather was then more broken, a position was chosen at station H, nearer to Heath Point. In this way it could be more quickly reached whenever the weather was sufficiently moderate to hold at anchor. During nine days anchorage was made four times at this station; and two of these days were too rough to make the attempt. Although the position made was closely the same each time, the depth ranged from 35 to 42 fathoms. This was still sufficient for good under-current observations.

Station C is 18 miles off Cape Whittle, where the main bend in the north shore occurs. It affords a good position to ascertain any relation between currents that may follow the trend of the shore in either direction; and also to detect any tidal element which may influence the currents.

Stations D and E are situated further to the eastward along the north shore. They are 13 to 15 miles from the coast, which makes their situation similar to station C, with reference to any current which may follow the direction of the coast itself. Station E is so placed also, as to be away from the vicinity of the inlets on that part of the coast, and thus to avoid any local cross-currents of a tidal character. The depth at station D is 45 fathoms, and at E, 98 fathoms. These six stations all lie in the vicinity of the steamship route from Belle Isle to the St. Lawrence.

Stations F and G are similarly situated with respect to the coast of Newfoundland; and the same considerations influenced the choice of their positions. Station G is quite beyond the influence of any local current from Bonne Bay. The depth at these stations is 40 and 42 fathoms respectively. It was found better, owing to the irregular character of the currents themselves, to occupy these eight stations for a longer time, rather than to attempt observations at a greater number of points, in the time available for the work.

GENERAL CHARACTER OF THE CURRENTS.

In the region referred to, the currents in the summer months are all very moderate in their speed, usually ranging from about half a knot to one knot per hour. It is reported, however, that there are currents much stronger than this in the spring of the year; but this we will have occasion to refer to again. In their direction the currents are extremely variable and irregular, especially towards the surface; that is, in the layer of water between the surface and five or ten fathoms in depth. Below this, the under-current at 20 and 30 fathoms may sometimes show more definite characteristics; as for example a tendency to make constantly in some one direction, or to vary with the tide. The surface current often appears, therefore, to have little relation to the under-current in its direction or velocity, in the time at which it slacks, or the manner in which it veers.

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The reason most probably is that the surface of the water is more directly affected and disturbed by the influence of the wind; while the under-current may continue to follow the law which dominates in any particular locality. A noteworthy example of this has already been described in the case of the current in the Strait of Belle Isle. (See annual report, Marine and Fisheries, for 1894; page 99.) The usual tidal character of the current in that strait is maintained by the under-current, at times when the surface current is gradually acquiring a constant set in one direction under the influence of heavy and continuous wind.

It is thus essential to give careful attention to the investigation of the under-current in order to understand the surface current itself; for if it is the movement of the under-current which is more in accordance with the normal conditions of the locality, it will come up to the surface as soon as the disturbing influences which have been acting on the surface of the water, cease to operate. The study of the under-current is therefore also necessary, if any hope is entertained of arriving at the general circulation in this portion of the Gulf, or the true relation of its currents to the causes which influence them.

The general causes which act upon both the surface and the under-current, and often affect them so differently are:—1. Tidal influence. 2. The influence of the wind and barometer. 3. A cause of a wider character which shows itself as a tendency in the current to set constantly in some one direction.

In describing the actual behaviour of the currents as ascertained from the observations taken, and from the information which was collected during the season, we will have occasion to refer to the effects of these influences upon the currents, so far as they can be traced. The observations will also show the limiting speed of the currents; their prevailing directions; and the range of direction in which they may possibly set; all of which is of direct practical value.

NATURE OF THE CURRENTS AS OBSERVED.

The positions of the stations at which the observations were made, are shown on the outline chart, Plate I. The actual directions of the surface current at the various stations are shown in Plates II. and III., in which the times of high water and low water from the tidal station at South-west Point, Anticosti, are also given for comparison. In Table I., a summary is given to show the time during which the current set in each direction at the various stations, and the time during which there was no current. This table is made from the observations of the current every half hour, by summing up the total number of half-hours during which the current set in each direction. It serves to show whether the current has any dominant direction; and also the directions through which it may veer and in which it is most prevalent. The same result is shown graphically on the chart, Plate I.; where the arrows radiating from each station in the eight leading directions, indicate the prevalence of the current in each of these directions. (The length of the arrow gives the time that the current ran in its direction, as a percentage of the total time that the station was occupied. Hence the total length of the arrows at each of the stations is the same, if the time during which there was no current, is allowed for; as this length makes up 100 per cent in each case.)

The observations of the under-current are given in Table II. The direction and velocity at the surface and three fathoms, were obtained from the surface float and the meter record. From three fathoms downwards, the results were obtained by the deep fan as already explained. Many of the individual results given at the different depths, were careful averages, or were taken twice, or checked by both meter and fan. Any results in which there was any uncertainty, from the swinging of the ship or other causes, are omitted; and in this way some of the longer intervals of time for which no observations are given, are accounted for.

In reviewing the results obtained at the different stations we may first notice those at station C, as this is a typical station in the central part of the region under consideration. It will thus serve to illustrate the nature of the currents in the open waters, as this station lies 18 miles off Cape Whittle. It was also occupied twice,

for five days in July and four days in August. Continuous records were thus obtained for 89 hours in July and 87 hours in August, or 176 hours in all.

The way in which the current veers completely around the compass is very noticeable. (See Plate III.) From 27th July, at 14 o'clock, till 30th July, at 5 o'clock, the current in 63 hours veered completely round *four* times. This veering was right-handed or in the direction of the hands of the clock; and the period of one complete revolution was 16 hours on the average. During the same time there were *five* complete tides from high water to high water, occupying 61 hours in all, or on the average the usual tidal period of a little over 12 hours. This was followed by three oscillations in the direction of the current from S.E. to N.E. during the succeeding 24 hours. As the veering of the current occupied a longer period than the tidal intervals, the direction of the current was necessarily out of relation with the time of the tide, but the regular character of the veering may be taken as an indication of tidal influence. This is the more probable, as the more regular veering was immediately after spring tides, and the later oscillations in the current were towards the neaps.

In August the station was again occupied from the 12th to the 15th. This was shortly after the spring tides, as the moon was new on the 9th. As the weather was also very calm, the tidal character of the current was more distinct than before. During the rise of the tide the set of the current ranged from west to north, and judging by the day observations, when the average direction between the surface and 18 feet was obtained, the dominant set during the rise of the tide was to the N.N.W. During the fall of the tide, the direction of the current is more irregular and fluctuating, but it may probably be taken as ranging usually from west to south. A time of veering and slack water is also noticeable about high water and low water. The velocity of the current did not exceed one knot per hour in any direction.

We thus find that while there is least wind disturbance, the surface current makes on the whole in westward directions, although it veers and fluctuates as just described, under the influence of the tide. But when the influence of the wind is also taken into account, the actual set of the surface current is very nearly equal in every direction. This will be seen by comparing the directions of the current during each of the two periods in July and August taken separately, with the total or combined results of all the observations. The directions in each period by itself are shown near the lower right hand corner of the chart, Plate I.; and the combination of the two periods is shown at the true position of station C on the chart. The period in August may be taken to show the direction of the set while undisturbed, and including only the veer produced by the tide, as the weather was then very calm. The prevailing direction of the wind during the summer season is south-westerly, and this season the wind was more constantly than usual in that quarter. It appears, therefore, that the influence of this wind when combined with the tendency of the current to set dominantly to the westward, produces an actual set which on the whole is nearly equal in every direction.

This tendency of the current to set to the westward, is more distinctly shown by the under-current, as it is less influenced by the wind. The set of the under-current at 20 and 30 fathoms ranged usually from west to north, or in a general north-westward direction. That this was its dominant direction will be seen in the following table, which is condensed from all the under-current observations of July and August, given in Table II. The figures are the sums of the velocities in knots in each direction, whenever any current was found; which is sufficient for comparative purposes.

STATION C.—Direction of the under-current at 20 and 30 fathoms.

	S.	S. W.	W.	N. W.	N.	N. E.	E.	S. E.
In July.....	0·4	0·0	1·2	1·9	0·8	0·8	0·9	0·4
In August.....	0·4	0·3	0·4	0·4	1·0	0·3	0·2	0·0
Total.....	0·8	0·3	1·6	2·3	1·8	1·1	1·1	0·4

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The under-current thus makes in a dominant direction, while the surface current usually veers in all directions, and during any short period there is, therefore, no relation discernible between them. The directions of the under-current, when classed according to the rise and fall of the tide, fail to show any tidal character. If there is any tidal influence it is so obscure as to be indeterminate.

Station A, half way between East Cape and Natashquan Point, in the middle of the channel north of Anticosti, was occupied without interruption from 8th to 15th July, and continuous observations were obtained during 130 hours. The current was found to veer completely around the compass, and the direction in which the veering took place was right-handed, as at station C. The period of a complete revolution was not quite so definite, but it ranged from 14 to 18 hours, which was much the same on the average. As the period is again longer than the tidal interval between successive high waters, the current at this station also is necessarily out of relation with the tide. The only other distinct feature which this current shows is the tendency to make to the southward of a line lying east and west, rather than to the northward. (See Table I.) The direction of the surface current is thus outward from the channel north of Anticosti, and a comparison will be given further on, to show its amount with reference to the influence of the wind.

Station B, at 24 miles S.E. of Heath Point, Anticosti, was occupied from 15th to 23rd July; and station H, in the same vicinity (13 miles S.E. of Heath Point), was occupied several times between the 16th and 26th September, as already mentioned. The total time during which observations were obtained here in the two months was 180 hours. It was expected that tidal influence would be more felt here, as this position is near the main entrance to the St. Lawrence. The surface current showed much the same character, however, as that already described at the other stations. The direction of the current would sometimes veer completely round the compass in about 16 hours; and it would also make a half revolution in 8 or 10 hours. This veering was usually right-handed, but there was sometimes also a left-handed veer from S.E. to E. While veering in this way, the current would sometimes set directly towards or from the end of the Island of Anticosti for as much as three hours at a time. A persistent set to the eastward for 8 or 10 hours at a time is also very noticeable. Once or twice also there was a sudden reversal of the set from the eastward to the westward. (See Plate II.) The more continuous observations of July showed the more dominant set to be between N.E. and S.E. In September the current veered much in the same way, and occupied about 9 hours in making a half revolution, either in a right-handed or left-handed direction. The velocity in July was not more than one knot; but in September it exceeded one knot on the 21st and 24th. This was probably due to the influence of the heavier winds in that month.

At Stations B and H, fifty-seven observations of the direction of the under-current at 20 and 30 fathoms, were obtained in July and September. (See Table II.) These were all classified in relation to the time of high and low water, at South-west Point, with the following result: A slack time in the under-current was found on seven occasions, which occurred at half tide, either rising or falling. For three hours before and after low water the under-current makes on the whole to the north-eastward and eastward, its direction ranging from N. by W. to E.S.E.; and for three hours before and after high water, it makes on the whole to the south-westward and westward, its direction ranging from S. to N.W. In the fifty observations in which the current had a definite direction, there were only four exceptions to the above rule; and these occurred near to the time of half tide, rising or falling.

The following table shows the relation between the tide and the direction of the under-current. The period of three hours before and after high-water is indicated as "H.W." and the remaining period before and after low-water as "L.W." The figures give the number of times that the under-current set in the directions indicated, out of the 50 observations obtained.

STATIONS B AND H. Direction of the under-current at 20 and 30 fathoms, in relation to the tide.

Period.	N.N.W.	N.	N.N.E.	N.E.	E.N.E.	E.	E.S.E.	S.E.
"H.W."	0	0	0	1	0	1	0	0
"L.W."	0	5	4	4	3	2	2	0

Period.	S.S.E.	S.	S.S.W.	S.W.	W.S.W.	W.	W.N.W.	N.W.
"H.W."	0	3	3	2	7	8	2	1
"L.W."	0	0	0	0	0	1	0	1

It thus appears that the under-current has a definite set in two directions in accordance with the tide, while the surface current continues to veer completely round in such a way as to be quite out of relation with the tide. The two dominant directions of this set are, to the W.S.W. while the tide is high, and to the N.E. while the tide is low. These directions are nearly across the end of Anticosti Island. To determine the true relative amounts of the set in these two opposite directions, the average velocity of the under-current towards each of the points above given, was first found from all the observations obtained at Stations B and H; the amount by which the current makes towards the N.E. and W.S.W. respectively, was then carefully computed; (by adding together the components of these average velocities as projected on axes lying in these two directions). When finally reduced to a percentage for convenience in comparison, the result is as follows:—

Amount by which the under-current makes towards the N.E. = 100.

Amount by which the under-current makes towards the W.S.W. = 116.

This shows that the amount by which the under-current makes to the W.S.W. is 16 per cent greater than towards the N.E. The water thus makes to the westward on the whole, around the east end of Anticosti; which is very significant in relation to the general circulation, and in showing also the direction from which the water comes, which forms the return flow to make up for the Gaspé Current. (See report of progress, April 1896; pages 27 and 28.)

Station D was situated at 15 miles S. by W. of Great Mecattina Island, and its position was fixed from the beacon on Flat Island. It was occupied during six complete tides, from August 19th to 22nd. The current was very irregular in its direction, however; and the only indication of tidal influence is that it appears to set more steadily to the southward about the time of high water, and to be slack and variable about the time of low water, but these indications are obscure owing to the irregularities which occur. The dominant direction of the set is thus to the southward, and this direction is off shore. The under-current however, at 20 and 30 fathoms, makes very constantly along shore to the south-westward. This is important with relation to the general circulation in the Gulf.

At Station E, 13 miles off Shecatia Bay, observations were only obtained during two complete tides, or 30 hours in all, owing to interruption from rough weather. Where the irregularity is so great, this time is too short to give any relation with the tide. The direction of the under-current was both to the S.W. and N.E., but more frequently to the S.W. The change in direction might prove to be due to tidal influence, as this station may be near enough to the Strait of Belle Isle to be affected by its tides.

At Station F, 10 miles N.N.W. of Rich Point, the tidal element is distinct. The ebb and flood run alternately in nearly opposite directions, as shown on the chart, Plate I. The turn of the tide is felt first in the under-current which makes its way up to the surface and replaces the former direction of the surface current, in a way that often occurs in tidal currents at some distance off shore. This station lies between the influence of the constant current which follows the west coast of Newfoundland, and the tidal influence of the Strait of Belle Isle. It is probably for this

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reason that the directions of the ebb and flood are nearly at right angles to the trend of the shore, and not because of the proximity of this station to St. John's Bay.

Station G is situated off the long stretch of straight coast on the west side of Newfoundland. It is at 12 miles E.N.E. of Cow Head, and was occupied several times from the 3rd to the 14th of September; shelter being found meanwhile in Bonne Bay, when the weather was too rough to obtain results. The total time secured at this station was 72 hours. The current here sets almost always to the north-eastward, and very seldom veers in direction through a wider range than from N.N.W. to E. When at the one extreme of this range, it sets directly off shore; and on one occasion it set on shore to the S.E. by E., during $3\frac{1}{2}$ hours. The relative frequency of these directions is shown on the chart, Plate I.; and also the evidently dominant direction of the current along the shore to the north-east. In the under-current, this direction is even more definite. At 20 and 30 fathoms, it does not veer through a greater range than from N. to E.; and even at 10 fathoms, the dominant direction is better maintained than by the surface current. At this station, it is not unusual for the whole of the current from the surface to 30 fathoms, to set in the same direction for three hours at a time, especially when this direction is N.E. or E.N.E.; and it is then also strongest, its velocity being nearly one knot at the surface, and falling off to half a knot at 30 fathoms. This is the only station at which the current showed so definite and constant a character.

Some instances of the relation of the under-current to the surface current may also be given to illustrate the way in which changes may pass from the one to the other. The one may best be taken from the observations at stations B, H and C. (See under-current observations, Table II.) There is at times a distinct difference in the current, between the surface and three fathoms, especially when the current is changing. The current may slack off first at the surface, while it still retains considerable strength at three fathoms. This could sometimes be observed very distinctly on calm days; when the surface of the water was found to be quite still as shown by floating objects, while the meter and fan agreed in showing a current of as much as half a knot at three fathoms. (See Table II.; station B, 21st July; station C, 12th August; &c.) This may occur when the under-current is making its way up to the surface. At station B, on 21st July, the line at which the under-current struck up to the surface could be seen as a distinct current rip, which approached gradually, and on reaching the vessel carried objects in its current which had been floating around it for an hour previously.

On the other hand the surface current itself may consist of a comparatively thin layer, only 5 or 10 fathoms in thickness; and below this the water may be quiescent. A number of instances of this will be noticed in Table II; as it is much more usual than to have the surface layer at rest, with a distinct under-current running immediately below it. Such a surface current may even set in after a slack time, by a moving layer making its way over the surface of the water. This once occurred on 13th August at station C. The day was very calm and the edge of the moving surface water was visible as a distinct line or current rip. This came up to the point of observation at 16:30; and it was over two hours afterwards before the new current could be felt as far down as 10 fathoms. These changes are remarkable, so far from shore as 18 and 24 miles, and when the currents themselves do not exceed one knot in their speed.

When it is the surface layer only which is in motion, its thickness is sometimes very distinctly marked. At station H, on the afternoon of 24th September, when the current was as strong as ever observed, its velocity fell sharply at a depth of 12 fathoms, from over one knot to less than half a knot per hour. For over an hour the current thus remained slow at 13 fathoms and below; while very strong from 11 fathoms upwards.

It may also happen that the only movement of the water is in a layer at a depth of 10 or 20 fathoms; while the water at the surface and below is quite still. (See station G, 14th September). At times also there is a bottom current at 40 or 50 fathoms, which may have a direction of its own. As a result of these movements at various depths, the current sometimes had what may be called a spiral character;

or an apparent veering in direction with the depth from the surface downwards, at any given moment. As time went on, the under-current usually veered the same way as the surface current, although several points behind it in direction; but instances of these currents veering in opposite directions were not unknown.

These changes in the depth of the water will help to explain the changes in the surface current itself. They also show that the drift of the mere surface layer of a few inches or a foot in thickness, may not represent correctly the direction in which the current will set a vessel of ordinary draught. If the currents in such waters are ever examined by means of drifting floats, these should consist of spars floating upright in the water, and reaching to the same depth as the average draught of the vessels for which it is desired to ascertain the set of the current. Such spars would of course require to be weighted at their lower ends, and to have a hollow ball or a disc of wood at the upper end to keep them from sinking, and to avoid any exposure of surface to the wind.

Shore Currents in the Channel north of Anticosti.—The direction of the current off East Cape, Anticosti, was observed during the day time from 7th July to 10th August. The current sets north or south along the shore; and its direction was indicated by two buoys attached to each other as already explained. These buoys were placed 1½ miles off the cape, in 30 fathoms of water. The direction of the current was noted every two hours from 5 or 6 a.m. to 7 or 8 p.m. and also the time at which the currents changed in direction. The shore runs north and south; and the current was nearly parallel to it. But it was very irregular, as sometimes it set in the same direction all day, for two or three days in succession; and it was comparatively seldom that there were two changes of direction during the day, as in the case of ordinary tidal currents. A summary of the observations obtained on twenty-three complete days in clear weather, during the above time, gives the following result:—

- On nine days, the current ran in the same direction all day, either north or south.
- On nine days, one change in direction occurred.
- On five days, the direction changed twice.

It is, therefore, clear that in these circumstances it is not possible to make out any relation between the current and the tide. On the other hand, the observations show that the prevailing set of the current is to the southward. The total number of times that the direction of the current was noted was 231; and out of this number the set of the current in each direction was as follows:—

Current setting to the northward.....	78 times.
Current setting to the southward.....	153 do

This may be taken as a fair comparison; as during the course of a little more than a full month, the observations are distributed pretty evenly over all the states of the tide.

At Natashquan Point on the other side of the channel north of Anticosti, the direction of the current was obtained in the same way, by means of buoys. The observations were more continuous, extending from 9th July to 19th September and including the time of daylight on each day. The direction of the current was usually north-west or south-east; although it sometimes veered two points or more from these directions. This is parallel to the general direction of the coast. The current sometimes ran in the same direction all day, for two or three days in succession; and this feature was even more noticeable here than at East Cape. When a change in direction occurred, it took place at any time, without reference to the time of the tide.

In classifying the whole of the observations with relation to the rise and fall of the tide, it appears that during the rise of the tide the set of the current is very nearly equal in each direction; but during the fall of the tide, the set to the south-east largely predominates. This is, therefore, the dominant direction on the whole. The direction of the current was noted 627 times in all; and out of this number, the set of the current in each direction was as follows:—

In directions between N. and W.....	218 times.
do S. and E.....	409 do

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The set of the current is thus distinctly outwards on the whole, in much the same proportion as at East Cape. The "constant currents" shown locally on the Admiralty charts at these points, must therefore be taken to mean that the current sets in the direction indicated about twice as often as in the contrary direction. We will refer again to the relation of these currents to the general circulation.

Influence of the Wind. In moderate weather, when the wind was light and variable, or blowing steadily in one direction, the current would veer completely round the compass as already described. The only effect, therefore, which it would be possible to attribute to the wind, in the tendency of the current to set in some dominant direction. The best comparison of this character which can be made is at Station A. This was the most open of all the stations, as it was 35 miles from the land on either side; and the direction and mileage of the wind were, therefore, well observed on board. Also, the direction of the current as observed at this station, was the direction on the surface only, where it is most under the influence of the wind. The set of the current (see Plate I.) was mostly to the south-east; and least towards the N.W. and N. The total mileage of the wind while the station was occupied, from 8th to 15th July, was 1,967 miles during 156 hours; or only 12 miles an hour on the average. The mileage of the wind in each direction is given below, in comparison with the set of the current as observed during 130 hours. (The figures for the current are the number of half hours in each direction, as in Table I. There were 8 hours of calm, and 25 half-hours of no current, which are omitted in the comparison. The directions are magnetic throughout.)

Mileage of wind	S. 125	S.W. 332	W. 359	N.W. 955	N. 79	N.E. 28	E. 16	S.E. 73
Set of current	N. 13	N.E. 18	E. 37	S.E. 50	S. 40	S.W. 37	W. 28	N.W. 12

This comparison shows a distinct correspondence between the wind and the more usual direction of the current. It may, therefore, be taken to indicate the general influence of the wind, when a long period is taken as a whole, to cause a leading drift or set in its own direction. It is to be noted, however, that during any shorter period the current was veering round continually, while the wind often maintained a steady direction.

At station B, and at C in the month of July, the dominant direction of the surface current also accords in general with the direction of the greatest mileage of wind at the time. At these stations the tide has a greater influence relatively to the wind than at A; but the influence of the wind is still sufficient to overcome in the surface current the tendency which the water there has to move in other directions, which are indicated by the under-current. This will be seen from the following tables, which give the comparison between the wind and current in the same way as for station A. The comparison at station B is for a period of 107 hours, from 17th to 23rd July, in which 11 hours of no current are omitted; and at station C, for a period of 90 hours, from 27th to 31st July, in which 1½ hours of no current are omitted.

STATION B.—Mileage of wind.....	E. 0	S.E. 0	S. 311	S.W. 941	W. 355	N.W. 195	N. 87	N.E. 0
Set of current.....	W. 12	N.W. 8	N. 16	N.E. 41	E. 65	S.E. 30	S. 15	S.W. 5
STATION C.—Mileage of wind....	E. 0	S.E. 0	S. 30	S.W. 1147	W. 325	N.W. 0	N. 0	N.E. 42
Set of current.....	W. 9	N.W. 6	N. 22	N.E. 45	E. 35	S.E. 36	S. 18	S.W. 6

During the month of July, the heaviest wind at any of the stations was on the 30th at station C. From 14 o'clock on the 29th to 20 o'clock on the 30th the wind blew steadily from S.W. by W. The total mileage from that direction was 659 miles in 30 hours; yet this amount did not increase the thickness of the current beyond 10 fathoms. On the 30th, from 8 to 20 o'clock, the rate of the wind was 26 miles per hour. During that time the current set as shown below; the only exceptional feature was a left-handed veer from S.S.E. through E. to N.E. This may have been due to the wind; although it veered back to S.E. while the wind maintained the same direction, and continued to increase.

July 30th. Hour.....	8	10	12	14	16	18	20
Set of Current.	S.S.E.	S.E.	E.S.E.	E.	N.E.	E.	S.E.

The heavy winds above mentioned increased to a gale on 31st July and 1st August. There was also heavy weather in the middle of the month; but there was no opportunity to occupy a station immediately afterwards on either occasion.

In the windy weather of September, good observations could not be obtained in the early part of the month while at station G; as Bonne Bay was used as a harbour in rough weather, and the mountains around it made wind observations unreliable. There is no permanent meteorological station in that region. The off and on-shore directions of the current occurred, however, at such times as to make it possible that these were due to the effect of wind or barometer.

The best examples of heavy winds were obtained in September at station H, off Heath Point, where there is little or no shelter to be had. On 21st September there was a strong westerly wind, which changed at midnight to N.E., and veered by the morning of the 22nd to nearly E. The current on one of these days veered in the usual right-handed direction, and on the other the veer for some hours was in the reverse direction. A comparison of the wind and current are given below:—

Sept. 21st. Hour.....	9.00	11.00	13.30	16.00	Wind velocity during 8 hours; 25 miles per hour.
Direction of wind..	W.	W. by S.	W.S.W.	W. by S.	
Set of current.....	E.	S.E.	S.	S.W.	
Sept. 22nd. Hour.....	10.00	11.00	13.00	14.00	Wind velocity during 8 hours; 26 miles per hour.
Direction of wind..	E. by N.	E.	E. by N.	E. by N.	
Set of current.....	N.W.	N.W. by W.	W.N.W.	W.	

On the night of the 22nd and during the 23rd, the wind increased to a gale from the E. and N.E. Its rate was over 50 miles an hour; and the waves reached a height of 14 feet and a length of 180 feet from crest to crest. The total mileage of wind from an easterly direction during 32 hours, up to 16 o'clock on the 23rd, was 1,163 miles. The wind then moderated, and backed into the north; and during the following day, the 24th, it varied between N. and W.N.W., with an average rate of only 15 miles per hour. The current on that day, from 9 to 21 o'clock, veered from N.E. through S.E. and S. to S.W. It thus made half a revolution in the usual right-handed direction in 12 hours. The current in the morning was setting against the direction of the heavy wind of the previous day. It also veered during the day to the right, while the wind backed to the left; and by evening it was setting directly across the new direction which the wind then had. It is, therefore, difficult to know what effect to attribute to the influence of the wind; unless it be that in backing against the usual direction in which the current veers, it may have lengthened its period of rotation.

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Throughout the night of the 24th the wind averaged 26 miles an hour for 12 hours, and it veered again from N.W. to N.N.E. On the 25th the wind fell off during the forenoon to a calm; and towards evening it set in as a light breeze from the S.W. The current in the morning was W.N.W. and from 10.30 to 18.30 it veered to the left, making a half revolution from N.W. through south-west to S.E. in 8 hours. The current in the morning was thus nearly contrary in direction to the strong wind of the previous night; and during the day it veered round in the reverse direction to that which the wind had taken. Also both morning and evening the current was setting at right angles to the direction of the wind which was blowing at the time.

From these examples, when strong winds were best observed, and stations were occupied at the time or immediately afterwards, it is quite evident that the current does not run in the same direction as the wind which is blowing locally at the time. On the contrary, the current continues to veer as usual; although its movements appear to be more disturbed; and the strength of the current was also greatest during windy weather. The current at any given time may thus set in any direction quite irrespective of the wind; while on the other hand it is to be inferred that when continuous observations can be obtained for as long a period as a week, it would be found that the greatest amount of set had taken place in the same general direction as the greatest total mileage of wind.

Usual veer of the current in relation to wind and tide.—If we look for an explanation of both features which these currents show, it might, therefore, seem reasonable to attribute the veering in the direction of the current to tidal influence; and to consider any tendency of the current to set in a dominant direction as due to the influence of the wind. The difficulty in adopting this view is, that the period in which the current veers completely round is 16 hours on the average, at the more open stations. The period is thus nearly four hours longer than the tidal period of about 12 hours; and this difference in the two periods results practically in an entire want of relation between the direction of the current and the time of the tide.

It is possible to suppose that the longer period of 16 hours is of the nature of an over-run, which is brought into harmony with the tidal period by the time occupied in veering in the reverse or left-handed direction which sometimes occurs. The observations do not favour this view; as it is during the least disturbed periods and also when the tidal influence is greatest, that the 16-hour period is most distinct. But if this should prove to be the case, some explanation might be found in the tidal interference between the tide entering the Strait of Belle Isle and the main tide of the Gulf of St. Lawrence which enters through Cabot Strait. Otherwise we must look for some cause which is capable of lengthening the ordinary tidal period by retarding the rate of veer in the current itself.

The period could not be lengthened by the combined effect of a tidal rotation and a wind drift. The effect of a steady wind on a current which was veering continually with the tide, would be to make it set more strongly and veer more slowly when it ran with the wind; and to be slacker and veer more rapidly when setting against the wind. But it would be impossible for a steady wind, or the surface drift which it produced, to alter the period of rotation, or the time which the current would take to veer completely round.

This period could only be lengthened by combination with another rotation in the contrary direction. If the wind itself were to back round continually to the left after the manner of a perpetual storm, it might produce this result. It is possible that the veering or backing of the wind may at times have an appreciable effect; and it is fair to remark that in the northern part of the Gulf of St. Lawrence, the wind as a rule backs to the left during storms, and thus tends to lengthen the period of veer in the current.

The only left-handed rotation of a constant character which we know of, is the general circulation in the Gulf itself, which we will see to be pretty conclusively proved when all the information available is considered together. It is difficult to say whether a slow circulation of this kind would have an appreciable effect on the veering of the current; but it may at least be allowable to point out that the lengthening of the

tidal period which we here meet with, accords with the opposite direction in which this general circulation takes place; and so far as our information goes, these two features are consistent and help to explain each other.

DENSITIES AND TEMPERATURES.

Throughout the region under consideration, the density of the surface water is higher and much more uniform than in the remainder of the Gulf. There were times, however, when lower densities were found in the neighbourhood of the eastern end of Anticosti. With this exception, the density of the surface water in the whole area lying to the north-east of a line from Cape Ray to Heath Point, and including the channel north of Anticosti, varies only from 1·0234 to 1·0242. This is based upon 231 determinations made throughout this region on all the courses run in July, August and September. It was very rare to find densities below the lower of these limits, except locally near the mouths of rivers. In the western end of the Strait of Belle Isle itself (off Forteau Bay at the beginning of September) the surface density was 1·0239 to 1·0241. These densities are the true specific gravity of the water at 60° Fahrenheit, determined with the same precautions to ensure accuracy as formerly used.

This result is important, in showing that the lower densities found in the south-western portion of the Gulf of St. Lawrence are confined to that side; and this further confirms the conclusion already reached last season, that the general set or drift across the Gulf, as shown by the water of lower density, is in the direction of a line from Gaspé to Cape North. (See general chart of density of water in the south-western portion of Gulf of St. Lawrence, Plate III., in Report of Progress of 13th April, 1896.)

The density in the open Atlantic, from seven determinations made at the end of June off the south and south-east coasts of Nova Scotia, was found to range from 1·0237 to 1·0242, which is practically the same as in this north-eastern portion of the Gulf. It may, therefore, be stated broadly, with regard to these two divisions of the Gulf, that throughout the north-eastern portion the average surface density ranges from 1·0235 to nearly 1·0245; while in the south-western portion, the density is below 1·0235, ranging usually down to 1·0220, and falling in the Gaspé Current itself to 1·0210. The dividing line between these two portions of the Gulf, runs approximately from the east end of Anticosti, to a point in the middle of Cabot Strait, about 20 miles west of Cape Ray. The densities in the border region near this dividing line, vary to some extent, just as the other lines of equal density elsewhere vary in their position.

On the other hand, the endeavour to obtain some differences locally, which would correspond with the various directions of the current, was without result; although a large number of temperatures as well as densities were taken at the various stations for this purpose.

The best observations to ascertain the amount of change in the temperature of the surface water with the season, were obtained at a series of points, five miles apart, on each of the following lines:—(1.) From 30 miles off Heath Point, to Cape St. George on 6th July. (2.) From station C, off Cape Whittle, to the offing of Cape St. George, on 3rd August. (3.) Same line as No. 1, run a second time on 28th September. The results were as follows:—

- (1.) July 6th. From 49½° to 51½° Average = 50.°93.
- (2.) August 3rd. From 50° to 54°. Average = 52.°68.
- (3.) September 28th. From 52° to 54½°. Average = 53.°62.

The following deep densities will also serve to show how closely they correspond with those found in previous seasons in other parts of the Gulf, at the same depths. (See Report of Progress, 13th April, 1896; p. 7, and tables A. to F.) Densities at these depths were also obtained for comparison in the open Atlantic off the Nova Scotia coast. These were taken at six points, at ten to fifteen miles from shore, on

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a course from the offing of Liverpool Bay, past Halifax, to 13 miles east of Cape Canso.

DEEP DENSITIES in the Atlantic, and in the north-eastern portion of the Gulf of St. Lawrence.

Locality.	Surface.	10 Fathoms.	20 Fathoms.	30 Fathoms.	50 Fathoms.	100 Fathoms.
In the Atlantic off Nova Scotia, June 30th, and July 1st, 1896.....	1·0240	1·0243	1·0245	1·0246	1·0245	
	1·0240	1·0243	1·0245	1·0246		
	1·0237	1·0243	1·0245	1·0246		
	1·0239	1·0243	1·0244	1·0243		
	1·0239	1·0243	1·0243	1·0243		
	1·0237	1·0239	1·0243	1·0243		
Station A.—July 10th.....	1·0234	1·0240	1·0243	1·0243	1·0246	1·0253
July 14th.....	1·0235	1·0239	1·0242	1·0245	1·0247	1·0255
Station D.—Aug. 21st.....	1·0236	1·0237	1·0242	1·0245		
Aug. 22nd.....	1·0236	1·0239	1·0244	1·0246		
Station E.—Aug. 24th.....	1·0239	1·0241	1·0245	1·0245	1·0248	
At 7 miles south of station E.....	1·0239	1·0240	1·0248	1·0248		
At 21 miles south of station E.....	1·0235	1·0241	1·0248	1·0248		
Station F.—Aug. 28th. Morning.....	1·0236	1·0241	1·0245	1·0248		
Aug. 28th. Afternoon.....	1·0238	1·0240	1·0247	1·0247		
Across the Strait of Belle Isle. Three points, 3 miles apart, Sept. 1st, 1896 {	1·0239	1·0240	1·0240	1·0245		
	1·0240	1·0240	1·0243	1·0245		
	1·0239	1·0241	1·0244	1·0245		
Station G.—Sept. 10th.....	1·0240	1·0240	1·0242	1·0246		
Sept. 14th.....	1·0238	1·0239	1·0243	1·0247		
Station H.—Sept. 21st.....	1·0240	1·0244	1·0246	1·0247		
Sept. 24th.....	1·0235	1·0238	1·0247	1·0247		
Sept. 25th.....	1·0235	1·0239	1·0246	1·0247		

The deep temperatures obtained show that in this region as elsewhere in the Gulf, the cold layer occurs at a depth of about 50 fathoms. The three points in the Strait of Belle Isle are on a line running across the strait from Amour Point to Green Island; in the same part of the strait in which the detailed examinations of 1894 were made.

Depth.	Station A.	Station D.		Strait of Belle Isle, Sept. 1st. Three points, 3 miles apart.		
	July 10th.	Aug. 20th.	Aug. 22nd			
Surface.....	50	54	55	52	53	57
10 fathoms.....	42	51	51	46	51	55
20 do.....	34	44	40	40	38	48
30 do.....	31½	36	38	.....	37	39
40 do.....	.....	31	35	.....	.....	.....
50 do.....	31	.....	.....	.....	.....	.....
75 do.....	31½	.....	.....	.....	.....	.....
100 do.....	36½	.....	.....	.....	.....	.....

INFORMATION OBTAINED REGARDING CURRENTS.

A considerable amount of information of value was collected during the season, with regard to the currents in this part of the Gulf. By taking advantage of the stormy weather, this was obtained with little loss of time to the main work in hand.

The fishermen were able to give the best information, because they anchor their boats, and thus have a fixed point from which to observe; while the masters of trading schooners have difficulty in distinguishing current from lee-way. On the other hand, sealing schooners which lie in the ice and drift with it, can often give satisfactory information. In obtaining information from the fishermen, care was taken to see that they described the currents as found at some miles off the open coast, away from the vicinity of large bays, or channels between islands, where currents of a local character might occur. By questioning the men of longer experience, and comparing their statements, reliable results could be arrived at.

Drift of the ice as an indication.—The currents in the early spring (March and April) are often well indicated by the drift of the ice, and numbers of small vessels are then engaged in seal fishing. It is necessary, however, to distinguish between the different kinds of ice which are met with, and also to keep in mind the difference in the movements of the surface water and the under-currents, as already explained; as otherwise the inferences drawn from the drift of ice may be far from correct.

The ice met with is of three kinds:—(1) Berg ice, or the true icebergs which come into the Gulf through the Strait of Belle Isle. They are also found off the south coast of Newfoundland, nearly as far west as Cabot Strait. (2) Flat or pan ice, forming fields or in broken pieces, usually not more than 6 feet in thickness, but sometimes as thick as 10 feet. This often jams or shoves along the shore or between islands, and may form masses 20 feet or more in thickness, but it can never be mistaken for berg ice. In this flat ice a distinction is sometimes made between "Northern ice," which finds its way in through the Strait of Belle Isle under certain conditions, and "Gulf ice," which forms in the Gulf itself. As the effect of the wind and current upon it is the same in either case, the distinction is not of importance for our present purpose. (3) River ice, from the St. Lawrence River and its estuary. This is also flat ice, and in the Gaspé region it can be readily distinguished by its appearance from the Gulf ice. It is not found, however, in the region which we are now considering.

The berg ice, from its great depth in the water, will evidently move with the under-current; and it will not be appreciably affected by the wind. These bergs do not necessarily indicate the direction of the current as affecting shipping, except when the surface current has also the same direction, which is not usual. They show in reality the average direction which the current has, between the surface and the depth of their draught. This draught is limited to about 35 fathoms by the depth of the strait. They are thus of much value as an indication of the general movement or circulation of the water.

The relation of the flat ice to the wind and current requires some little consideration. It is, of course, just as true of this ice as of the berg ice, that the greater part is under water; but as it is almost always in broken pieces, more or less piled and with upturned edges, the wind has a much greater hold upon it in proportion to its total weight, than on the berg ice. Even when this is allowed for, its depth in the water still gives the current a greater hold upon it than the wind has. For example, if such ice is drifting with a current in a given direction, and the wind is blowing across that direction at right angles, the ice will seldom be set more than two points, or three at the most, off the true direction of the current. When the ice becomes soggy or water-soaked and loses its edges, as it does later in the spring, it will set still more correctly with the current.

When the surface current itself is moving in the direction of long continued or prevalent winds, as it often does in this region, the ice naturally follows the same direction too. Also in regions where the current is tidal, and the ice in calm weather would drift as far in the one direction with the flood tide as in the other direction with the ebb, the direction in which it makes on the whole will depend upon the wind. It is probably for these reasons that it is so often said that the ice drifts with the wind; although this merely expresses the fact, without distinguishing between the relative influence of the wind and the current upon it.

There is also a direct effect which the ice has upon the strength of the current in regions where the direction of the surface drift is under the influence of the wind.

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The broken and upturned edges of the ice give the wind a much greater hold upon the water than it otherwise would have. Hence during long continued winds the velocity of the current is appreciably greater than if the ice were not present. This is undoubtedly the explanation of the common belief which is expressed by saying that "the ice makes its own current." It may be well to recall that the weight of the ice itself is the same as the water which it displaces, and, therefore, the wind has no greater mass to set in motion in producing a surface current than if the ice were to melt and refill the hollow which it makes in the water; while the presence of the ice gives the wind a better hold than it would have upon the surface of open water, free from ice.

There is one condition of the ice which may prevent it from showing correctly the drift of the water. When it is set against an island or headland and packed together for a long distance out, with open water beyond, it may circle round as on a pivot. The outer edge of the pack may thus make a long sweep very different in its path from the true set of the current; and its movements also become irregular, as vessels caught in such ice which are near together in the evening may be ten or fifteen miles apart in the morning.

Current and wind.—There is one relation between the wind and the strength of the current which was not observed at the stations, but which is so generally stated to be the case that it must be accepted as a fact. It appears to apply chiefly, if not entirely, to currents which are fairly constant in their direction. Such a current is found to run more strongly before the wind comes, if the wind is to be in the same direction, and it slackens if the wind is to be against the current. The fishermen when anchored in their boats take these indications as warnings of the approach of heavy weather. This change in the current before heavy winds is found to occur on the south and west coasts of Newfoundland, and has also been noticed on the north shore of the Gulf of St. Lawrence. It appears to be due to the action of the wind during storms, in first holding back the water and then releasing it, and the low pressure area of the storm as it passes along also increases the result. It is also probable that the effect is more distinct in the case of confined waters, as it is very noticeable on the Great Lakes. It is from analogy with the conditions which obtain there that this explanation is suggested.

The information which was obtained with regard to the currents, was kindly furnished by the following persons:—

Captain Farquahar, of the SS. "Harlaw," which makes regular trips during the summer and autumn along the south and west coasts of Newfoundland. He has also been engaged in sealing in the Gulf in the spring.

George Curtis, for the last thirty years, has made three trips in the Gulf each season in a schooner; sealing in the spring, cod fishing in the summer, and herring fishing in the autumn.

Jonathan Noel, who has had a long experience in the Gulf as master of a sealing and trading schooner.

Also four masters of schooners, Wadman of Rose Blanche, Newfoundland; Isaac Shepherds of Bay of Islands; and two others.

On the west coast of Newfoundland, Jonas Shears, John Parsons and William Young, fishermen of long experience at Roche Harbour on the open coast at the mouth of Bonne Bay. Also fishermen of Whale Cove in Bonne Bay, Lark Harbour in the Bay of Islands, and Cow Head Harbour; who fish some miles off shore.

In the Strait of Belle Isle, Mr. T. M. Wyatt, lightkeeper at Amour Point, and Charles Davis, a resident of Forteau Bay. Also a fisherman engaged for the last thirteen years at the fishing establishment at Schooner Cove, Loup Bay.

Sam Gaumond, the only permanent resident on Great Mecattina Island. He has now lived there for many years.

Several fishermen at Natashquan Point and little Natashquan village.

Two fishermen, old residents of Fox Bay, near the east end of Anticosti; who are also well acquainted with the neighbouring coasts.

Mr. Z. Gagné, lightkeeper at Heath Point.

GENERAL CHARACTER OF THE CURRENTS IN THE NORTH-EASTERN HALF OF THE GULF.

We may now consider these currents as a whole, and trace their movements throughout the north-eastern half of the Gulf of St. Lawrence; and we will base this consideration upon the observations of this season as already detailed, supplemented by the information obtained, and the notes made by the captains of trans-Atlantic steamships. It will be best to begin with Cabot Strait itself, where the main interchange of water between the Gulf and the Ocean takes place.

Currents on the south coast of Newfoundland, and in Cabot Strait.—On the south coast of Newfoundland between St. Pierre Island and Cape Ray, the current makes to the westward, and passes around Cape Ray into the Gulf. This was found to be the case at the stations off Cape Ray where observations were taken in 1894 and 1895; and it is also shown by icebergs off St. Pierre Island, which make westward even against a north-west wind. It is stated in the Sailing Directions that when approaching the entrance to the Gulf of St. Lawrence (by Cabot Strait), the current generally sets to the southward on the Cape Breton Island side of the strait; but on the Newfoundland shore it has frequently been found setting to the northward about one knot an hour. (St. Lawrence Pilot, vol. II, 1895; page 12).

Captain Farquahar, of the SS. "Harlaw," which passes through these waters on its regular fortnightly trips throughout the summer and autumn, states that along the south coast of Newfoundland the trend is westward, and that the current sets inwards around Cape Ray. While fishing in summer, Curtis has had his schooner at anchor three or four miles off Cape Ray, and has found the current to be inwards. Anchorage cannot be had much further out, as the depth increases rapidly to 250 fathoms; but the observations and evidence show that this current is distinctly felt for a width of 8 or 10 miles out, and it must often extend considerably further, as it sometimes occupies half the width of Cabot Strait. There can be no doubt, therefore, that this is the usual current on the Newfoundland side of the strait; and that it is this which makes up for the water which leaves the Gulf in the outward current around Cape North, as already explained in former reports on this survey.

This outward current on the west side of Cabot Strait, which sets to the south-east past Cape North, is the most constant in one direction of any at the Gulf entrances, as it is rarely checked under any conditions that occur. But there is evidence to show that the inward current on the Cape Ray side, is not constant at all times. There are instances of sealing schooners in the ice about the month of March, which drifted in the opposite direction past Cape Ray. It appears, however, that while the inward current prevails, the water is usually open and free from drift ice, as it remains open off the south coast of Newfoundland throughout the winter and spring. This in itself is corroborative of the westward set of the current, as the Atlantic water must then be warmer than the Gulf water. The evidence goes to show that when there is ice in the offing of St. George's Bay and off Cape Ray, it comes from the opposite direction, with the general current which makes across the Gulf from Gaspé towards Cape North, and at times when this current or a branch of it, is driven further to the eastward than usual. It is apparently in this way that the outward drift of ice on the Cape Ray side is to be explained, as this undoubtedly occurs in the early spring of some years at least, and when certain winds prevail. The Sailing Directions remark that, in changeable weather, vessels can reach as far north as Lark Harbour, in the Bay of Islands, in any month, as it is only strong westerly winds which bind the ice in on the coast, and it soon clears away.

The ice is thus brought there under conditions which make it an indication of disturbance in the current, as otherwise the water would remain open. This disturbed condition of the current is also accompanied by circling movements in the ice. A schooner in the ice off St. George's Bay has circled around for several days between Cape St. George and Cape Ray without passing either of these capes. When there is ice in this locality, circling movements of a similar kind occur also in Cabot Strait itself, which indicate an inward current in some part of the width of

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that strait. There may thus be sufficient inward current to compensate for the outflowing water on the Cape North side, but it is also possible that the outflow from the Gulf may then be partly made up for by an inward flow through the Strait of Belle Isle, which is sometimes considerable in the early spring.

It is not clear what becomes of the current which passes in at Cape Ray. As a rule there is no appreciable current off St. George's Bay, and very little from Cape St. George to the Bay of Islands. We cannot thus trace this inflowing water as an actual current, but it is probable that it makes to the north-eastward, and diffuses itself over the Gulf in that region, because we find that the density of the water throughout the north-eastern portion of the Gulf is the same as in the open Atlantic, and this density could not be so maintained without some inflow of this character.

West coast of Newfoundland.—From the Bay of Islands to Rich Point the current becomes distinct, and runs along the coast to the north-eastward. It is stated by Lieut. Margesson, navigating lieutenant of H.M.S. "Buzzard," which has been stationed on this coast for three years, that the current in the summer season is always in this direction when it is felt at all, and that it usually amounts to one knot. It was stated by Lieut. Betty, navigating lieutenant of H.M.S. "Pelican," who had spent more than one season in cruising here, that there is an almost constant current running north-eastward along this coast between Cape St. Gregory and Rich Point, which is only intercepted by the flood and ebb tides running in and out of the larger bays on the coast. This is the most definite current, and the most constant, in the north-eastern portion of the Gulf, and its characteristics and the unusually steady flow of the under-current have been described from the observations at station G.

The fishermen on this coast anchor their boats as much as 10 or 12 miles off shore, in about 30 fathoms of water. They have thus an excellent opportunity of observing the behaviour of the current. It will be understood, however, that their information refers chiefly if not entirely to the surface current. They state that its prevalent direction is to the E.N.E. parallel with the shore; it will run constantly in that direction for three or four days together; and on the whole it has that direction for rather more than two-thirds of the time. For 12 to 20 hours before the arrival of a south-westerly gale, it sets more strongly in its usual direction; and before a north-easterly gale arrives, it slacks; although this is not so certain an indication of wind, as it may also slack at other times. With long continued easterly winds it may be reversed in direction. It may also set directly off or on-shore for three or four hours or even longer.

The current is stronger near the shore and weaker further out; as it is found that a schooner going westward will make better headway with long tacks; but if going eastward, with short tacks in-shore.

Flat ice, of about six feet in thickness, appears off Bonne Bay about January or February, and remains till March or April. The direction from which this ice comes is variously stated; some holding that it is formed in the Gulf, and others that it comes in through the Strait of Belle Isle; as they say that they can distinguish the gulf ice by its appearance from the northern ice from the strait. Icebergs have also been seen off Bonne Bay large enough to ground in 30 fathoms, but it is very seldom that they come further west on the Newfoundland side than Rich Point.

The ice serves, however, to indicate the usual direction of the current on this coast; as it drifts north-eastward in one day as far as it drifts south-westward in three days, with the same amount of wind one way or the other. A schooner caught in the ice off Cape St. George at the end of March, drifted along the coast as far as St. Barbe in about ten days; a distance of 190 miles; which gives on the average the ordinary rate of about one knot. The ice sometimes makes to the eastward all the way through the Strait of Belle Isle. In March 1896, two schooners caught off Bonne Bay, drifted with the ice eastwards through the strait, and were carried down the Atlantic side of Newfoundland to Notre Dame Bay.

Area at the western end of the Strait of Belle Isle.—Between Rich Point and the entrance of the strait, the current becomes tidal, and does not usually make in

one direction more than the other on the whole. The ice may make a considerable drift when the wind is with the current; but when against it, the ice stands and shoves. The observations obtained here, also show the tidal character of the current in this locality, as already described.

On the opposite shore off the Esquimaux Islands, the fishermen when anchored six miles from shore, find that the current usually runs along the shore in one direction or the other; but there are times when it sets off or on shore for a whole tide. We thus find at the western end of the Strait of Belle Isle an area in which the tidal element predominates; but in which the currents are irregular, and cross-currents are frequent. The area in which these conditions prevail, may be considered to extend from Greenly Island westward as far as a line running magnetic north from Rich Point to the Esquimaux Islands. There is also one of these cross-currents, which sometimes runs from Greenly Island south-eastward; and forms a strong set on shore towards Flower Cove.

Strait of Belle Isle.—The usual character of the current in this strait is tidal, with a flow which is nearly equal in each direction, while the current is undisturbed by heavy or long continued winds. Its behaviour under normal conditions, and when disturbed, has already been fully described in previous reports. (See annual report, Department of Marine, for 1894; pages 95 to 104; and Report of Progress, April, 1896; Plate 1). All the information obtained goes to show that the undisturbed condition when the flow is practically equal in each direction with the tide, is the usual one throughout the summer months. This is also confirmed by the report of Mr. M. H. Warren in 1854 to the Newfoundland government, based upon his observation of the current during a season which he spent there; as already quoted in the reports of this survey. (See Report of Progress, April, 1896; page 4).

In the spring and late in the autumn, however, the disturbance is greater; and the flow may be more persistent in one direction or the other. It is usually said that there is much inward flow to the west in the early spring; but if this is inferred from the drift of icebergs, it should be remembered that bergs which are carried in through the strait by the inward flow seldom return; as most of them ground or break up and melt in the Gulf. Hence the inward flow towards the Gulf is made visible, while the outward flow may not be. It is, therefore, necessary to take with caution any statements which may be chiefly based upon the drift of icebergs.

The usual tidal character of the current, and its equal flow in each direction during the summer months is confirmed by Curtis, who has had a long experience in these waters; but in the spring and autumn in his experience, the current although it does turn, runs longer and stronger outwards than inwards; and thus makes outwards on the whole even when the winds are easterly. This is corroborated by Noel from his experience in the ice while sealing in spring; although on the other hand they know that seals on the ice may be carried inwards through the strait into the Gulf, during heavy north-easterly winds.

Such evidence as the above refers necessarily to the set of the surface current; while on the other hand the drift of icebergs shows in which direction the flow takes place on the average of the whole depth; as the bergs are as large as the strait will admit. This explains the difficulty of arriving at just conclusions from the evidence; as we now know that it is the under-current rather than the surface current which indicates the balance of flow in either direction through the strait. If the movements of the icebergs were observed at equal intervals of time, and in relation to the tide, they would give a valuable result; but there are few men who take the care or have the opportunity to do this. It is also likely that in the spring, one year may differ from another with respect to the amount of water which enters or leaves the Gulf through the strait; but a careful consideration of all the evidence obtained corroborates the conclusion which was arrived at by this survey after the first season's work; that the usual tidal flow in the strait does not give more than a small difference in favour of the inward direction towards the Gulf.

In reply to circulars issued by this survey, reports have been received from the captains of trans-Atlantic steamships of the leading lines, which state the direction

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of the currents as met with on each trip made through this strait, between Belle Isle and its western end. The result is as follows:—In 1895, from 11th July to 18th October only eight trips were reported. Out of this number, the current set outwards to the east *six times*, with a velocity of 0·25 to 1·50 knots per hour on the average during the whole run through the strait; and *twice* there was no current or it was partly in each direction. In 1896, there are twenty-six trips reported, which were made between 27th June and 30th October. Out of this number the current set outwards *fifteen times* with a velocity of 0·25 to 2·00 knots on the average during the run. It set inwards to the west *five times*, with an average velocity of 0·75 to 1·50 knots; and *six times* there was either no current, or it was part of the time in each direction.

During the season of 1896, the fishermen at the western end of the strait, who have been there all summer, state that the current has run east and west with the tide, as it generally does. These men anchor their boats in 5 to 20 fathoms of water, or if further out, they drift up and down with the tide. They have thus an excellent opportunity of knowing the set of the current; as the strait is there only 12 miles wide. It is not so easy to gather from them in which direction the balance of flow has been the greater; but it appears that on the whole the current has made outwards to the east, rather than inwards, during the past summer. From the beginning of June to the middle of July, the winds were heavy; first, easterly, and later west and north-west. Since then there was a greater amount of south-west wind than usual throughout the summer. All kinds of weather came up with the same wind; and even fog, which is infrequent from that quarter. The winds in the early season did not bring in the ice as they generally do; but on the contrary the strait was clear of ice by 15th May which is earlier than usual. Although there was a great deal of ice at the Atlantic end of the strait throughout the summer, there were fewer bergs than usual which came into the strait itself, and none were seen west of Greenly Island. It is so reported by Captain Macauley of the SS. "Canada," Dominion line, and Captain Johnston, of the Allan line. The icebergs were numerous around Belle Isle, and many passed west of it, and out around Cape Norman; but comparatively few came up the strait west of that cape.

The temperatures of the water in the strait, taken on 1st September, when compared with the temperatures obtained during the season of 1894, show that the temperature of the water towards the surface was above the average. This corresponds most nearly with temperatures found during outward flow; but they are not so high as during the period of persistent outward flow for several days, which occurred five weeks earlier in the season of 1894. (See temperatures as observed on 21st July, 1894). The surface density on 1st September was 1·0239, which is distinctly lower than in 1894, when the average density at eight points in the strait was 1·0243 as observed early in July.

From a consideration of the evidence compared with these indications, it appears that the outward flow of this season was chiefly at the surface, and probably amounted only to a slight difference in favour of that direction; because the observations of 1894 show that the under-current may maintain its tidal character in the two directions, even when the surface current has a dominant set in the one direction, under the influence of the wind. The under-current thus tends to make the flow more nearly equal in each direction than the surface current would indicate. This is nevertheless important to note, while tracing the general circulation.

The North Shore. (Saguenay County, Province of Quebec.)—From the Esquimaux Islands or the offing of St. Augustine, along the north shore to Cape Whittle, all the evidence goes to show that the prevailing movement of the water is westward, if the direction of the under-current is taken into account as well as the surface current. The unusual prevalence of south-westerly winds this season, seems to have had its effect upon the surface current at station E, as well as in the Strait of Belle Isle; but at the three stations on this shore, C, D and E, the under-current made usually to the westward. Where the dominant direction is indicated more clearly by the under-current than by the surface current, the drift of icebergs is a valuable indication. The captains of the steamship lines have seen them as far

west as the Mecattina Islands, and sometimes, though rarely, they reach Cape Whittle. There is good evidence that a small berg was once seen in the early spring as far as Natashquan. From the independent testimony of two fishermen there, this berg was thirty yards square, and as high as the masts of a schooner. It appears to require a combination of favourable circumstances to bring them as far as this, however. The manner in which these bergs make their way westward is thus described by Noel:—An iceberg off St. Augustine drifted in one day on a south-west course to Treble Hill Island, making off-shore; next day it came squarely in towards the land on a north-west course; it afterwards continued on a south-west course, and so worked its way in. It is also stated by Curtis, that within two miles of the shore, where the current runs more strongly in both directions, it still makes to the westward on the whole, and that this applies to the whole shore from St. Augustine to Cape Whittle. It will be noted that the icebergs on this shore are carried to the westward more than twice as far as on the Newfoundland side, where they are rarely found beyond Rich Point.

The master of a schooner who spent the early spring of 1896 in the offing of the Mecattina Islands, states that the current then ran westward continuously during three weeks. The wind at the time was easterly, ranging from E. S. E. to E. N. E. At other times he has also found that this is its usual direction on the whole.

At Great Mecattina Island, which is well off shore, Gaumont states that the current runs in either direction, but is strongest to the westward. In the early spring the ice passes westward at a walking pace, which he estimates at three knots an hour. The channel between this island and the mainland freezes over in winter, and if the ice is more or less packed in it, the island becomes practically a headland, which may thus increase the current. The strength of the current is also indicated by the drift of a schooner which was becalmed on 3rd June last, off Outer Island. From dark at about 20 o'clock till 4 on the following morning, it drifted from there to Little Mecattina Island, a distance of 22 miles in 8 hours or nearly three knots per hour. It is unlikely that the current in the open, ever exceeds this rate of three knots except under special conditions in the Strait of Belle Isle itself. The fishermen not infrequently speak of much higher velocities in these parts; but it is always found on inquiry that these are over-estimated, or that they refer to local rips off points or in confined channels.

A measure of the velocity of the surface current in the eastward direction or contrary to its usual set, was obtained at the end of July, 1894, at three stations lying between Rich Point and the Esquimaux Islands. These stations were occupied immediately after prolonged westerly winds; and it was stated in the report for that year, that the velocities then found were probably as great as ever occur in this eastward direction, owing to the special conditions at the time. The velocity amounted to 0.79 of a knot per hour at the middle, and 1.19 to 1.37 knots on the two sides. The layer of water in motion had a thickness of only 5 to 10 fathoms. (See conditions as described in annual report, Department of Marine, for 1894; pages 103 and 104.)

Reports have been received from the captains of trans-Atlantic steamships, in reply to the circulars, in which the Gulf was divided into several regions. On the run between Heath Point and Greenly Island, the current which was met with on each trip is described, with the following result:—In 1895, from 11th July to 18th October, only eight trips were reported. Of this number, there were *six times* when there was no current appreciable; and *twice* the current set to the westward with a velocity of half a knot. In 1896 there are twenty-four trips reported, which were made between 5th July and 30th October. *Ten times* there was no current appreciable; *nine times* the current set eastward with a velocity which ranged from 0.20 to 0.75 of a knot per hour on the average during the above run; *five times* the current set westward, with a velocity which ranged from 0.30 to 0.75 of a knot on the average.

It is clear that in dealing with such currents as these, a distinction must be made between the set of the surface water and the direction in which the general circulation takes place. There can be little doubt that when both surface and

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under-current are taken into account, the movement of the water as a whole is to the westward on the north shore from the Esquimaux Islands to Cape Whittle.

The surface current will also have this direction when undisturbed, or during easterly winds; but its actual set is very irregular and may be in almost any direction. On comparing the observations obtained at stations C, D and E, with the other evidence, it is found that these observations may be taken as a good illustration of the ordinary behaviour of the current, as now stated; and they show that even when the surface current sets in other directions, the under-current still makes usually to the westward.

It is more than probable that the water which makes westward along the north shore is a return current corresponding with the north-eastward set on the Newfoundland side. There is no other direction from which this water can come; as any inflow that there may be through the Strait of Belle Isle is quite insufficient to keep up the supply. A large volume must make to the westward if this is in reality the usual direction of the under-current from about 15 fathoms downwards, where the total depth is seldom less than 40 fathoms.

The water must make across from the Newfoundland side to the north shore in the area already referred to, lying between Rich Point and the west end of the Strait of Belle Isle. On the western confines of this area, there is a constant current setting in from the south-west, and another setting out to the westward, while on its eastern side there is the strong ebb and flow of the strait itself. There may also be times when long continued winds give the surface current a drift which is either eastward or westward according to its own direction. As the depth ranges from 30 to 70 fathoms, it is sufficient to allow the water to make across to the northern side as an under-current, as it is quite possible that it does. The irregular character of the currents in this area is thus accounted for.

On the west coast of Newfoundland, the surface current and the under-current have the same direction; but in the return current on the north shore the direction is maintained chiefly by the under-current, while the current on the surface is not infrequently to the eastward. The reason of this must be, that in these latitudes the prevailing winds are westerly; and they are with the one current, and against the other; and thus reverse its surface drift.

Although the current on the Newfoundland side is thus the more distinct, the north shore current is the better known, as it lies more directly on the route of the Atlantic steamships; and that coast is also more frequented by fishermen. The icebergs carried westward by it may also have been taken as a corroboration of the old belief in the dominant inward direction of the current in the Strait of Belle Isle; but the examination now made, points to a quite a different explanation as we have seen.

Cape Whittle to Heath Point, and the Channel north of Anticosti.—From the observations of 1895, in the Mingan Strait, it appears that the current is there tidal, with a flow which is practically equal in each direction. (See Report of Progress, April, 1896, pages 17 and 18). There is, therefore, no through current to be expected in the channel north of Anticosti.

At Natashquan Point, which is half way between Cape Whittle and the Mingan Islands, the observations during the summer with the flag buoys show that the surface current makes out to the south-eastward more than inwards. The observations show this outward flow to be even more marked at East Cape, where the set is southward for two-thirds of the time. It is also stated by men who know Anticosti, that it is only on the short length of coast, from Table Head to East Cape, where the shore runs north and south, that the current has a dominant set of this character.

At station A the dominant direction of the surface current was found to be the same as the direction of the winds which had the greatest mileage at the time. As winds from the westerly quarter are the most prevalent at any time, it is probable that the surface current usually has this outward tendency. This is confirmed by the experience of Captain Macauley of the SS. "Canada," who states that in crossing from Heath Point to Cape Whittle, vessels are set more to the southward by north-west winds, than to the northward by south-east winds.

As there is no evidence of any through current in this channel, the outward tendency of the surface water must originate in the channel itself; and it appears to be balanced by an inward tendency in the under-current. The two series of observations obtained at station C, show that the current which sets to the westward along the north shore, on reaching Cape Whittle makes on the whole to the north-westward. This dominant direction is more marked in the under-current than on the surface; and this inward trend of the current around Cape Whittle is to be looked upon as an indraught to make up for the outflow on the surface.

These dominant directions of the current when taken together, point to the conclusion that the water on the whole makes across from Cape Whittle towards East Cape. It probably does so chiefly as an under-current; because the prevailing westerly winds influence the surface water in their own direction. But as the southward set is stronger on the Anticosti side, the surface water appears to be carried over against that side by the westward direction of the water off Cape Whittle; which shows that its influence is felt all the way across.

Off the east end of Anticosti, the water makes on the whole to the westward, as we have seen from the under-current observations at stations B and H. It is more than probable that this water continues westward, and contributes to the return flow which compensates for the Gaspé Current. The temperature and density of this water do not furnish any positive indication to show where it comes from; and although it may possibly be drawn from the central part of the Gulf, where the water coming in at Cape Ray diffuses itself, it appears more likely that it is water which has made its way across from Cape Whittle.

GENERAL CIRCULATION IN THE GULF.

Although there are few instances of currents in this region which run steadily enough to be termed constant, we have yet found it possible from continuous observation or long experience to arrive at a dominant direction for each locality; or the direction in which the current runs more frequently, and in which, therefore, the water makes on the whole. In reviewing these movements of the water, with a view to tracing the general circulation in the Gulf, it is the principle of the balance of flow which is the most evident. Wherever a current of a constant character occurs, there is a corresponding return current to make up for it. Thus in Cabot Strait, the outflowing water at Cape North is balanced by the inflow at Cape Ray; the north-eastward current on the west coast of Newfoundland is balanced by the contrary direction of the movement on the opposite shore; and we have fairly good indications of a return flow to compensate for the Gaspé Current.

It is this balance of flow which points to the nature and direction of the circulation of water in the Gulf. If we begin to trace it from Cabot Strait, where the balance between the Gulf and the Ocean takes place, the inflow at Cape Ray appears to diffuse itself more or less widely over the central part of the Gulf, but it regains its strength on the west coast of Newfoundland, and makes a deep bend into the north-eastern angle of the Gulf, and returns westward, as we have seen, along the north shore. On reaching Cape Whittle, it still makes westward; and, whether as an actual set, or by displacing water which comes more directly from Cape Ray, it appears to work around the eastern end of Anticosti, and so compensates for the outflow of the Gaspé Current from the estuary of the St. Lawrence. This current, after rounding the Gaspé coast, makes south-eastward as a general set or drift across the Gulf to the western side of Cabot Strait; and its waters there leave the Gulf in the outflowing current off Cape North. This current is still felt along the sweep of the north-eastern coast of Cape Breton Island, sometimes as far as Scatari, before it mingles with the waters of the Atlantic.

This general movement of the water in the Gulf is in accord with the uniform and relatively high density of the water in its north-eastern portion, already referred to; and explains why this density should be so nearly the same as in the open Atlantic; and also why there should be so small an increase in the temperature of the surface water with the progress of the season.

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This must, therefore, be the usual course of the water, more especially in the summer season when the currents are least disturbed. But if at times in the spring, the outflowing water in Cabot Strait occupies the greater part of the width of that strait, the amount of water required for compensation may then flow into the Gulf through the Strait of Belle Isle. Although it is quite possible that this may occur in the early spring of some seasons, the evidence does not point strongly in that direction. On the other hand, it is now more evident than ever, that there cannot be any through current across the Gulf from Belle Isle to Cabot Strait according to the old theory; as we now see that any inflow at Belle Isle would be turned along the north shore, rather than in that direction.

It also appears that the whole of the balance or compensation in the Gulf currents takes place at the surface and in ordinary under-currents, which do not probably extend to a greater depth than some 50 or 60 fathoms. There is nothing, therefore, to show the necessity for any appreciable movement in the deep water from 60 or 80 fathoms downward, which lies in the deep channels of the Gulf. Such direct indications as have been obtained favour the belief that this deep water is quiescent.

How far the prevailing westerly winds may influence these general movements of the water, it is difficult to say. The prevailing winds over the Gulf generally, are north-westerly in winter and south-westerly in summer. These winds may have an appreciable influence in maintaining the current on the western side of Newfoundland and in carrying it further into the north-eastern angle of the Gulf before it returns. If this effect is attributed to the wind however, it makes it all the more difficult to understand why it is that the water of lower density in making its way from Gaspé to Cape North is not carried further over into the Gulf, but keeps to the south west, or the windward side. This feature has already been remarked upon in a previous report; and, although a satisfactory explanation is not yet apparent, it may be well to point out that the bias of the current in both cases accords with the rotation of the earth. Thus the Gaspé Current, after rounding the Gaspé coast, tends to the west, as its course is southward; and the inflowing water at Cape Ray, with a northward direction, tends to the east. As the Gulf of St. Lawrence lies between 46° and 52° north latitude, it is possible that the rotation of the earth may have an appreciable effect.

It is probable that the temperature and density of the water and the direction of its currents, may have important bearings upon the movements of fish, which as yet are imperfectly understood. This opinion is held by the countries bordering on the North Sea; and the information afforded by the investigation of the movements and other characteristics of the water are there used as a basis in arriving at the reasons for the distribution and migration of fish at different seasons. This information has its chief application in the North Sea to the herring fishery; and yet a practical return is expected for the outlay which is made in obtaining it; and the investigation is of such importance that arrangements are being discussed for international co-operation amongst the countries bordering on the North Sea in carrying it on. In our fisheries, the cod and mackerel have a greater importance relatively than the herring; which would warrant the expenditure of larger sums in proportion in promoting their interests by such investigations.

As an example of the importance of knowing where fish are to be found, and why they prefer one region to another in different seasons, it may be mentioned that during last season fishing schooners were returning from Labrador in September with half cargoes, while within the Gulf we found on the "Lansdowne" that cod were everywhere abundant throughout the summer on the 30 and 40-fathom banks, which no schooners were taking advantage of. It is held by fishermen that fish are never caught while the water is clear; and its clearness must have some relation to physical conditions which could be ascertained. It is also known that the cod are caught in shallower water in the spring, and further from shore as the season advances. This may depend more directly on the movements of the herring or capelin which they follow; but these fish may themselves be influenced in their movements by the temperature or other characteristics of the water which may differ at different times.

Summary note regarding the set of the surface current in the north-eastern portion of the Gulf of St. Lawrence.—From the character of the currents as described, and the great variation in direction which they show, especially at the surface, it is necessarily difficult to lay down rules with regard to the current as it affects shipping, which will not be subject to a large amount of exception. It is of practical importance to note that the currents throughout this region are all slow, and seldom exceed one knot per hour in the summer season. It is no doubt on this account that they are so liable to disturbance, and present so much irregularity when examined in detail.

It has been possible as we have seen, when longer periods are considered, and when the under-current also is taken into account, to trace the general circulation of the water; which depends upon a greater movement in some dominant direction rather than in other directions, when long averages are taken. A knowledge of this general circulation is important to mariners, as it includes all the more constant currents, and it also shows the direction which the surface current tends to take when undisturbed.

The primary tendency in the surface current is thus to follow the direction which the general circulation has in the locality in question; but this tendency is disturbed and often overcome by the influence of the tide and the wind. The tidal influence shows itself chiefly as a veer in the direction of the current, which is either through a limited range, or completely around the compass; and it is also probable that the tides themselves are irregular in this region, owing to the interference of the tidal undulation from the Strait of Belle Isle with the main tide which enters through Cabot Strait. When the wind remains in one quarter and has any considerable strength, the drift which it gives to the surface water soon extends to a depth of five fathoms or more, and its influence thus makes itself felt throughout the thickness of the surface layer which affects shipping. As a rule these influences are all acting at the same time; and it is their combined effect which gives rise to the actual behaviour of the surface current.

It may, therefore, be of advantage to give in brief the actual behaviour of the surface current, in the various parts of the region under consideration; without distinguishing more than may be necessary, between the causes which influence its movements. It is to be understood that the currents referred to are in the offing, and do not include local currents close in shore.

On the west coast of Newfoundland, the current almost always sets along shore to the north-east. It is scarcely appreciable from Cape St. George to the Bay of Islands; but from there to Rich Point it is distinct and usually amounts to one knot per hour. Occasionally, the set may be off or on shore for a few hours at a time. It is also possible for the current to slack, or to be reversed on the surface, during heavy north-easterly winds.

From Rich Point to the western end of the Strait of Belle Isle, the currents are variable and uncertain in their direction, and cross-currents are frequent. The reasons for this have already been explained. The area in which such currents may occur, extends westward from the narrowest part of the strait at Amour Point to a line through Rich Point running magnetic north to the Esquimaux Islands. Towards the western side of this area, the currents are usually less than one knot, and seldom exceed one and a half knots; but towards the entrance of the strait their strength increases, while in direction they are more nearly in the line of the strait itself.

The characteristics of the current in the Strait of Belle Isle itself have been already fully described. (See reports already quoted; and also Notice to Mariners, No. 65 of 1895, Department of Marine and Fisheries, Ottawa).

On the steamship route running through this region from Greenly Island to Heath Point, the surface current has in general the following characteristics in the summer season, as ascertained by observations in the months of July, August and September, 1896:—From the offing of the Esquimaux Islands to the east end of Anticosti, the strength of the current usually ranges from half a knot to one knot per hour. In direction, the current veers continually, and it usually makes complete

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revolutions around the compass in a right-handed direction. In ordinary weather the manner in which this veering of the current takes place is such that the direction of the current is out of relation with the time of the tide. (From continuous observations of both surface and under-currents, some tidal relations have been made out, which hold good for the surface current during periods of calm weather). With regard to the influence of the wind, when a period of several days or a week is taken as a whole, it is found that the greatest amount of set has taken place in the same general direction as the greatest total mileage of wind; but at any particular time, the direction of the current is seldom the same as the wind which is blowing locally.

On the different parts of this route, it may also be noted that along the North Shore from the offing of the Esquimaux Islands to Cape Whittle, the direction of the current is more usually along the shore, than either off or on shore. Also, judging from the general movement of the water as indicated by the under-current, it is probable that on the surface the current sets more strongly to the westward during east winds, than eastward during west winds. (In the early spring, it is said to attain a speed of three knots when setting westward). In the more open waters from Cape Whittle to Heath Point, the observations make it probable that the current sets more frequently to the south-eastward than in other directions, under the influence of the prevailing winds. Also, in the offing of Cape Whittle during periods of calm weather, the current makes to the north-westward more than in other directions; and in its movement, a tidal element can be recognized. In the offing of Heath Point, the current as it veers around, sets off or on shore for about two hours at a time.

Present position of this branch of the Tidal Survey, and future work.—During the past three seasons, a general examination of the currents in the interior of the Gulf of St. Lawrence and the straits connecting it with the Ocean, has been made with special reference to the leading steamship routes which pass through it. Little attention has yet been given to the currents in the wide bay formed by the sweep of the coast from Miscou to Cape Breton, in which Prince Edward Island lies. The strong tidal currents of the Lower St. Lawrence have not yet been examined; as they are usually parallel with the shore and have less tendency to set a vessel out of its course; and also because from Father Point to Quebec, vessels have the advantage of the Pilot service. It was also necessary to obtain first some knowledge of the Gulf currents and their relation to the Ocean. No detailed examination has yet been made of the currents in the Atlantic, off the outer end of the Strait of Belle Isle, for the assistance of vessels in making the strait. On the south coast of Newfoundland, it is reported that there is a strong indraught into the larger bays; and to this several wrecks are attributed. The distance from shore that this is felt, and the conditions of wind and tide which give it the greatest strength, should be ascertained; as two of our leading steamship routes follow this coast. Some information has been collected with regard to the general set of the current on the Atlantic coast of Nova Scotia; but the currents on the south-western coast and in the Bay of Fundy are much more important. In the upper arms of the bay, the currents are probably parallel with the coast line, as in the Lower St. Lawrence; but there, the navigation is entirely dependent on the tide, and the time and height of the tide are of the first importance. Towards the mouth of the bay, the currents require investigation in the interest of the steamship lines running to St. John, and to ports in western Nova Scotia. An examination of these should be made while the principal tidal stations are still in operation; as they are chiefly tidal, and their behaviour can only be ascertained by direct comparison with a tidal record. This may serve to indicate the information which is most needed with regard to the currents on our eastern coasts, and which it is important to obtain as soon as possible in the interest of Canadian shipping.

I have, sir, the honour to remain,

Your obedient servant,

W. BELL DAWSON,

In charge of Tidal Survey.

TABLE I.—DIRECTION OF THE SURFACE CURRENT; showing the time of flow in each towards the directions indicated. The directions

NOTE.—After August 12th the directions of the current, during the day time, are the mean

Locality.	1896.	Total time in hours.	S.	S.S.W.	S.W.	W.S.W.	W.
<i>Station A.</i>							
Midway between East Cape, Anticosti, and Cape Whittle.	Wednesday, July 8..	3½					
	Thursday do 9..	24	4	1		1	3
	Friday do 10..	24	2	2	2	1	
	Saturday do 11..	24	2	2	10	4	8
	July 12-13..	24	9	7	1	6	5
	Tuesday, July 14..	24	2	1	6	2	2
	Wednesday do 15..	6½	3	2	3	1	
	Totals.....	130	22	15	22	15	18
<i>Station B.</i>							
At 24 miles S.E. of Heath Point, Anticosti.	July 15-16	7½					
	Friday July 17	3½					
	Saturday do 18..	24	6	2	2	2	
	Monday do 20..	24					
	Tuesday do 21..	24	3			1	
	Wednesday do 22..	24	1	1		1	6
	Thursday do 23..	7½					
	Totals.....	114½	10	3	2	4	6
<i>Station C.</i>							
At 18 miles S. of Cape Whittle	Monday, July 27..	11	2		1		
	Tuesday do 28 ..	24	3	1	1		1
	Wednesday do 29..	24	1	4		4	3
	Thursday do 30..	24					
	Friday do 31..	6½					
	Wednes'd'y, Aug. 12..	15			1	3	7
	Thursday do 13..	24	2	4	6	10	
	Friday do 14..	24		2	1	3	12
	Saturday do 15..	24	3	4	4	7	1
		Totals.....	176½	11	15	14	27	24
<i>Station D.</i>							
At 15 miles S. by W. of Great Mecattina Island.	Wednesday, Aug. 19.	15	8	2	3	2	3
	Thursday do 20.	24	1	6	2	3	
	Friday do 21.	24	6	8	4	2	2
	Saturday do 22.	16	9	5	5	2	
		Totals.....	79	24	21	14	9	5
<i>Station E.</i>							
At 13 miles S.S.E. of Shecatiga Bay.	Monday, Aug. 24.	2					
	Wednesday do 26.	13½	2				
	Thursday do 27.	14½	2			1	
		Totals.....	30	4			1
<i>Station F.</i>							
At 10 miles N.N.W. of Rich Point.	Thursday, Aug. 27.	6	1				
	Friday do 28.	24	3				
	Saturday do 29.	8					
		Totals.....	38	4			

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direction. The figures give the number of half-hours during which the current set are magnetic. Variation, 29° to 34° W.

between the directions at the surface and at a depth of 18 feet. Compare Plates II. and III.

W.N.W.	N.W.	N.N.W.	N.	N.N.E.	N.E.	E.N.E.	E.	E.S.E.	S.E.	S.S.E.	S.	No current.
2		1	2	4	5	3	1	1	2	4		
1	2	2	1	3	3	3	8	9	1	2	4	12
1	3	1	1		1	3	3	3	1	2	2	6
	2	1					1	5	7	4	2	5
		1	2	1	1		3	10	10	5	9	2
									1	3	3	
4	7	6	6	8	10	9	16	33	24	20	22	25
		1		4	6	2	1		1			
4		7	2	2	3	2	2	7	6	4	6	1
			2	3	3	12	17	5	3	3	3	3
			1	2	8	13	7	2		3	3	8
3	1		1	4	1	4	6	7	6	1	1	10
		2			2	5	1					
7	1	10	6	15	23	38	34	27	14	7	10	22
1			3		1	2	2	1	4	5	2	
2	1	2	3	3	8	8	5	3	3	4	3	
3		3	3	3	4	4	3	4	2	5	1	2
			1	4	8	15	3	6	11	4		
			4	4	4	1						
5	2	4	2	1								5
4	1	9	5	4	1				1		2	1
13	14											3
4	5	8	6	4						1	3	1
32	23	26	27	19	26	30	13	14	21	19	11	12
	3			1	2	5	7	7		7	8	5
								1	4	4	1	7
								4	2	16	6	5
										5	9	
	3			1	2	5	7	12	6	32	24	17
					1	3						
				2	2	1	1	10	1	8	2	
	2						9	5		2	2	8
				2	3	4	10	15	1	10	4	8
						2	6			2	1	1
	8	5	1	9	1	4	3	8	2	1	3	3
	5	1						2		1		7
	13	6	1	9	1	6	9	10	2	4	4	11

TABLE I.—Direction of the Surface Current, showing the

Locality.	1896.	Total time in hours.	S.	S.S.W.	S.W.	W.S.W.	W.
<i>Station G.</i>							
At 12 miles W.N.W. of Cow Head, (on the west coast of Newfoundland).	Thursday, Sept. 3.	2					
	Tuesday do 8.	13.					
	Wednesday do 9.	24					
	Thursday do 10.	22½					
	Friday do 11.	4					
	Monday do 14.	6½					
	Totals.....	72					
<i>Station H.</i>							
At 13 miles S.E. of Heath Point, Anticosti.	Wednesday, Sept. 16.	2½	2	2			
	Thursday do 17.	16½	4				2
	Monday do 21.	8	2	2	2		
	Tuesday do 22.	5					1
	Thursday do 24.	15½	3	8	2		
	Friday do 25.	15½		1	1	6	3
Saturday do 26.	3						
	Totals.....	66	11	13	5	6	6

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time of flow in each direction, &c.—*Continued.*

W.N.W.	N.W.	N.N.W.	N.	N.N.E.	N.E.	E.N.E.	E.	E.S.E.	S.E.	S.S.E.	S.	No current.
		3	1									
		4	9	6		6						1
		9	1		1	33	3					1
				2	10	27	6					
								7	1			
		3	3	2	1	1						3
		19	14	10	12	67	9	7	1			5
									1		2	
			1	2	6	5	2	2	4	1	4	4
						2		3	2	3	2	
6	3											
2				4	2			3	1	3	3	3
6	2				1	8	1		1	1		
	1					1			1			3
14	6	.....	1	6	9	16	3	8	10	8	11	10

TABLE II.—UNDER-CURRENTS; THEIR VELOCITY AND DIRECTION.

The positions of the stations are shown on the chart, Plate I. The time of the observations is Standard time for the 60th meridian, reckoned on the 24 hour system from midnight to midnight. The figures in the columns show the velocity of the current in knots per hour; and the directions are those towards which the current sets. These directions are magnetic. Variation, 29° to 34° W.

These results were obtained by means of an attached surface float, a current meter at three fathoms, and a deep fan supported by sounding wire; in accordance with the methods explained in the body of the report. The results as given are reliable. When the under-current was so slow that its bearing was uncertain, its general direction only is given. The velocity is correct to the nearest tenth of a knot; and if uncertain, it is omitted.

STATION B.—OFF HEATH POINT, ANTICOSTI. DEPTH, 52 FATHOMS.

Depth.	Saturday, 18th July, 1896.							20th July.	
	10.30	13.10	14.00	15.30	16.30	17.40	18.40	9.30	10.30
Surface.....	0.5 E b S	0.9 SE	0.8 SE	0.8 SE	0.8 S b E	0.9 S b W	1.1 SW	0.2 E b S	0.3 SE
3 fathoms...	0.4 E b S	0.9 SE	0.8 SE	.....	0.8 S b E	0.9 SW	0.9 WSW	None.	0.3 S'ly
10 do ..	None.	0.4 E	0.7 E	.....	None.	0.3 SW	0.6 W b S	None.	Slack.
20 do ..	None.	0.4 E	0.4 E	0.5 NE	0.4 NNE	None.	0.5 W'ly	0.6 W b S	0.3 W b N
30 do ..	.....	0.5 E	.....	0.3 NE	0.6 NNE	None.	0.6 W'ly	0.4 W b S	.....
40 do ..	.....	.....	0.5 N	.....	0.8 N b W	0.4 ENE	0.6 W'ly	0.4 W b S	.....
Depth.	Monday, 20th July—Continued.					Tuesday, 21st July.			
	11.30	12.10	13.50	16.15	19.15	10.15	10.50	11.30	14.20
Surface...	SE b E	SE b E	0.6 ESE	0.6 E b S	0.5 ESE	None.	None.	0.5 WSW	0.5 ENE
3 fathoms	0.3 SE	0.4 SE	0.5 SE	0.5 ESE	0.3 NNE	0.6 SW	0.7 W	Undercur-	0.5 ENE
10 do ..	None.	0.4 SE	0.5 NE	0.4 ENE	0.4 NNE	1.0 W b N	0.8 W	rent	0.6 NE
20 do ..	0.3 NW	None.	0.5 NNE	0.6 ENE	0.5 NE	0.7 W b N	0.6 W	comes up	0.3 E
30 do ..	0.4 WNW	.....	None.	0.5 ENE	0.3 NE	0.5 WSW	0.7 W	to surface.	None.
40 do ..	0.4 WNW	0.2 NW	None.	0.5 NNE	0.4 NE	0.5 WSW	0.7 WSW	.....	.....
Depth.	Tuesday—Con'd.		Wednesday, 22nd July, 1896.						
	16.00	17.00	9.45	10.40	11.10	13.50	16.10	17.50	18.45
Surface...	0.8 NE	0.9 NE	0.1 W'ly	0.1 W'ly	None.	0.3 NE	0.3 ESE	0.3 ESE	0.4 SE
3 fathoms	0.8 ENE	0.9 NE	0.5 NW	0.5 W	0.6 WNW	0.6 —	0.7 E	.....	None.
10 do ..	0.7 ENE	0.5 NE	0.5 WSW	0.5 W	0.7 W	0.3 W'ly	0.8 NE	.....	0.5 E
20 do ..	0.5 NE	0.6 NE	0.2 W'ly	0.4 W	0.5 W	0.9 NW	0.6 NNE	.....	0.6 NNE
30 do ..	0.5 NE	0.7 NE	0.2 W'ly	.....	0.4 W	0.8 NW	0.6 NNE	.....	0.6 NE
40 do ..	0.7 NE	0.7 NE	None.	.....	0.4 W	0.7 WNW	.....	0.9 N	0.8 NNE

Marine and Fisheries—Marine Branch.

TABLE II.—Under-currents—Continued.

STATION H.—OFF HEATH POINT, ANTICOSTI. DEPTH, 37 FATHOMS.

Depth.	Thursday, 17th Sept., 1896.				Weather very rough. Observations approximate.	Monday, 21st Sept.			
	9.05	10.20	14.00	16.10		9.15	9.55	10.55	11.50
Surface.....	0.5 SE	0.6 S b W	Slack.	0.5 N b E	1.1 E b N	0.9 E b N	0.9 ESE	1.0 SSE	
3 fathoms..	0.5 SSE	0.6 S b W	0.4 S b W	0.6 N	1.1 E b N	0.9 ESE	0.9 SE	1.0 SSE	
5 do ..	0.7 S	0.6 SSW	.....	Slack.	1.1 E b N	.....	1.0 SSE	1.0 S
10 do ..	0.3 SW	0.3 SW	0.5 WNW	None.	0.9 E b N	1.0 ESE	0.8 SE	0.9 S	
20 do ..	0.3 SSW	0.3 SW	None.	Slack.	0.8 E b N	0.6 ESE	0.4 ESE	0.3 S'y.	
30 do ..	None.	0.3 SSW	.....	.....	0.5 E b N	0.5 E	None.	None.

Depth.	Monday—Continued.			Tuesday, 22nd Sept.				
	13.25	14.50	15.40	10.10	11.10	13.00	14.10	
Surface.....	1.1 S	1.2 S b W	— SW	0.7 NNW	0.7 WNW	0.7 WNW	0.7 W	Heavy weather continuing Wednesday. Wind E to NNE. 1157 miles in 36 hours.
3 fathoms..	1.1 SSW	1.2 —	(Rolling heavily.)	0.7 NNW	0.7 NW	0.6 NW	0.7 W b S	
5 do ..	.....	.....	.....	0.5 N b W	0.6 NW	— NNW	.....
10 do ..	0.9 SSW	0.9 S b W	0.9 SW	0.6 N	0.5 NNW	0.5 W	0.9 W'y	
20 do ..	0.4 S	0.5 S b W	0.5 SW	0.3 N'y	NW'y	1.0 WSW	1.0 WSW	
30 do ..	0.3 S	0.5 S b W	0.4 SW	None.	NW'y	.....	.....

Depth.	Thursday, 24th Sept., 1896.								
	9.05	10.00	11.15	11.45	13.35	14.55	16.20	16.55	17.45
Surface.....	1.1 NNE	0.9 NNE	0.8 E	0.7 ESE	0.9 SSE	1.3 S b E	1.3 SSW	1.3 SSW	1.0 SW
3 fathoms..	1.1 NNE	1.0 NE	0.8 E	0.5 ESE	0.9 S b E	1.3 S b W	1.2 SSW	1.2 SSW	1.0 SW
5 do ..	1.1 NE	0.9 NE	0.7 NE	0.5 E b S	0.7 S	1.1 —	.....	1.2 SW	0.9 WSW
10 do ..	1.0 NE	0.6 NE	0.3 NNE	0.3 SSE	0.5 S b W	0.8 SW	.....	1.0 WSW	0.8 SW
20 do ..	0.7 ENE	0.4 ENE	0.4 N	None.	0.5 W	0.8 WSW	0.5 WSW	0.5 WSW	0.3 SSW
30 do ..	0.7 E	0.4 ENE	0.4 N	None.	0.5 WSW	0.7 SW	0.5 SW	.....	0.6 SE

Depth.	Friday, 25th Sept., 1896.							
	8.55	9.40	11.00	11.55	13.20	14.50	17.10	18.35
Surface.....	0.7 WNW	0.7 WNW	0.6 NW	0.6 WNW	0.7 W b S	0.7 WSW	0.5 WSW	0.5 ESE
3 fathoms..	0.7 WNW	0.8 NW	0.5 WNW	0.6 WNW	0.7 W b N	0.6 W b S	0.4 WSW	0.4 SE
5 do ..	.....	0.8 NW	0.6 NW	0.6 WNW	0.7 W b N	0.6 W b N	0.5 W b S	0.5 SSE
10 do ..	0.4 NNE	0.4 NNW	None.	0.6 WNW	0.6 W	0.8 WSW	0.7 W b S	None.
20 do ..	0.7 NNE	0.6 N b E	0.4 N'y	None.	0.4 W	0.8 WSW	0.8 W b S	0.4 SSW
30 do ..	0.6 NNW	0.6 NNW	0.4 NNW	None.	0.5 WNW	0.6 W	0.8 W	0.5 SSW

TABLE II.—Under-currents—Continued.

STATION C.—OFF CAPE WHITTLE. DEPTH, 71 FATHOMS.

Monday, 27th July, 1896.									
Depth.	14.15	14.30	15.10	15.35	16.05	16.35	17.05	17.35	19.05
Surface.....	1.0 E b N	1.1 E b S	1.1 ESE	1.0 ESE	0.9 SE	1.0 SE	1.0 SE	SE b S	1.1 SSE
3 fathoms..	1.0 SE	.....	1.1 SE	1.0 SE	.....	.....	1.0 SE	.....	.....
10 do ..	None.	None.	None.	0.5 ESE	None.	None.	0.3 E	0.3 E..	0.3 SSE
20 do ..	0.6 NW	.....	None.	0.3 W	0.3 W	None.	None.	None.	0.3 SE
30 do ..	.....	0.5 W	None.	0.4 Wly	None.	0.3 W	None.	0.4 E	0.3 ESE
40 do ..	0.5 NW	.....	.....	.....	.....	.....	.....	.....	.....
50 do ..	0.6 NW	.....	.....	0.5 NW	.....	None.	.....	.....	.....
Tuesday, 28th July, 1896.									
Depth.	9.10	9.35	10.15	10.40	11.05	11.55	13.10	13.45	15.15
Surface.....	0.8 SSE	0.8 S b E	0.7 S	0.7 S	0.8 S b W	1.0 S b W	Veering	0.8 WNW	0.8 NW
10 fathoms..	0.5 SE	0.3 S	0.2 S	0.2 S	0.3 S	0.4 S	None.	None.	None.
20 do ..	0.5 NNE	None.	None.	None.	None.	0.5 SSE	None.	None.	.....
30 do ..	0.5 ENE	0.4 E	None.	None.	None.	0.4 S	None.	.....	.....
50 do ..	0.5 NNE	.....	.....	0.5 NE	.....	.....	.....	.....	.....
Tuesday—(Continued).					Wednesday, 29th July, 1896.				
Depth.	16.15	16.45	17.20	17.45	9.10	10.15	10.45	11.40	13.20
Surface.....	0.8 N b W	0.8 N	0.7 NNE	0.7 NE	0.9 NE	1.0 ENE	1.0 ENE	0.9 E b N	0.8 E b S
3 fathoms..	.....	.....	.....	.....	.....	.....	.....	0.9 ENE	0.9 ESE
5 do ..	.....	.....	.....	.....	0.8 NE	.....	.....	0.7 ENE	0.5 ESE
10 do ..	0.6 NW	None.	None.	0.5 E	0.4 NE	0.4 E	0.4 ENE	0.3 ENE	0.3 N NW
20 do ..	.....	None.	.....	None.	None.	0.3 E	0.3 ENE	0.3 ENE	0.4 N NW
30 do ..	0.3 N	0.3 N	.....	None.	None.	0.3 E	0.2 ENE	0.3 ENE	None.
50 do ..	0.5 W	0.6 W	.....	None.	None.	None.	0.3 ENE	.....	.....
Wednesday—(Continued).					Thursday, 30th July, 1896.				
Depth.	14.40	15.10	16.15	17.30	19.00	9.45	17.20	17.45	19.05
Surface.....	0.5 ESE	0.5 SE	0.7 SE	0.6 SSW	0.5 SSW	* SE	* E b N	* E b N	* E b S
3 fathoms..	0.5 SE	0.5 SE	.....	.....	.....	.....	Uncert.	0.6 SE	.....
5 do ..	0.4 SE	0.4 SE	.....	.....	.....	.....	0.3 NE	0.3 E	0.6 SE
10 do ..	0.3 NW	0.2 NNW	None.	None.	.....	Slack.	None.	None.	None.
20 do ..	0.4 NW	0.5 NNW	0.3 NW	0.3 NW	None.	Slack.	.....	None.	None.
30 do ..	0.4 NW	0.5 NNW	0.3 WNW	0.3 NW	.....	Slack.	.....	.....	.....
50 do ..	.....	.....	None.	.....	.....	.....	* Rough	weather.	.....

Marine and Fisheries—Marine Branch.

TABLE II.—Under-currents—Continued.

STATION C.—Concluded.

Depth.	Wednesday, 12th Aug., 1896.						Thursday, 13th Aug.		
	10.30	11.40	13.15	15.40	17.15	19.30	9.45	10.50	11.45
Surface.....	0.2 WSW	0.4 WNW	0.4 NW	None.	None.	None.	0.3 NW	0.4 NNW	0.5 NNW
3 fathoms...	Slack.	0.2 WNW	0.4 —	0.4 Wly.	0.4 WSW	0.4 W	0.3 NW	0.4 NW	0.5 N ^b W
5 do	Slack.	Slack.	None.	0.5 W	0.3 SSW	.....	None.	.....	0.4 N
10 do	None.	None.	None.	0.4 W	None.	0.4 SW	None.	.....	0.3 N
20 do	None.	None.	None.	0.4 W	None.	—Wly	None.	0.3 NNE	0.3 NNE
30 do	None.	0.2 S	None.	0.3 WSW	0.2 SW	0.3 S	0.3 E	0.2 NNE	.....
50 do	None.	None.	.....	0.5 W	0.2 SW	None.	0.5 E	0.3 ENE	.....

Depth.	Thursday—Continued.				Friday, 14th Aug.			
	14.30	15.45	17.00	19.05	9.40	10.15	11.40	13.00
Surface.....	0.4 N	0.5 N b E	Slack.	0.6 S b W	0.3 NW	0.4 NNW	NW b N	0.5 NW
3 fathoms...	0.4 N b W	0.5 N	None.	0.5 SSW	None.	0.4 NNW	0.5 NW	0.5 NW
5 do	0.4 N	0.3 W	Slack.	0.4 SW	None.	0.3 NNW	0.3 NW	0.3 NW
10 do	0.3 N	0.3 W	Slack.	—Wly.	0.4 W	0.4 W	0.3 NW	None.
20 do	0.3 N	None.	None.	None.	None.	None.	0.3 NW	0.3 NW
30 do	0.2 NNW	0.3 W	.....	None.	None.	.....	None.	None.
50 do	0.2 NNW	0.3 WNW	.....	.....	.....	.....	.....	.....

(Current to the southward begins at the surface and gradually becomes deeper.)

Depth.	Friday—Continued.		Saturday, 15th Aug., 1896.					
	16.10	19.05	9.15	11.15	13.30	15.45	16.50	17.35
Surface.....	0.6 NNW	0.5 W	0.4 WSW	0.3 W	0.6 NNW	0.6 N b W	0.4 N b E	0.3 NNE
3 fathoms...	0.6 NW	0.5 WNW	0.4 W	0.3 W b N	0.6 NNW	0.6 WNW	0.5 NNW	0.4 N
5 do	0.5 NW	0.5 NW	0.3 W	None.	0.4 NW	0.5 WNW	0.4 W	0.5 NW
10 do	None.	None.	0.4 SW	None.	0.3 N	0.3 WNW	0.2 NNW	0.3 NW
20 do	0.3 N	None.	0.4 SSW	None.	0.3 N	0.2 W	.....	None.
30 do	None.	None.	0.2 SSW	None.	.....	None.	.....	None.
50 do .....	.....	.....	None.	None.	.....	.....	.....	Wly.

STATION D.—OFF MECATTINA ISLANDS. DEPTH, 45 FATHOMS.

Depth.	Wednesday, 19th Aug.				Thursday, 20th Aug.—(Continued on next page.)				
	10.40	11.35	13.20	15.05	8.40	9.50	10.35	11.40	13.35
Surface...	0.6 S b E	0.5 S	0.5 SSE	0.4 S	0.2 S	0.3 SSW	0.3 SSW	0.2 SW	None.
3 fathoms...	0.6 S b W	0.5 SSW	0.5 S	0.3 SSW	None.	0.3 SSW	0.3 S b W	0.3 SSW	None.
5 do	0.6 SW	0.6 SSW	0.4 SW	0.3 SSW	0.3 WSW	0.3 SSW	0.4 SW	0.3 W	None.
10 do	0.8 SW	0.7 SW	0.5 SW	0.5 W	0.4 WSW	0.4 W b N	0.4 WNW	0.4 W	None.
15 do .....	.....	.....	.....	.....	.....	0.4 W	0.4 W	0.5 WSW	0.4 W
20 do	0.6 WSW	0.5 W b S	0.4 W	0.3 W	None.	None.	None.	None.	None.
30 do	0.4 WSW	0.4 SW	0.4 SSW	0.3 SSW	None.	None.	.....	.....	.....

TABLE II.—Under-currents—Continued.

STATION D.—Concluded.

Depth.	Thursday—Continued.			Friday, 21st Aug., 1896.				
	14.30 to 16.15	17.15	17.40	9.15	9.45	10.30	13.30	14.50
Surface	Surface current veers from West through north to East.	0.3 ENE Slack.	0.3 E	0.2 ESE	0.4 SE	0.3 SE	0.5 S b E	0.6 SSE
3 fathoms		0.3 ENE	0.3 ESE	0.2 SE	0.4 SE	0.3 SE	0.7 S	0.7 S
5 do		NEly	0.2 E	.....	0.2 WSW	None.	0.7 SSW	0.7 SSE
10 do		NEly	None.	.....	0.3 WSW	0.2 W	0.5 SW	0.4 SSW
20 do		0.4 W	0.4 W	0.5 Wly	0.6 WSW	0.6 W	0.5 W b S	0.4 SW
30 do		0.3 W	0.3 W	0.4 Wly	.....	0.4 W	0.4 WSW	0.3 SW

Depth.	Friday—Continued.		Saturday, 22nd Aug., 1896.						
	17.00	18.50	9.00	10.00	11.40	12.35	14.25	15.00	15.20
Surface	0.6 SSE	0.5 S b E	— SE b S	— S b E	0.8 S	0.8 S	0.9 SSW	— S	— S
3 fathoms	0.6 S b E	0.5 S b E	0.5 SE	— S b E	0.8 S	0.8 S b W	1.0 SSW	— S	— S
5 do	0.7 S	.....	0.6 SE	0.7 S b W	— S b W	0.7 SSW	0.8 SW	0.9 SW	0.9 SW
10 do	0.4 SW	0.5 SW	0.9 SSW	0.9 SSW	0.9 SW	.....	0.6 SW	.....	0.4 SW
20 do	0.3 WSW	0.4 SW	0.5 SW	0.4 SSW	0.4 SW	.....	0.4 SSW	.....	0.4 SW
30 do	None.	None.	0.4 SW	0.4 SW	0.4 SW	.....	None.	.....	.....

STATION E.—OFF SHECATICA BAY. DEPTH, 98 FATHOMS.

Depth.	Monday, 24th Aug., 1896.			Wednesday, 26th Aug., 1896.				
	12.00	13.25	—	10.45	11.45	13.30	14.40	16.00
Surface	0.3 ENE	0.4 NE	Rough weath'r; continuing on Tuesday.	0.3 NE	0.3 ENE	0.3 ESE	0.5 ESE	0.6 ESE
3 fathoms	0.2 Ely	0.3 E		0.3 NNE	0.3 ENE	0.3 ESE	0.5 ESE	0.6 ESE
5 do	None.	.....		0.3 NNE	0.3 NE	0.3 ENE	0.4 E	.....
10 do	0.3 Ely	0.4 ENE		0.3 WNW	0.3 WSW	None.	0.3 E	.....
20 do	None.	0.5 E		None.	0.2 NW	None.	None.	.....
30 do	None.	0.4 ESE		0.3 Wly	0.2 NW	.....	None.	None.
50 do	.....	0.4 ESE		None.	.....	.....	.....	.....

Depth.	Wednesday—Con.		Thursday, 27th Aug., 1896.						
	16.40	18.40	9.00	9.50	10.30	10.50	11.50	13.15	13.55
Surface	0.6 ESE	0.6 SSE	Slack.	Slack.	Slack.	None.	0.2 S b E	None.	None.
3 fathoms	0.6 SE	0.5 SSE	None.	None.	.....	None.	None.	0.3 NW	.....
5 do	0.5 SE	0.6 SSE	0.3 SW	0.5 W	.....	0.2 W	0.4 NW	None.	.....
10 do	0.4 ESE	None.	0.3 W	0.3 WSW	.....	0.4 W	0.5 NW	None.	.....
20 do	None.	None.	None.	0.3 NW	.....	None.	None.	0.2 Wly	.....
30 do	0.3 SE	.....	None.	0.2 W	.....	None.	.....	.....	None.
50 do	0.2 Ely	.....	.....	.....	None.	.....	.....	.....	None.
80 do	0.2 Ely	.....	.....	.....	.....	.....	.....	.....	None.

Marine and Fisheries—Marine Branch.

TABLE II.—Under-currents—*Concluded.*

STATION F.—OFF RICH POINT. DEPTH, 40 FATHOMS.

Depth.	Thursday.	Friday, 28th Aug., 1896.							
	18.40	8.50	9.50	11.25	13.40	14.40	15.00	16.25	17.30
Surface.....	0.4 E b N	Slack.	0.4 ESE	0.4 SSE	None.	None.	0.5 NW	0.5 NW	0.5 N b W
3 fathoms..	0.4 E b S	0.5 E b S	0.4 SE	0.4 SSE	0.4 WNW	0.4 W	Undercur-	0.5 NW	0.5 NNW
5 do ..	0.4 E	Uncert.	0.4 SE	0.3 S	0.4 NW	0.4 NW	rent comes	0.6 NW	0.6 NNW
10 do ..	None.	None.	None.	Slack.	0.4 NNW	None.	up to sur-	0.3 ESE	0.3 ESE
20 do ..	None.	None.	.....	None.	None.	None.	face.	0.3 ESE	0.4 ESE
30 do ..	None.	None.	.....	None.	None.	None.		None.	None.

STATION G.—OFF COW HEAD, NEWFOUNDLAND. DEPTH, 42 FATHOMS.

Depth.	3rd Sept.	Tuesday, 8th Sept.					Wednesday, 9th Sept.		
	14.45	11.15	13.15	15.15	17.00	18.40	8.30	10.10	11.25
Surface....	0.3 NNW	0.5 NE	0.5 N b E	0.6 N b E	0.5 N	0.4 NNE	0.7 ENE	0.7 ENE	0.6 E b N
3 fathoms..	0.4 NE	0.5 N b W	0.6 NNW	0.5 NNW	0.4 N	0.7 ENE	0.7 ENE	0.6 E b N	0.6 E b N
5 do ..	0.5 NNW	0.4 NE	0.6 N b W	0.4 NW	0.6 NNW	0.3 NNE	0.6 ENE	0.6 E b N	0.4 E b N
10 do ..	0.6 NNW	0.4 NE	0.5 N b E	0.4 N b E	0.5 N	0.3 N	0.5 ENE	0.5 E b N	0.4 E b N
20 do ..	None.	0.4 NE	0.4 NNE	0.3 N b E	None.	0.3 N	0.3 ENE	0.3 E b N	0.3 ENE
30 do ..	None.	0.3 NE	.....	0.3 N b E	None.	0.3 N	0.5 ENE	0.4 E b N	0.2 ENE

Depth.	Wednesday— <i>Continued.</i>				Thursday, 10th Sept.			
	13.10	15.05	16.10	17.25	8.55	10.25	12.45	14.50
Surface....	0.6 E b N	0.4 E b N	0.3 ENE	— E b N	0.7 ENE	0.7 ENE	0.8 ENE	0.7 ENE
3 fathoms..	.....	0.4 ENE	0.3 ENE	.....	0.7 ENE	0.7 ENE	0.9 ENE	0.7 ENE
5 do ..	0.5 E b N	0.3 —	.....	0.5 E	0.6 ENE	0.7 ENE	0.8 ENE	0.7 NE b N
10 do ..	0.4 E b N	0.3 ENE	0.4 ENE	0.5 E	0.7 ENE	0.7 ENE	0.6 ENE	0.5 NE b N
20 do ..	0.3 E b N	0.3 ENE	0.3 ENE	0.3 E	0.5 ENE	0.5 ENE	0.4 ENE	None.
30 do ..	None.	None.	None.	0.3 E	0.5 ENE	0.5 ENE	0.4 ENE	None.

Depth.	Thursday— <i>Concluded.</i>		Monday, 14th Sept., 1896.					Remarks.
	16.00	18.40	13.10	13.50	14.20	16.55	17.50	
Surface....	0.6 NE b E	0.6 NE	None.	None.	0.1 ENE	0.1 N	0.1 N b W	Very little cur- rent except at 10 and 20 fathoms.
3 fathoms..	0.6 NE	0.5 NNE	Slack.	None.	Slack.	0.1 NW	0.1 N b W	
5 do ..	0.5 NE b N	0.4 NNE	Slack.	None.	.....	.....	.....
10 do ..	0.6 NE b E	0.5 N b E	Slack.	0.5 NNE	0.5 NNE	0.4 NW	0.5 NNW	
20 do ..	None.	0.2 ENE	Slack.	0.3 NNE	.....	0.4 NNE	None.
30 do ..	None.	None.	Slack.	None.	.....	None.	None.

APPENDIX No. 4.

METEOROLOGICAL OFFICE,

TORONTO, 15th August, 1896.

Major F. GOURDEAU,
Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit herewith the twenty-fifth annual report of the Meteorological Service, this report being for the fiscal year 1st July, 1895, to 30th June, 1896, with Appendices A and B, reports on Quebec and St. John observatories.

During the past year, owing largely to the means of disseminating the daily forecasts having been increased, much more interest has been manifested by the public in all branches of this service, the daily wind bulletin issued at 10 a. m., and posted at the principal ports on the lakes and the maritime provinces being much appreciated. The train weather signal system has been extended to the Ontario division of the Michigan Central Railway, and in Nova Scotia to the Dominion Atlantic Railway. Arrangements are also being made to extend the system to the Prince Edward Island Railway, these signals being of considerable service to the farming community more especially during harvest time. It is also proposed, and arrangements have been almost completed, for the posting each day in Toronto of a weather map similar to those employed in the principal cities in the United States, showing at a glance the actual weather prevailing over Canada and the United States at 8 a. m. These charts may in time be extended to other cities in Canada.

Much valuable data regarding the climate of the country has been collected from the voluntary observers to whose earnest care this service is much indebted. These observers now number 236, and continue to increase, forty-four having been added during the past year, thereby increasing considerably the clerical work of this office, all their observations having to be reduced to their several mean values. Among the most valuable additions to the list of stations are a number in the northern and eastern portions of Ontario, from which districts observations are much needed. Some important stations in Manitoba and British Columbia have also been added.

Following is a list of the stations added during the past fiscal year from which reports are received:—

Ontario.

Class II.—

Fort Francis, Rainy Lake.....	W. W. Birdsall.
Collingwood, "Kiononta Farm".....	F. Dawson.
Agincourt, East York.....	G. H. Dean.
Otonabee, Peterborough.....	J. M. Drummond.
Bobcaygeon, Victoria.....	J. Cairnduff.
Desbarats, Algoma.....	E. H. Twight.
Erasmus, Wellington.....	George Wood.
Weston, West York.....	E. Smith.
Vankleek Hill, Prescott.....	Rev. J. Macleod.
Emo River, Algoma.....	A. Locking.
Bloomfield, Prince Edward.....	W. R. Bowerman.

Marine and Fisheries—Marine Branch.

Ontario—Concluded.

Class III.—

Linden Valley, Victoria.....	J. Sanderson.
Camden, Addington.....	J. Teskey.
Ursa, Peterborough.....	C. J. M. Kettle.
Kitley, Leeds.....	R. Gile.
Montagon, Leeds.....	J. Chalmers.
Parma, Lennox.....	C. R. Allison.
Arden, Addington..	T. Anderson.
Jermyn, Peterborough.....	Wm. Armstrong.
Cherry Valley, Prince Edward.....	L. Platt.
Westport, Leeds.....	W. McNight.
Sparrow Lake, Ontario.....	A. Waincko.
Lansdowne, Leeds.....	J. C. Stafford.
Roblin's Mills, Lennox	E. Roblin.
Wooler, Northumberland.....	J. C. Dunn.
Emsdale, Muskoka.....	William Jenkin.
Fenelon Falls, Victoria.....	S. J. Reazin.
Port Hope, Durham.....	W. W. Barret.

Quebec.

Class II.—

Gaspé Village, Gaspé.....	J. Slous.
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Nova Scotia.

Class II.—

Guysborough, Guysborough	E. B. Smith.
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Manitoba.

Class II.—

Rosebank, Selkirk.....	W. Irvine.
Russell, Marquette.....	E. A. Struthers
Treherne, Marquette.....	J. Cooper.
Mellendean, Selkirk	William Stark.

Class III.—

Rathwell, Marquette	C. O. Evans.
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North-west Territories.

Class II.—

Macleod, Alberta.....	S. B. Steele.
Yarrow, Alberta.....	G. T. Berry.

British Columbia.

Class II.—

Kootenay Reclamation Works.....	W. Henderson.
Garrey Point, New Westminster.....	William McColl.
Tobacco Plain, East Kootenay.....	M. Phillips.
Quatsino, Vancouver Island.....	B. W. Leeson.

Class III.—

Victoria Water Works, Vancouver Island.....	
Nanaimo, Vancouver Island	M. Bray.
Valdez Island, Gulf of Georgia	T. Bell.

The following stations have been closed, observations having been discontinued:

Quebec.—Class II., St. Hyacinthe..... Observer resigned.
 N.W.T.—Class II., Saskatoon..... Observer moved.
 B. C. —Class II., Duncans..... Observer moved to Victoria.

On August 27th, Mr. W. G. Knight, the observer at the telegraph reporting station at Swift Current, N.W.T., who had acted as agent for this service for many years, died and was succeeded by Mrs. Maud Knight.

In January, 1896, the Reverend Canon J. Flett having discontinued the observations at the telegraph reporting station at Prince Albert, Mr. C. O. Davidson was appointed agent.

In January, the station at Ottawa was raised to a telegraph reporting station and Mr. W. T. Ellis was appointed observer.

On 2nd March, Mr. George Macleod, agent at the telegraph reporting station at Banff, N.W.T., died after a long and painful illness, and Mr. Norman B. Sanson was appointed observer in his place.

On 31st March, Mr. John Murray, agent at the telegraph reporting station at Spence's Bridge, died after a brief illness and Messrs. Clyde and Munro continued the observations to 30th June. Mr. Murray was a most conscientious observer and his death is much regretted. Kamloops having been considered a more central position than Spence's Bridge for a telegraph reporting station, it is proposed to close the latter station immediately and establish one at Kamloops in its stead.

In June, a storm signal station was opened at Fox River, Quebec, with Mr. Alexis Dufresno as agent. This place is frequented by a large number of fishing vessels and the storm signals are much appreciated.

The shipping interests at Wiarton, Ont., being considerable a storm signal station was established at this place in the spring of 1896, with Mr. H. R. A. Ely as agent.

CENTRAL OFFICE.

No change in the staff of the central office has taken place during the past year; in order to keep pace with the work, however, which is rapidly increasing, some additional assistance will shortly be required.

STORM SIGNALS.

There were not very many heavy gales during the past year, but of those that occurred, with few exceptions, early warning was given of their approach. Perhaps the three most violent storms of the year in the lower lake region, occurred on 28th September, 6th October and 17th October; twelve, six and twenty-four hours notice of their approach respectively being given. In the gulf and maritime provinces, some of the heaviest gales occurred on October 12th and 16th, November 19th and 25th, December 2nd, 5th and 10th and March 11th, and warning of their approach was given from six to twenty-four hours in advance. The list of wrecks and loss of life on the great lakes and along our Atlantic seaboard, does not appear large and in many cases mariners acknowledge that they derive great benefit from heeding the storm signals.

Marine and Fisheries—Marine Branch.

TABLE I.

The following table shows the total number of warnings issued and the percentage verified:—

YEAR.	No. Issued.	No. Verified	Percentage Verified.
1877	743	510	68·6
1878	860	673	78·3
1879	712	591	83·0
1880	889	736	82·8
1881	854	727	85·1
1882	841	658	78·2
1883	1,085	858	79·1
1884	798	663	83·2
1885	830	741	89·3
1886	906	799	88·2
1887	1,093	972	88·9
1888	897	758	84·5
1889	1,126	926	81·3
1890	1,199	987	82·3
1891	1,019	826	81·2
1892	1,161	888	80·7
1893	1,317	1,118	84·9
1894	1,333	1,149	86·2
1895	1,285	1,169	91·0
1896—six months, 1st January to 30th June	297	259	87·3

WEATHER FORECASTS.

Weather forecasts have been issued regularly during the past fiscal year, being published by most of the leading newspapers throughout the Dominion and also posted in about 1,500 telegraph offices in Manitoba, Ontario, Quebec, and the maritime provinces. In addition to these forecasts a bulletin message giving the expected direction and force of the wind during the next 36 hours, and when thought advisable a general statement of the probable movement of storms, is telegraphed to the harbour masters or others at the principal ports on the lakes and in the maritime provinces where they are posted in conspicuous places in frames provided for the purpose. These wind bulletins are evidently much appreciated as will be seen from the following quotations from a few of the many letters received from the harbour masters and others who post them.—B. Clow, Murray Harbour, P.E.I.—“The people generally, as well as the sea-going ones, have been watching it closely.” B. W. Henesey, Port Hawkesbury, N.S.—“I feel satisfied that it has been of good service to many masters of vessels.” C. P. Terris, Arichat, N.S.—“I have to bear testimony to the accurateness of the service in most instances.” E. McFarlane, Annandale.—“The weather bulletin has been received very regularly and posted, and while being so received was eagerly looked for by all who might be benefited, and would be greatly missed during the fishing season.” George Conroy, Tignish, P.E.I.—“The storm warnings are appreciated by masters of vessels frequenting this part of the province and during the past season the service has given ample time to prepare for approaching storms.” J. A. Matheson, Campbellton, P.E.I.—“I think it was quite an advantage to fishermen as I frequently noticed them coming to look at the probabilities before going out in the morning.” Joseph Ramsay, Campbellton, P.E.I.—“Vessel men found it very useful and were warned upon several occasions not to go to sea thus avoiding heavy gales.” Robert Thompson, Owen Sound, Ont.—“I consider it of great benefit especially to the smaller class of vessels.” W. H. McEvoy, Amherstburg, Ont.—“It has been of great service to vessel men—our early morning report has been very accurate and has been regarded by masters of American ships as most reliable.” Robert MacAdams, Sarnia, Ont.—“It is looked for with interest by the townspeople.” John L. Clark, Port Dalhousie,

Ont.—“It has been posted every day at the canal office and is a great benefit to the captains of boats passing up and down the canal.” W. P. Cooke, Port Arthur, Ont.—“Weather bulletins have been posted at the meteorological office and post office regularly during the summer, and have been regularly consulted and acted upon by all interested therein.” Sylvester Brothers, Toronto.—“Your predictions were so wonderfully correct that few, if any, craft large or small thought of leaving port without reference to the weather report.” James Hemlow, Liscomb, N.S.—“They have been of much value to vessels making this port their harbour, fishing vessels, especially in the fall and winter, make this their harbour as it is always free of ice, and when in port frequently, I may say daily, come ashore to find out the probabilities.” Peter McNeil, St. Peter's, N.S.—“There were two boats stayed in port recently when they saw the warning, and now consider themselves very lucky. A vessel lay here the same day and the captain is glad he did so.” J. A. McGowan, Shelburne, N.S.—“I consider it very beneficial to mariners, and find it is being consulted more and more as it becomes better known.” S. H. Crowell, North Sydney, N.S.—“I just called upon a couple of our ship brokers and they say that they have in company with different captains frequently called to see the weather report during the year, and can safely affirm that many captains have been influenced by these mid-day reports, and that the reports in the main have been very accurate and have been highly appreciated.” H. McDonald, Port Morien, N. S.—“Masters of vessels and fishermen always look to the bulletin before leaving port, and it is correct every time.” John Gunn, Pictou, N.S.—“As late as last week there were three boats going to Pictou Island which had been detained here with unsettled weather and would not leave. They all have faith in it.” Arthur Newberry, Charlottetown, P.E.I.—I am of opinion that shipping largely rely upon these predictions.” Samuel Hemphill, Georgetown, P.E.I.—“The correctness of the forecast is generally commented on and on that account it is much appreciated, it is invaluable, and many a boat and vessel has had reason to feel thankful for having seen the bulletin in time.” Wesley Myers, Victoria, P.E.I.—We all consider it a benefit to mariners, and captains of vessels are governed by it.” Joseph Gallant, Rousticoville, P.E.I.—“I consider them of great value to mariners and fishermen.” Mrs. C. C. Seely, Grand Manan,—“The fishermen seem to find it of great benefit to them, buyers of frozen fish seem to be guided a great deal by it.”

Warnings of the approach of storms likely to block trains by snow were issued to the railways and apparently are much appreciated.

The train weather signals have been displayed as usual during the summer months, these signals being principally for the benefit of the farming community along the lines of railways.

Special predictions were issued as usual without charge to all persons applying for them.

The following table (No. 2) shows the predictions and the percentage of fulfilment in each district in each month and in the whole period.

Marine and Fisheries—Marine Branch.

TABLE II.—METEOROLOGICAL SERVICE—Number of predictions and percentage of fulfilment in each district, in each month and in the year July, 1895, to June, 1896.

MONTH.	MANITOBA.				LOWER LAKE REGION.				GEORGIAN BAY.				OTTAWA VALLEY.						
	Number of predictions.	Verified.			Number of predictions.	Verified.			Number of predictions.	Verified.			Number of predictions.	Verified.					
		Number fully.	Number partly.	Number not.		Percentage.	Number fully.	Number partly.		Number not.	Percentage.	Number fully.		Number partly.	Number not.	Percentage.			
1895.																			
July	86	66	11	9	83.1	92	19	5	87.5	116	92	13	3	91.2	93	75	7	84.4	
August	92	79	10	3	91.3	92	13	3	91.2	108	92	13	3	91.2	99	74	11	14	80.3
September	91	47	22	22	63.7	85	15	14	81.1	114	85	15	14	81.1	87	59	17	11	77.6
October	102	76	11	15	79.9	100	15	8	87.4	123	100	15	8	87.4	104	85	14	5	88.5
November	78	58	10	10	80.8	92	14	8	86.8	114	92	14	8	86.8	104	85	14	8	85.7
December	91	59	17	15	74.2	72	17	18	75.2	107	72	17	18	75.2	98	78	12	8	85.7
1896.																			
January	85	62	13	10	80.6	68	25	18	72.5	111	68	25	18	72.5	91	72	9	10	84.1
February	80	69	8	3	91.2	90	11	9	83.9	90	70	11	9	83.9	89	67	12	10	82.0
March	79	46	13	20	69.4	68	10	13	80.2	91	68	10	13	80.2	89	68	11	10	82.6
April	74	47	15	12	73.6	72	15	7	84.6	94	72	15	7	84.6	87	78	22	15	77.4
May	76	51	18	7	78.9	85	21	11	81.6	117	85	21	11	81.6	115	85	13	12	83.2
June	84	65	11	8	84.0	84	16	11	82.9	111	84	16	11	82.9	110	85	13	12	83.2
Total	1,018	725	156	134	79.0	1,296	980	191	125	83.0	494	370	67	57	481	378	61	49	84.9

TABLE II.—METEOROLOGICAL SERVICE—Number of predictions and percentages of fulfilment in each district, &c.—Continued.

MONTH.	UPPER ST. LAWRENCE.			LOWER ST. LAWRENCE.			GULF.			MARITIME.			TOTAL.												
	Number of predictions.	Verified.		Number of predictions.	Verified.		Number of predictions.	Verified.		Number of predictions.	Verified.		Number fully.	Verified.											
		Number fully.	Number partly.		Percentage.	Number fully.		Number partly.	Percentage.		Number fully.	Number partly.		Percentage.	Number fully.	Number partly.	Percentage.								
1895.																									
July.....	107	82	16	9	84.1	101	76	15	10	82.7	110	89	14	7	87.3	114	86	24	4	86.0	634	491	99	44	85.3
August.....	100	83	11	6	88.5	97	75	11	11	83.0	108	87	16	5	88.0	117	96	17	4	80.3	622	512	78	32	88.6
September.....	105	84	8	13	83.8	103	80	8	15	81.5	101	84	10	7	88.1	109	88	13	8	86.7	623	468	76	79	81.2
October.....	121	100	14	7	88.4	116	90	21	5	86.6	120	91	21	8	84.6	125	102	17	8	85.4	707	559	99	49	86.1
November.....	101	83	13	5	88.6	97	81	11	5	89.2	97	95	6	6	90.7	97	78	10	9	88.6	584	477	64	43	87.2
December.....	94	65	9	20	73.9	94	65	12	17	75.5	96	62	17	17	73.4	108	68	24	16	74.1	590	391	96	103	74.4
1896.																									
January.....	91	61	19	11	77.5	85	64	9	12	80.6	87	63	13	11	79.9	113	80	27	6	82.7	572	398	106	68	78.8
February.....	93	73	7	13	83.3	90	77	5	8	88.3	87	68	10	9	83.9	102	82	12	8	86.3	726	586	69	71	85.5
March.....	98	68	14	11	80.6	93	67	11	15	78.0	102	96	15	21	72.1	109	74	15	20	74.8	755	530	101	124	76.9
April.....	89	65	12	12	79.8	83	61	11	11	80.1	83	70	6	9	85.9	86	57	24	5	80.2	687	490	111	77	80.7
May.....	105	82	16	7	85.7	95	77	12	6	87.4	95	70	18	8	83.3	103	79	16	8	84.5	811	607	137	67	83.3
June.....	97	79	12	6	87.6	104	75	19	10	80.3	107	72	19	16	75.2	105	84	15	6	87.1	816	622	117	77	84.6
Total.....	1,196	925	151	120	82.8	1,158	868	145	125	82.9	1,196	907	165	124	82.7	1,288	974	214	100	83.9	8,127	6,140	1,153	834	82.6

NOTE.—The percentage of verification is obtained by taking the sum of those fully verified and half the sum of those partly verified and dividing by the whole number.

Marine and Fisheries—Marine Branch.

UNITED STATES WEATHER BUREAU.

The chief of the United States Weather Bureau has continued to interchange reports with this office, and I desire to express my warm appreciation of the uniform courtesy that has characterized all communications from that office.

PUBLICATIONS.

Applications are frequently made by persons and institutions in different parts of the world for the publications of this office. Over 800 copies of the Monthly Weather Review and Toronto General Meteorological Register are distributed immediately upon their being printed. Five hundred Weather Charts are issued on about the 7th of each month, many of which are posted in conspicuous places for reference.

LIBRARY.

During the past year some improvement has been made in the library by the addition of some book cases, which were much needed. The publications received consist of two hundred and twenty-nine books, pamphlets and annual reports, and twenty-one daily, weekly and monthly reports. No binding have been undertaken during the past ten years, many valuable reports and other works will require to be bound, in order to save them from total destruction.

INSPECTION OF STATIONS.

During the past fiscal year stations were inspected, and the necessity of frequent and careful inspection and adjustment of instruments, was very apparent.

The following stations were inspected by Mr. H. V. Payne, from whose report some extracts are made:—Port Arthur, Fort William, Winnipeg, Qu'Appelle, Swift Current, Medicine Hat, Fort Macleod, Edmonton, Calgary, Banff, Glacier, Spence's Bridge, Chilliwack, Agassiz, Port Simpson, Rivers' Inlet, Esquimalt, Kamloops, Grand Prairie, Vernon, Enderby, White River, Schreiber, Kingston, Kingston (Tete du Pont barracks), Deseronto, Picton, Wiarton, Owen Sound, Presqu'Isle, Collingwood, "Kiononta Farm," Blue Mountains.

At Port Arthur the approaches to the signals were found unsafe and were repaired, arrangements were also made for giving wind instruments better exposure. At Fort William, Ont., it was found that instruments were not being properly attended to and some repairs and painting were necessary. At Winnipeg instruments were adjusted and agent was instructed with regard to certain errors found in observations. At Qu'Appelle all instruments were tested, and the agent was instructed with regard to rainfall observations. At Edmonton, N.W.T., the position of instruments not being suitable they were moved, giving them better exposure. At Swift Current, N.W.T., an observer having just been appointed she was instructed regarding the observations and all instruments were tested. At Banff it having been proposed to erect an anemometer on some well exposed position, surrounding mountains were examined, instrumental comparisons and tests were made and the observer's assistant was instructed. At Agassiz the position of instruments was not suitable and instructions were given to move them. At Esquimalt, B.C., the barometer was cleaned, a position was selected for a rain gauge and instruments were tested. At Grand Prairie the observer having died an attempt was made to obtain another observer without success, so the instruments were taken away. At Schreiber the position of the rain gauge not being good it was changed. At Kingston comparisons of the instruments were made with standards and the position of some of the instruments, and the signal mast not being good, it was recommended that they should be moved. At Picton the signal mast was found in bad condition and was repaired and painted. At Wiarton a signal agent having been appointed he was instructed in his duties. At Owen Sound repairs to the signal mast were

found necessary. At Presqu'Isle the anemograph was put in order. At "Kiononta Farm," near Collingwood, thermometer shed was properly adjusted.

The following stations were inspected by Mr. B. C. Webber:—Parry Sound, Gravenhurst, Burk's Falls, Sprucedale, Eau Claire, Mattawa, Clontarf, Renfrew, Rockliffe, Winnipeg, Portage la Prairie, Minnedosa, Brandon, Qu'Appelle, Indian Head, Regina, Prince Albert, Battleford, Swift Current, Calgary, Banff, Carmanah, Esquimalt, Agassiz, Chilliwack, Spence's Bridge, Kamloops, Edmonton, Chaplin and Medicine Hat.

At Parry Sound a new electrical vane was erected and all instruments were examined. At Burk's Fall the thermometer shed, which had been erected upside downwards, was adjusted and the observer was instructed. At Mattawa the observer was instructed with regard to rainfall observations, &c. At Renfrew the rain gauge was found to be out of repair. At Rockliffe, Ont., a new barometer was supplied and a better exposure for the anemograph was examined and approved.

At Winnipeg all instruments were examined and the work of the station was carefully gone over. At Minnedosa the barometer was reading too low and the wind vane was not working properly; these instruments were adjusted. At Qu'Appelle the barometer was cleaned and comparisons of other instruments were made. At Indian Head the observer was instructed with regard to the observations. At Prince Albert a new structure for the anemometer and a new site for other instruments was found necessary. At Battleford the barometer was cleaned and a spare instrument was left, the sunshine recorder was also adjusted. At Swift Current a new set of electrical instruments was supplied, the barometer was cleaned and the rain gauge was adjusted. At Medicine Hat barometers were cleaned and tested and old rain gauge was replaced by new one. At Calgary a structure was erected for the anemometer and the thermometer shed was repaired and moved to another site. At Banff the barometers were tested and adjusted, and the observer was fully instructed with regard to the manipulation of the wet and dry bulb thermometers. A site for an anemometer on Tunnel Mountain was also examined and reported on. At Carmanah, B.C., the barometer was cleaned and rain gauge which was much worn was replaced by a new one. At Esquimalt all instruments were examined and were found in good order. At Spence's Bridge instruments were tested and barometers were cleaned. At Kamloops, full instructions were given to the observer regarding the observations, it having been proposed to establish a telegraph reporting station at that place. At Edmonton, several repairs were found necessary and all instruments were examined and adjusted. At Fort William the signal mast was found to have been heaved by the frost and instructions regarding it were given. At White River all instruments were tested, and a position for the anemometer on the station roof was suggested and approved.

The following stations were inspected by Mr. F. N. Denison,—Southampton, Kincardine, Goderich and Stratford.

At Southampton the electrical anemometer and vane was much in need of attention and was put in thorough working order, and other instruments were tested. At Kincardine the foundation of the signal house was in need of repair and instructions regarding it were given, all instruments were examined. At Goderich the signal mast having been destroyed a new one was erected, and the electrical anemometer was adjusted. At Stratford, instruments were examined and instructions regarding them were given.

Respectfully submitted,

R. F. STUPART,

Director.

Marine and Fisheries—Marine Branch.

MAGNETIC OBSERVATORY.

TORONTO, 15th August, 1896.

Major F. GOURDEAU,
Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit herewith the report on this observatory for the fiscal year ended 30th June, 1896.

During the year the regular routine magnetical and meteorological observations have been carried on as in past years, and the photographic instruments, barograph, thermograph, and magnetographs have been kept in operation, the curves from which turn out satisfactory. Field observations made by the director have been continued on Sundays at a point two hundred yards magnetic north of the observatory, well removed from all influence of buildings, in order to determine the amount of the effect of the new school of science and adjacent buildings on the various magnets in the observatory.

The determinations made in this manner have shown that all the magnets are affected and constant corrections will have to be applied. On account of the invariable vibration of the magnets caused by the electric cars all absolute determinations have to be made on Sundays when the cars are not running. The effect of the electric currents on our magnets certainly impairs the value of the magnetic observations at this observatory, but by no means renders them worthless, as corrections can be applied and our photographic traces show very clearly the daily curves, and our records of anything approaching a storm are probably as valuable as they ever were. The magnetic daily mean absolute values have been regularly charted on millimetre paper forming curves, which, with daily observations of the sun spots made with the six inch equatorial afford valuable data for magnetic research. During the year the value of the magnetic elements have each day been sent to Washington where they are used with those of other magnetic observatories in an investigation into the relationship between meteorological and magnetical phenomena. The principal magnetic storms occurred on 12th and 13th July, 9th and 10th August, 29th and 30th September, 12th, 13th, 28th and 29th October, 9th and 10th November, 4th March, May 2nd and 3rd.

On April 28th the suspension thread of the upstairs declinometer broke, the magnet was resuspended, and the break measured by means of the photographic trace. In December the vertical force magnetograph needle was dismantled to put on a damper to see if the vibrations caused by the trolley cars could be lessened, but no great improvement could be seen. Spider webs were noticed on the declinometer magnetograph needle in May. On the 20th the outside cover was removed and the magnet cleaned of webs. Hourly tabulations from the curves were duly made and results abstracted.

Eye observations to control the automatic records of the barograph and thermograph are taken tri-daily and the arrangement is very satisfactory. The residual correction to the barograph is .005 and the zeros of the thermograph standard thermometers were redetermined in the commencement of April, also maximum and minimum in the same shed and were found to be unchanged. During the excessively cold weather in February the thermograph clock stopped. The cover of the instrument was taken off and the clock thoroughly overhauled and it has been running satisfactorily since. On 19th June the barograph clock cord broke. A new one was at once put on. The magnetic clock has been running uninterruptedly throughout the year. In December the gravity battery was substituted for the law as the latter's action deteriorated rather quickly, since then there have been very few breaks in the magnetic cut-offs. A summary of magnetic changes is added each month to the monthly Weather Review.

TIME SERVICE.

During the year ending 30th June, 1896, observations of stars in the meridian for time on 97 days and 11 solar transits during long intervals of cloudy nights were taken at the Toronto Observatory in which 362 stars have been observed. The positions of the stars as given in the "Berliner Jahrbuch" have as formerly been used in the reductions.

Determinations of the collimation error of the transit instrument have frequently been made, chiefly by micrometrical measurements on the cross wires in the collimating telescope.

An unusual number of visitors have been shown over the observatory this year, and at night time a great many parties were accommodated with views of the celestial bodies through the six-inch equatorial telescope.

The total eclipse of the moon on the 3rd September, 1895, was observed with the large telescope and was watched by an interested number of spectators gathered under the dome of the observatory tower. The various phenomena connected with the eclipse were noted, the night being beautifully clear at Toronto. The darkness of this eclipse was more marked than that of 10th March last, and during totality the moon presented a decided deep coppery colour. The occultations of four faint stars were observed, and the times of their disappearance noted. At 2.30 a.m. of the 4th aurora was observed in the north Class III., with some streamers.

The regular sun spot observations were continued throughout the year, and maps 4 inches in diameter obtained on 219 days. A maximum period occurred from the 7th to the 15th July, followed by a well-marked minimum to the 26th, and from the 29th July to the 7th September another maximum occurred, the period from the 1st to the 11th August being marked by numerous beautiful groups stretching across the central portion of the sun from east to west. 8th to the 25th September was a moderate minimum period, and from the latter date to the 9th October a well-marked maximum was observed, consisting of a number of large groups. Moderately marked maximum and minimum periods alternated until the 11th April, 1896, when a remarkably long continuous minimum set in, lasting up to the 27th May. During this time the sun was completely free of spots on the 14th April, this being the first day of no spots on the sun since the observations were commenced 15th March, 1895; also on the 15th and 17th April and the 16th May the sun was clear of spots. On many days of this period only the minutest pinhole of a spot was observed. From the 27th May to the 30th June a moderate maximum prevailed.

The exchange of time between the observatories at Montreal, Quebec, St. John and the Toronto observatory have taken place as usual, the comparisons being registered on the chronograph. The errors of the Toronto clock and the different timepieces used by the observers, being computed from the latest observations.

The time has also been given regularly on time exchange days to Halifax up to the 7th April when it was discontinued.

The examination of the clock and chronometer comparisons and observations sent in from the observatories at Quebec and St. John has been performed.

Marine and Fisheries—Marine Branch.

The following table shows the difference between the "adopted time" and that given at the different exchanges. The sign + indicates that the time as sent from the various observatories is faster than the "adopted time." This latter time is the arithmetical mean of the times as determined at Toronto and Montreal.

	Toronto.	Montreal.	Quebec.	St. John.
1895.	Seconds.	Seconds.	Seconds.	Seconds.
July 11	+0 10	-0 10	+0 45	+0 63
do 30	+0 15	-0 15	+3 80	+1 62
Aug. 16	-0 02	+0 02	+0 88	+0 49
Sept. 4	+0 22	-0 22	+1 59	+1 52
do 24	0 00	0 00	+0 13	+2 31
Oct. 8	-0 82	+0 82	-1 27	+0 69
do 24	-0 30	+0 30	+0 22	+0 51
Nov. 22	-0 39	+0 39	+0 09	+0 53
Dec. 10	-0 22	+0 22	+0 39	+0 17
do 27			+2 94	+0 70
do 30	+0 21	-0 21		
1896.				
Jan. 21	+0 08	-0 08	-0 63	-0 38
Feb. 12				-3 04
do 13	-0 17	+0 17	-0 10	
do 28	-0 09	+0 09	-0 14	+0 43
March 17	+0 15	-0 15	+1 11	+0 09
April 7	-0 30	+0 30	-1 37	+0 16
do 22			-0 71	+0 95
do 23	-0 16	+0 16		
May 7	-0 45	+0 45	-0 81	+0 47
do 27	-0 32	+0 32	-1 13	+1 50
June 11	-0 83	+0 83	-1 25	+1 32

Respectfully submitted.

R. F. STUPART,
Director.

APPENDIX A.

QUEBEC OBSERVATORY,
QUEBEC, August, 1896.

To the Director,
Meteorological Office, Toronto.

SIR,—I have the honour to submit the following report of the Quebec Observatory for the fiscal year ending 30th June, 1896.

All the meteorological observations were taken daily as heretofore, and transmitted to the central office at 8 a.m. and 8 p.m., and the bi-hourly temperatures were continued on the Citadel. Upon instructions from the Meteorological Office the storm-drum was not used this year.

The time was determined at the observatory by means of the transit of the standard stars every fine night, and also by the sun.

During the winter, and especially during the spring thaws, I noticed that the transit instrument is not placed upon ground sufficiently solid. On various occasions during the space of 24 hours I found a considerable change in deviation and inclination.

The correct standard time (75th meridian) was daily given to the city by means of the noon day gun, and during the navigation season, which, this year, began on the 27th of April, to captains of vessels by means of the time ball at 1 p.m.

The correct time was also given to watchmakers and other persons nearly every day by means of the telephone.

Several chronometers have also been rated at this observatory during the year.

Two failures of the ball and a few of the gun occurred during the year, there being no current on the telegraph line at the time.

The whole respectfully submitted.

ARTHUR SMITH,
Director Quebec Observatory.

METEOROLOGICAL OFFICE,
TORONTO, 20th August, 1896.

Major F. GOURDEAU,
Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to inclose herewith the annual report of the St. John observatory for the fiscal year 1895–96 this being Appendix B to my report forwarded on the 18th instant.

I have the honour to be, sir,
Your obedient servant,

R. F. STUPART, per F. P.,
Director.

APPENDIX B.

ST. JOHN OBSERVATORY.

St. JOHN, N.B., August 15th, 1896.

R. F. STUPART, Esq.,
Director, Meteorological Service,
Toronto, Ontario.

SIR,—I have the honour of presenting my annual report for the fiscal year 30th June, 1896.

The usual chief station routine of meteorological observations have been continued as reported in former years.

The time service has received careful attention; observations of stars with the transit instrument for the determination of clock errors and rates, have been made at frequent intervals. The daily time signal has been given to the shipping and others, by dropping the time ball at 1 p.m., local time.

During the year electric lights have been placed in the transit room for lighting purposes as well as illuminating the diaphragm of transit telescope.

The morning weather bulletin containing the 8 a.m. probabilities, conditions of the weather throughout the continent, in general terms, and reports from stations covering the coast from Anticosti to Boston, is now received by wire from Toronto at an earlier hour, which enables me to give the bulletin wider circulation and increase its value to the shipping and other interests. This bulletin is posted in public places and published by all of the St. John daily papers, as well as other papers throughout the province. In addition to the bulletin, a report of our local meteorological conditions is published by all the daily papers here. Owing to the correctness of the forecasts wired from Toronto, I have many calls for the probabilities, especially during the stormy season.

I have the honour to be, sir,
Your obedient servant,

D. L. HUTCHINSON,
Director.

Marine and Fisheries—Marine Branch.

APPENDIX C.

To the Minister of Marine and Fisheries,
Ottawa.

McGILL COLLEGE OBSERVATORY,
MONTREAL, 11th March, 1897.

SIR,—I beg to submit the following report on the work of the McGill College Observatory, Montreal, for the year 1896.

The usual meteorological work in connection with the meteorological service of Canada has been carried forward without interruption throughout the year. This has consisted in: (1) A series of observation of the usual elements at four hours intervals. (2) The telegraphic observation series at 8 a.m. and 8 p.m. each day, upon which the weather probabilities depend. (3) A bi-hourly series of temperature observations from self-recording thermometers.

The time service and system of clock exchanges with the Toronto Observatory have also been conducted as detailed in former reports. Observations of 628 stars were made on 122 nights during 46 weeks. For six weeks—11th September to 24th October—clock errors were determined from the observations of the coast and geodetic survey assistants, Messrs. Sinclair and Faris, who were during that period engaged in longitude work here, and occupied our transit pier with their instrument. Comparisons of the meantime clocks, here and in the Toronto Observatory, were made on 18 days.

LONGITUDES.

During the past summer the Astronomer Royal visited Montreal on his way to Japan, and having brought with him the completed reductions of the Montreal-Greenwich longitude observations, I am able to announce the final value of the longitude of Montreal (the middle point between the two piers of the transit instruments at this observatory), as determined from the observations of Professor H. H. Turner and myself in 1892, as $4^{\text{h}} 54^{\text{m}} 18^{\text{s}} \cdot 670$. This quantity is in excess of the old value, which was obtained by connection with the United States system of longitudes, by $0^{\text{s}} 105$. The determinations upon which the American longitudes have hitherto rested were made by the United States coast and geodetic survey in 1866, 1870 and 1872. When it is considered that the cable signals were then sent on the old flash system and that the longitude operations, as conducted by the Americans, did not include an interchange of observers, the accordance of the old value with that above announced is quite within the limits of error which might properly have been assigned to the former.

During the months of May and June observations for determining the longitude of Ottawa were made in co-operation with Mr. W. F. King, of the Department of the Interior. During September and October the difference of longitude between Albany, N.Y., and Montreal was determined under the direction of Mr. C. H. Sinclair, of the coast and geodetic survey. This work completed the chain of longitude determinations between Washington, Cambridge and Montreal, and gave another connection between the American trans-Atlantic longitude determinations and our own determination in 1892.

By the kindness of Mr. Sinclair I am able to give the results of his field reduction, which makes the difference of longitude between Montreal and Cambridge $9^{\text{m}} 47^{\text{s}} 581 \cdot 011$. The difference obtained in 1883 by Professor Rogers, of the Harvard College Observatory, and myself was $9^{\text{m}} 47^{\text{s}} 550 \cdot 019$. Combining these two results we obtain $9^{\text{m}} 47^{\text{s}} 572$ as the difference of longitude between Montreal and Cambridge.

SOIL TEMPERATURES.

The soil temperature observations made in co-operation with H. L. Callendar, F.R.S., Professor of Physics in McGill University, have been continued. Two eye observations per day, at the several depths, have been taken throughout the year. The results up to the 1st May last were presented as a paper at the last meeting of the Royal Society of Canada, and will be published shortly.

I have the honour to be, sir,

Yours truly,

C. H. McLEOD,
Superintendent.

Marine and Fisheries—Marine Branch.

APPENDIX No. 5.

REPORT OF THE CHAIRMAN OF THE BOARD OF STEAMBOAT INSPECTION.

CHAIRMAN'S OFFICE,
OTTAWA, November, 1896.

Hon. L. H. DAVIES,
Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit herewith my annual report of the Steamboat Inspection Service, for the fiscal year ended 30th June, 1896.

The report contains statement of board meetings held during the year, appointments made, casualties occurred, and prosecutions for violation of the Steamboat Inspection Act, with the number of steamboats in the Dominion as known to the inspectors; form No. 1, showing the steamboats which were inspected, and form No. 2, the steamboats not inspected; form No. 4, shows the number of steamboats added to the Dominion, and form No. 5, the number of steamboats lost, broken up or otherwise put out of service.

There has also been inspected by the steamboat inspectors at Montreal, in addition to the steamboats inspected, the hoisting gear and ship's tackle of 382 vessels, which is used for loading and unloading the vessel.

Tables A, B and C show the total number of steamboats in the Dominion and their gross tonnage; the amount of dues and fees collected, and the number of steamboats added to the Dominion, with their gross and registered tonnage.

A.—NUMBER of Steam Vessels, inspected and not inspected, reported by the Inspectors of Steamboats in the Dominion and their gross tonnage, during the year ended 30th June, 1896.

Division.	Number of Vessels.	Gross Tonnage.
West Ontario, Huron and Superior.....	340	69,771·00
Kingston.....	156	25,848·96
Montreal.....	181	18,069·93
Quebec.....	136	36,099·00
Nova Scotia.....	123	27,475·80
New Brunswick and Prince Edward Island.....	129	17,292·51
British Columbia.....	152	22,165·09
Manitoba, Keewatin and North-west Territories.....	83	5,455·86
Total.....	1,300	222,178·15

B.—DUES and Fees collected on account of Steamboat Inspection during the year ended 30th June, 1896.

Division.	Amount.
	\$ cts.
West Ontario, Huron and Superior.....	6,838 22
Kingston.....	2,779 00
Montreal.....	2,249 63
Quebec.....	3,474 68
Nova Scotia.....	2,693 94
New Brunswick and Prince Edward Island.....	1,378 32
British Columbia.....	2,409 56
Manitoba, Keewatin and North-west Territories.....	554 82
Inspecting tow barges.....	110 00
Engineers' certificates.....	717 50
Total.....	23,205 67

C.—NUMBER of Steam Vessels added to the Dominion during the year ended 30th June, 1896.

Division.	Number of Vessels.	Gross Tonnage.	Register Tonnage.
West Ontario, Huron and Superior.....	10	240 00	162 00
Kingston.....	15	372 94	202 01
Montreal.....	12	1,122 51	667 69
Quebec.....	Nil.		
Nova Scotia.....	6	171 13	89 43
New Brunswick and Prince Edward Island.....	3	34 72	20 32
British Columbia.....	14	2,434 71	1,641 81
Manitoba, Keewatin and North-west Territories.....	6	647 20	430 10
Total.....	66	5,023 21	3,213 03

RULES AND AMENDMENTS.

During the year the rules and amendments for the inspection of steamboats, and for the examination of engineers of steamboats, have been consolidated, and sanctioned by the Governor in Council.

BOARD MEETINGS.

A meeting of a quorum of the Board of Steamboat Inspection was held at Toronto from 13th to 27th February inclusive, being composed of Inspectors John Dodds and James Johnston, of Toronto, with the chairman, E. Adams.

The meeting was held for the purpose of examining candidates for the position of steamboat inspector for the Manitoba district; also to decide on questions submitted by the inspector at Halifax pertaining to the form of pipe boiler known as the Babcock and Wilcox, to be placed for use on steamboat; and question relating to shafts for a tug boat building by the Upper Ottawa Improvement Company.

APPOINTMENTS.

On the retirement from the service of C. E. Robertson, late inspector for the Manitoba district, Mr. G. P. Phillips, of Rat Portage, who passed a satisfactory examination at Toronto, 27th February, 1896, was appointed to the position of boiler, machinery and hull inspector for said district, to reside at Rat Portage, with a salary of \$1,000 per annum, by Order in Council, 16th May, 1896.

Marine and Fisheries—Marine Branch.

CASUALTIES.

West Ontario and Huron Division.

July 14th, 1895.—Steamer "Cibola," of Toronto, was totally destroyed by fire at Lewiston, N.Y., originating while steamer was lying at the dock, one life was lost; cause of fire unknown.

September 5th, 1895.—Steamer "St. Magnus," of Hamilton, while on dry dock at Port Dalhousie took fire and was totally destroyed, one life being lost; cause of fire, from warehouse on dock.

October 7th, 1895.—Steamer "Africa," of Owen Sound, having in tow the barge "Severn," both loaded with coal, from Ashtabula, U.S., to Owen Sound, Ont., encountered a severe gale on Lake Huron, the tow line parted and the "Africa" fell into the trough of the sea and foundered, all hands, thirteen in number, being lost. The "Severn" was driven ashore in the vicinity of Lyal Island and went to pieces, the crew being saved.

November 3rd, 1895.—SS. "Athabasca," of Montreal, en route from Fort William to Owen Sound, when about fifty miles from Fort William the high pressure crank shaft broke. The steamer returned to Fort William and afterwards was towed to Owen Sound, where repairs were made.

East Ontario Division.

August 3rd, 1895.—Steamer "Daisy," of Port Hope, caught fire while the crew were sleeping. The vessel was totally destroyed; no lives lost.

September 15th, 1895.—Steamer "Columbia" of Port Hope, while tied up at Bobcaygeon dock, caught fire and the hull was badly burned. The crew being all on shore when fire started, no loss of life.

October 26th, 1895.—Steam yacht "Sea Gull," while lying at the dock at Port Perry, was completely destroyed by fire. Cause of fire, the explosion of a coal oil lamp.

October 31st, 1895.—SS. "Alexandria" of Montreal, struck a boulder in Lachine Canal and sank to the deck, afterwards was raised and repaired at Montreal.

November 8th, 1895.—Steamers "Hero" and "Nile" collided at night, near Huff's dock, Bay of Quinté. Both steamers were badly damaged. "Hero" was beached to keep her from sinking. The vessels afterwards were repaired at Deseronto.

November 15th, 1895.—Tug "James A. Walker," of Kingston, by striking a rock in Rapid Plat, stripped the blades off her propeller wheel, the engine running away and causing the breaking of the forward columns of the engine frame and cracking the condenser; was afterward towed to Montreal where repairs were made.

April 25th, 1896.—Tug "Eva" was totally destroyed by fire. The vessel was out on the ways at Lindsay and had been out all winter. Origin of fire unknown.

June 22nd, 1896.—SS. "Reindeer," of Kingston, while on a trip between Deseronto and Picton, broke the engine shaft and bed plate. The break was occasioned by a flaw in the shaft. Vessel was towed to Kingston where repairs were made.

Montreal Division.

September 20th, 1895.—Tug "St. Peter" and SS. "Turrett Bay," collided in the harbour of Montreal. The bow of the "St. Peter" was badly damaged and she also lost her smokestack overboard. The "Turrett Bay" proceeded on her voyage uninjured.

May 7th, 1896.—Ferry steamer "Mansfield," when on a trip between New Edinburgh and Gatineau Point, caught fire and became a total loss. Fire supposed to have originated by a spark from the furnace of boiler.

May 14th, 1896.—Steamer "Owens," a paddle tug, while lying at the Montebello wharf, caught fire and became a total loss. One man was badly burnt. The cause of fire unknown.

Quebec Division.

August 6th, 1895.—SS. "Canada," of Montreal, while on a voyage crossing from Tadousac to Rivière du Loup in a dense fog, ran on Percil Rock and was damaged. The steamer got off with the rising of the tide, and proceeded to Quebec; was there placed on dry dock and repaired.

November 21st, 1895.—SS. "Thames," of Quebec, while on a voyage from Newfoundland to Montreal, stranded on a bank near Cape Breton and became a total loss. No lives were lost.

May 18th, 1896.—The paddle tug steamer "Beaver," of Quebec, broke her shaft between the two paddle flanges. The break was detected while lying at the wharf. It was substituted by a larger one.

Nova Scotia Division.

August, 1895.—Str. "Islet," of Yarmouth, during a fierce gale, broke from her moorings and drove ashore, becoming a total wreck.

February, 1896.—SS. "St. Pierre," of Yarmouth, foundered at sea on a voyage from Halifax, Nova Scotia, to Vancouver, British Columbia. There was no loss of life attending the disaster.

New Brunswick and Prince Edward Island Division.

July 23rd, 1895.—SS. "Prince Rupert," with triple expansion engines, running between St. John, N.B., and Digby, N.S., on leaving the wharf at St. John, broke the high pressure cylinder and was detained until changes were made to work her compound.

Again, on August 22nd, broke the coupling bolts on starboard paddle shaft on the voyage from Digby to St. John.

August 17th, 1895.—Passenger steamer "Miramichi" collided with schooner "Ascola," on the Miramichi River, the jib boom of the latter striking the steamer forward of the smokestack, tearing it away, and sweeping one side of the upper deck to the stern. Five young lady passengers who were on the deck at the time, were swept overboard with the wreck, of whom three were drowned before assistance could reach them. An investigation was held, the result of which was the certificate of the master of the steamer was cancelled for twelve months.

August 12th, 1895.—Passenger steamer "Hampstead," and tug "Nereid," collided on St. John River, the latter striking the "Hampstead" at the forward gangway, cutting into her guards five feet, and her planking to the water's edge. Temporary repairs were made permitting her to finish the running season.

Nov. 17th, 1895.—Freight str. "Albert," of Charlottetown, P.E.I., sprung a leak at sea during a fierce gale of wind, and was abandoned in a sinking condition. The crew were saved and landed at St. Pierre, Miquelon.

June 9th, 1896.—The steam tugs "Hope" and "Maggie M" collided on St. John River. The "Maggie M" had her stern taken out to the water's edge; the "Hope" was cut through the guard to hull. The "Maggie M" was run ashore and temporary repairs made to prevent her from sinking.

British Columbia Division.

July 20th, 1895.—SS. "Coquitlan" stranded on rocks in Johnston Straits, whereby her stern and bow plates were damaged, was floated off and proceeded to Victoria, where damage was repaired.

Marine and Fisheries—Marine Branch.

August 1st, 1895.—SS. "Muriel," stranded and partly submerged in the Granville Channel, was raised August 6th, and temporary repairs were effected to bring her to Victoria, where she was hauled out on marine railway, and thoroughly repaired.

Nov. 1st, 1895.—SS. "Cariboo and Fly," on being taken into Mill Creek, Skeena River, to be laid up, grounded at both ends, when tide left, broke her back, a total wreck; machinery saved.

Nov. 25th, 1895.—SS. "Thistle" stranded in Chatham Sound, damaged keel, stern post and some of the planking, was got off next day, taken to Victoria where placed on the marine railway and repaired.

Dec. 22nd, 1895.—SS. "Islander" on passage to Vancouver, struck on Prevost Island, near Portlock Point lighthouse, floated off on 24th, and steamed to Victoria; extensive damage to stern, keel, keelson, frames and several plates; was hauled out on marine railway and repaired.

Dec. 27th, 1895.—Tug "Arrow" while towing a scow on Arrow Lake, Columbia River, a sudden squall capsized the steamer; master and engineer lost. The vessel was afterwards righted when it was found the boiler was lost.

Jan. 8th, 1896.—SS. "Falcon" with scow in tow on passage to Comox, fouled a log, which broke her propeller, was driven on Trial Island and broken up by seas. A total wreck.

Jan. 13th, 1896.—SS. "Vancouver" on voyage to Chemainus, stranded in Sansome Narrows, was towed off and steamed to Victoria, hauled out and repaired damage fore foot and keel.

Feb. 9th, 1896.—SS. "Mary Hare," while lying at Reed Island, Cowichan Gap, at anchor and all hands ashore; the steamer caught fire, and became a total loss.

March 9th, 1896.—SS. "Comox," while moored at the Union SS. Co., wharf, Vancouver, and all hands ashore, caught fire, supposed over boiler, causing considerable damage to deck, fittings, &c., which were all repaired.

May 4th, 1896.—SS. "T. W. Carter" on voyage from Victoria to Mud Bay, struck on Trial Island, afterwards floated off and sank in deep water; a total loss.

May 12th, 1896.—Tug "Mamie" while towing broke the tail shaft by fouling floating logs, was towed to Vancouver where a new shaft was made and fitted.

Manitoba, Keewatin and North-west Territories.

Aug. 12th, 1895.—SS. "Siskiwit" of Port Arthur, while lying at the dock at Fort William, caught fire and was partially burnt, cause unknown; was again rebuilt. Amount of damage valued \$1,025.

PROSECUTIONS FOR VIOLATION OF THE STEAMBOAT INSPECTION ACT.

Results in Each Case.

Str. "Rocket"—to which reference is made in my annual report for year ending June, 1894, of having been fined for violation of the Steamboat Inspection Act, and proceedings being taken to sell the boat for payment of same.

The proceedings were not executed; the fine having been paid by defendant, to the department, December 11, 1895, by deposit receipt No. 29, Bank of Montreal, for \$130.71, being the amount of costs and fine inflicted.

April 19, 1895. Proceedings were taken against the steam tugs "Equal Rights," "Fred. Davidson," "Maud," "Doty," and "Tender," for violation of the Steamboat Inspection Act, by carrying passengers without having a certificate permitting of such.

The cases were tried before the police magistrate at Barrie, Ont., when the defendants were convicted; four of them being fined \$50 and costs, and Str. "Fred. Davidson" \$20 and costs.

The owners of "Maud," "Fred. Davidson," and "Equal Rights," paid the charges amounting in all to \$126, for which the department received deposit receipt No. 2092 of the Canadian Bank of Commerce, Barrie, for the amount.

The owners of "Tender" and "Doty" were granted an extension of time for payment; which was collected and paid to the department, 30th July, 1895, by deposit receipt No. 2115 for \$100, on Bank of Commerce, Barrie.

I have the honour to be, sir,

Your obedient servant,

EDWARD ADAMS,
Chairman Board of Steamboat Inspection.

Marine and Fisheries—Marine Branch.

APPENDIX No. 6.

REPORT OF CHAIRMAN OF BOARD OF EXAMINERS OF MASTERS AND MATES.

The Deputy Minister of Marine and Fisheries,
Ottawa.

HALIFAX, N.S., 19th August, 1896.

SIR,—According to instructions contained in your letter of the 3rd inst., I have prepared and herewith beg to inclose the annual report of the Board of Examiners of Masters and Mates for the fiscal year of 1895-96.

I am, sir,
Your obedient servant,

W. H. SMITH,
Chairman.

HALIFAX, N.S., 20th August, 1896.

The Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit the annual report of the proceedings of the Board of Examiners of Masters and Mates, from the 30th June, 1895, to the 30th June, 1896, the end of the fiscal year.

The board met for examinations as follows:—

Port of Halifax.....	11 times.
do St. John.....	10 do
do Yarmouth.....	1 do
do Quebec	2 do
Total.....	24 times.

There were also three examinations for candidates at Victoria, B.C.

At Halifax 10 applications were made for sea-going certificates of competency as master and 17 for mates' and 4 for second mates' certificates.

Six masters, 10 mates and 3 second mates received certificates. Ten applications were made for certificates of competency as master of coasting and inland vessels and 2 for mates' certificates, and 10 masters and 2 mates received certificates.

At St. John 14 applications were made for sea-going certificates as master competency, and 11 certificates were issued to successful candidates.

Eleven sea-going officers applied for mates' certificates and one for a second mate's certificate.

Ten mates and 1 second mate were granted certificates. Two candidates applied for certificates of competency as masters of coasting and inland vessels and 1 for a mate's certificate.

Two masters and 1 mate received certificates for the coasting and inland trade.

At Yarmouth, 2 applications were made for sea-going certificates of competency as master and both candidates received certificates.

At Quebec 1 candidate applied for a master's certificate of competency sea-going, and also 1 for a second mate's certificate.

Both candidates were granted certificates.

At Victoria, B.C., 2 applications were made for mates certificates of competency and 1 for 2nd mate's certificate.

A certificate was issued to the second mate only.

By the foregoing statement it will be observed that for the 12 months ending 30th June, 1896, 26 applications were made for masters' certificates of competency sea-going, 31 for mates' and 7 for second mates'.

Nineteen masters, 22 mates and 6 second mates were granted certificates.

Twelve applications for certificates of competency as master coasting and inland, were made to the Board of Examiners, and 3 for mates' certificates.

Twelve masters and 3 mates obtained certificates for the coasting and inland trade.

Four certificates of service were issued through the Halifax office for masters in the coasting and inland trade and 5 for mates and 4 renewal certificates of all grades.

The total number of certificates granted by the Department of Marine and Fisheries at Ottawa, including competency, service and renewal, upon applications made to the Board of Examiners at Halifax, was 74, and fees to the amount of \$794.50 were collected and deposited in the Bank of Montreal to the credit of the Receiver General, and receipts for the same forwarded to the department monthly.

Fees for the examinations of candidates at Victoria are sent direct to Ottawa by the agent of Marine and Fisheries at that port, and are not accounted for by the chairman of the board at Halifax.

This report does not include certificates of competency for coasting and inland waters, issued by the department upon examinations at any other ports than those above mentioned.

At St. John the local member of the board holds examinations for coasting and inland, and also for service certificates, and makes the return to the department direct.

Amongst the applications above enumerated, some candidates have presented themselves a second or third time for examination, for master, mate or second mate, as the case may be, having previously failed.

The names of these candidates appear upon the books at this office each time they come forward to be examined. They are, however permitted to have a second trial without paying another fee, but on each successive occasion after that, no matter how often they present themselves, the full amount of the fee is again collected from them.

The examination of candidates for deep-sea certificates of competency, is similar to that required by the Imperial Board of Trade, and any new subject of examination introduced by the British Government is adopted by Canada, and the certificates granted by the Minister of Marine and Fisheries are the same in value as those issued in Great Britain.

The examination in the colour test has from time to time been changed, improved and made more searching, and now consists of the form vision, colour vision and colour ignorance tests, which are quite sufficient to ascertain if a candidate has any defect in his sight, as it is very important that an officer in charge of the deck of a ship should be able to distinguish the colour and descriptions of lights, immediately they come in sight, whether they are carried by a ship or placed in a lighthouse on shore.

I am of opinion that it is of the greatest importance that masters and officers of ships should have no defect in their hearing, as any one in charge of the bridge or deck of a ship when under way, should be able to distinguish the report of the look-out men, and, if he is a subordinate officer, he must of necessity be able to understand the orders of the master with reference to shaping the courses of the ship when necessary, and to understand the various directions of the captain with respect to the handling of the springs when approaching or leaving a wharf, otherwise serious accidents may at any time occur.

Marine and Fisheries—Marine Branch.

At an investigation recently held by me, it was proved that an officer was unable to hear and distinguish the orders issued by the master, even in calm weather and smooth water, and if this officer had been further employed, serious results might have been anticipated.

The former issue of the rules and regulations governing the examinations of candidates for sea-going certificates having been exhausted, a copy of the existing rules was taken, and all the amendments and additions which have been from time to time made in Canada and the United Kingdom, were inserted, and those parts which were considered unnecessary or obsolete, were left out.

These rules and regulations were approved of by the Minister of Marine and Fisheries, and also by the Imperial Board of Trade, to whom they were submitted, and were sanctioned by an Order in Council of the 29th June, all previous rules and regulations and Orders in Council being cancelled and annulled.

I am, sir,

Your obedient servant,

W. H. SMITH,
*Chairman of Board of Examiners
of Masters and Mates.*

APPENDIX No. 7.

MESSENGER PIGEONS.

HAZEL HILL, GUYSBORO' COUNTY, N.S., 28th Sept., 1896.

J. H. PARSONS, Esq.,
Agent Marine and Fisheries Dept.,
Halifax.

REPORT *re* CARRIER PIGEONS.

DEAR SIR,—Yours of the 14th inst. received. I beg to submit the following report *re* carrier pigeons:—

Received from Sergt. Mulholland, R.E., on 24th Dec., 1895.....	55
Died	1
Young birds hatched.	57
do died.....	2
Old birds in loft, 1st July, 1896.....	54
Young do do	55
	<hr/>
Total number.....	109

Birds were not in fit state for training at 1st July, 1896.

Yours faithfully,

S. S. DICKENSON, per D. C.

Digest of Letter of Capt. Kent, R. E., re Transfer of Carrier Pigeons from Halifax (Citadel) Loft, to Hazelhill, Canso.

31st December, 1895.

To J. PARSONS, Esq.,
Agent, Marine and Fisheries Dept.,
Halifax.

1. The pigeon loft at the Citadel was demolished on the 22nd December, 1895.

2. Sergeant Mulholland proceeded by railway on 23rd December, taking with him by express 13 boxes, &c., including 55 birds, carrier pigeons, also all the food on hand and the correspondence and books. He proceeded by steamer from Port Mulgrave to Canso, and thence to Hazel Hill in carriages.

3. Superintendent Dickinson of the Cable Service aided Sergeant Mulholland in conveying and disposing of the birds. A thick walled house 12 feet square (within) was assigned to the pigeons, and carpenter and other work done under direction of Sergeant Mulholland to adapt it to the pigeon service, and the birds were placed in their quarters. Owing to thickness of the walls, double and filled between with sawdust, artificial heating is unnecessary.

4. The books of pedigree, &c., and the correspondence were explained to a Mr. Carmichael who took the direct charge of the birds under Mr. Dickenson.

Marine and Fisheries—Marine Branch.

5. Before Sergeant Mulholland left Hazel Hill to return to Halifax, a floor had been laid, many roosting coops, &c., completed, wire netting fixed to the window just cut and glazed, wire netting exercise ground planned, electric light (incandescent) fixed in the room, and water arranged to be laid on.

6. Sergeant Mulholland's expenses were, travel, &c., \$25.75 and expressage on boxes of birds, \$6, certified by Capt. Kent, and subsequently paid by the department.

H. V. K.,
Supt. Signals, Etc.

Memo. of Agent Parsons's visit to the Pigeon Loft, Hazel Hill.

Early in January, 1896, I was at Canso, and spent part of an afternoon visiting and inspecting the pigeons and their quarters at Hazel Hill.

There was a double door to correspond with the double wall, and the one window gave fairly good light without admitting too much cold.

The birds seemed in good condition and the room and surroundings were clean and not ill smelling. The exercising yard was planned but not built. Mr. Carmichael, who has charge of the birds, is very intelligent and seems interested in the success of this service.

J. PARSONS,
Agent.

HALIFAX, Sept. 30th, 1896.

APPENDIX No. 8

SIGNAL SERVICE, CANADA,

QUEBEC, 27th, August 1896.

SIR,—I have the honour to inclose herewith the 14th annual report as to the services performed in this office and the agents, under the control of your department in the Signal Service, during the past fiscal year ending 30th June, 1896.

I have the honour to be, sir,
Your most obedient servant,

H. J. McHUGH,
Superintendent.

F. GOURDEAU, Esq.,
Deputy Minister of Marine and Fisheries,
Ottawa.

SIGNAL SERVICE, CANADA,

OFFICE OF THE SUPERINTENDENT,

QUEBEC, 27th, August 1896.

To the Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit the following report as to the service for the year ending 30th June, 1896.

As in preceding seasons reports have been received from the stations in the lower part of the river and gulf, recording the weather, wind, condition, location and movement of the ice during the winter and spring months, and during the season of navigation, all inward and outward vessels as signalled and seen from the stations.

Snow fell early, but did not exceed that of other seasons; ice formed slowly and harbours remained open much later than in preceding seasons.

No vessel was detained by ice in the river or gulf, this has not occurred before in the past thirteen years. With few exceptions most of the vessels inward and outward bound, from the opening of navigation to the 30th of June, encountered numerous icebergs from 300 miles to the eastward of Cape Race and Belle Isle, and to a distance of 60 miles westward of the former and of the latter, icebergs were met 20 miles west of Cape Norman in the Straits of Belle Isle.

Grosse Isle quarantine station reported as in former years, (with the exception when the cable was interrupted), all trans-atlantic vessels after having been given pratique. This service has been of great service to the shipping interests. These reports are free to the department being transmitted over the Government line to Quebec.

After the closing of navigation three reports a week are received and distributed in the ordinary way. From the 1st to the 20th April, reports were sent to the Board of Trade, Montreal, St. John, N.B., and Quebec, and to the Chamber of Commerce, Halifax, N.S., also to the press of Quebec and Montreal, to the agent of the department, Quebec, to the custom house and immigration agent, to all the agents of regular lines of steamers, tug owners, to the pilots for below and above Quebec, also to Messrs. H. Fry & Co., Lloyds's agents, Quebec.

Marine and Fisheries—Marine Branch.

Owing to earlier departures from foreign ports, daily reports were received and forwarded as above and also to North Sydney, during the season of navigation, from the 20th April.

The quarantine doctor at Rimouski is also supplied with a report of the incoming mail steamers, name of station and hour of passing being given when vessel first signalled.

The chief superintendent of the quarantine service at Grosse Isle is also supplied with a report of all incoming steamers, name of station and hour of passing, also weather and wind. (This applies to trans-atlantic and foreign vessels.)

Information as to the wind, weather and ice in the vicinity of Anticosti, Magdalen Islands, Meat Cove, C.B., St. Paul's Island, Cape Ray, Newfoundland, is also sent to Esquimaux Point on the Labrador coast in the month of March for the guidance of the sealing fleet.

This is the sixth season that no ice has been seen in the vicinity of St. Pierre de Miquelon after the middle of April.

Information was supplied also from this office as in past seasons to the agents at Anticosti, Magdalen Islands, Meat Cove, C.B., Cape Ray, Newfoundland, Low Point, North Sydney and Cape Race in the month of April, as to the weather, wind, movement and condition of the ice in the Gulf and River St. Lawrence up to Montreal for the guidance of any vessel calling at any of the above given stations for information.

NAVIGATION.

1895—Last outward sailing vessel, November, 16th, ship "America."

1895—Last freight steamer, November, 27th, "Turret Ball."

1895—Last mail steamer, November 18th, "Mongolian."

1895—Last coasting steamer, December 1st, "Polino."

1896—First inward freight steamers arrived on April 1st, "Flamboro" and "Loughbrigg Holme. The Allan liner "Mongolian" from Liverpool arrived on April 28th.

The first inwardbound sailing vessel arrived on May 12th, the bark "Medusa."

Navigation closed in the Gut of Canso, on January 29th, and was again open on March 25th.

Pleasant Bay, Magdalen opened on April 21st, the "St. Olaf" arrived there the same day from Pictou, N.S.

Pt. Escuminac, N.B., reported navigation open off there on April 23rd, no ice being seen after that date.

Sydney Harbour, C.B., was partially closed from February 16th to the 21st, and from that date to the 8th March, little or no ice was seen. It was again closed to the 17th, and from the 24th to the 28th of April remaining open after this latter date.

Respectfully submitted,

H. J. McHUGH,
Supt. Signal Service.

SIGNAL SERVICE, CANADA.

OFFICE OF THE SUPERINTENDENT,
 QUEBEC, 31st August, 1896.

SIR,—I have the honour to inclose herewith, the Appendices A, B and C to the fourteenth annual report of the signal service up to the end of the fiscal year ending June 30th. The reports from Point Rich, Newfoundland, and Cape Ray, have not as yet been received. Upon receipt of them I will without delay forward them.

I have the honour to be, sir,
 Your most obedient servant,

H. J. McHUGH,
Superintendent.

F. GOURDEAU, Esq.,
 Deputy Minister of Marine and Fisheries,
 Ottawa.

APPENDIX A.

REPORT on ice, &c., in the Straits of Belle Isle and the north and west coasts of Newfoundland as noted by the Agents of the Department at Belle Isle, Cape Bauld, Cape Norman, Point Amour, Greenly Island, Point Rich, Cape Ray, Bird Rocks, from July 1st, 1895, to June 30th, 1896.

BELLE ISLE.

1895, November 20th.—Last steamer sighted.

1895, November 25th.—Last sailing vessel sighted, a bark.

1895, December 3rd.—First snow fell.

1895, December 11th.—First slob ice formed and extended to the east and west of the island. A considerable quantity drifted out from the north-east. The month was generally cloudy and had a lot of snow, sleet and rain. Winds variable, W.S.W. in the first and E.N.E. in the latter part of the month.

1896, January.—This month was fairly clear. W.S.W. winds in the first, E.N.E. in the middle and W.N.W. in the latter part prevailed. Snow on two days only, namely, the 15th and 27th. Extensive sheets of level slob ice formed and passed towards the east, moving south. About 25 icebergs passed south at the same time. From the latter date ice formed continuously, covering all the straits. Numerous flocks of ducks and other water fowl remained around the island all month.

1896, February.—A good deal of heavy ice and numbers of icebergs passed south to the eastward. On the 14th heavy northern ice, the first seen, passed south, no open water or lakes among it. Its appearance indicated old ice and not of recent formation. The icebergs were in most cases of immense size, both in length and height. North to east winds prevailed, snow fell in large quantities, drifts of from 40 to 50 feet in some of the valleys. At the end of the month there were 5 icebergs aground to the west, viz., 1 off Chateau Bay, 2 in the centre of the straits and 2 on the south shore.

1896, March.—The weather this month was very variable, heavy breezes and gales from the W.N.W., with snow, sleet and fog. On the 7th the straits were completely filled with heavy ice and over 100 icebergs stationary in it, scattered in all directions. On the 22nd a strong gale from S.S.W. drove all the ice out and left clear water extending to Cape Bauld on the south and Labrador on the north.

Marine and Fisheries—Marine Branch.

On the 23rd two schooners came drifting down in field ice from the westward. On the 24th slob ice formed in large quantities during the night.

1896, April and May.—Owing to prevailing north and north-east winds during this month the straits have been completely blocked with heavy northern or arctic ice and when this broke up with slob ice. No vessel could have passed through at any time this month. About 500 icebergs passed south, some of immense size, 60 remained aground to the eastwards and in the straits. The weather has been cold and a great quantity of snow has fallen. No rain fell this month. The ice started to move out on the 26th, wind being from the west until the 29th, when it hauled to the N.N.E., a strong gale filling up the straits with heavy ice to the east and west and remained so until the 22nd of May. Strong west winds set in and on the 26th the straits were clear of field ice, navigation being practically open.

1896,—June 21st. The first inward bound steamer towards the west.
No seals seen this season.

ICEBERGS.

1896—January, 16th, 10 to E.	March 23th, 60 aground.
do 20th, 12 to S. E.	April 3rd, 47 to the E.
do 21st, 13 to E.	do 6th, 100 do and W.
February, 4th, 5 to E.	do 8th, 107 do do
do 5th, 5 do	do 12th, 160 do do
do 14th, 20 to W.	do 14th, 67 to S.
March, 7th, 100 aground.	June 24th, 98 do
do 15th, 97 do	

CAPE BAULD, NEWFOUNDLAND.

As stated in the previous annual reports, the distance from Belle Isle being but 14 miles, the observations as to wind and ice vary but little.

As in the previous year no seals were sighted on shore or on drifting ice.

CAPE NORMAN, NEWFOUNDLAND

1895.—December 1st.—First snow fell.

December 11.—First ice formed and extended from inshore to across the straits and remained so until the 20th of May. N.E. winds prevailed, keeping the ice to the westward and drifted in numerous icebergs. Navigation impossible up to the latter date. No seals or vessels seen during the season. Heavy snowfalls and drifts all winter, snow fell about every second day.

ICEBERGS.

1896.—April.—25 seen daily (average.)	
May.—29 do do	
June 25th.—94 to the eastward.	
do 26th.—89 do	
do 27th.—87 do	
do 28th.—80 do	
do 29th.—70 do	
do 30th.—70 do	

An average of 34 daily seen during this latter month.

POINT AMOUR, LABRADOR.

1895.—“Neptune,” Capt. Blandford, left Forteau Bay on November 10th.
November 13th.—Slob ice forming along shore.

December 1st to 10th.—Slob and shore ice formed fast and on the 11th the straits were fully covered. Seals passed in great numbers. The straits remained full of heavy northern and slob ice, with numerous icebergs here and there until the 21st of May, when all the ice moved off, leaving a few bergs aground.

May 26th.—First schooner from the west.

do 28th.—First steamer passed east.

ICEBERGS.

1896.—April.—9 daily average.

May.—11 do

GREENLY ISLAND, LABRADOR.

1895.—October 25th.—First snow, with very cold weather.

1895.—December 13th.—First slob ice formed along shore and outside to the west and south.

SEALS.

Numerous herds of seals were seen during the months of March and April.

ICEBERGS.

1895.—December 5th, 1 to the East.

1896.—April 11th, 5 to the East.

June 13th, 1 to the East.

BIRD ROCKS.

1895.—First ice formed and made rapidly on the 10th November, and the last ice seen on the 28th of April, 1896.

1896.—March 12th.—First sealing steamer off here.

April.—First inward bound steamer passed here for the St. Lawrence.

Respectfully submitted,

H. J. McHUGH,
Supt. Signal Service.

Marine and Fisheries—Marine Branch.

APPENDIX B.

THERMOMETER Readings at Belle Isle from 1st December, 1895, to 30th April, 1896.

Date.	Degrees.	Date.	Degrees.	Date.	Degrees.
1895.		1896.		1896.	
Dec. 1.....	36	Jan. 20.....	10	Mar. 12.....	26
do 2.....	26	do 21.....	5	do 13.....	22
do 3.....	20	do 22.....	8	do 14.....	11
do 4.....	17	do 23.....	17	do 15.....	12
do 5.....	9	do 24.....	6	do 16.....	14
do 6.....	32	do 25.....	12	do 17.....	19
do 7.....	20	do 26.....	5	do 18.....	14
do 8.....	27	do 27.....	20	do 19.....	18
do 9.....	10	do 28.....	7	do 20.....	27
do 10.....	4	do 29.....	13	do 21.....	29
do 11.....	3	do 30.....	10	do 22.....	30
do 12.....	8	do 31.....	6	do 23.....	2
do 13.....	5	Feb. 1.....	6	do 24.....	7
do 14.....	22	do 2.....	11	do 25.....	16
do 15.....	33	do 3.....	20	do 26.....	29
do 16.....	29	do 4.....	10	do 27.....	37
do 17.....	22	do 5.....	6	do 28.....	26
do 18.....	20	do 6.....	12	do 29.....	19
do 19.....	30	do 7.....	20	do 30.....	30
do 20.....	30	do 8.....	28	do 31.....	24
do 21.....	18	do 9.....	26	April 1.....	27
do 22.....	22	do 10.....	27	do 2.....	29
do 23.....	29	do 11.....	30	do 3.....	29
do 24.....	30	do 12.....	26	do 4.....	25
do 25.....	32	do 13.....	19	do 5.....	27
do 26.....	32	do 14.....	1	do 6.....	17
do 27.....	32	do 15.....	14	do 7.....	13
do 28.....	32	do 16.....	6	do 8.....	17
do 29.....	26	do 17.....	12	do 9.....	21
do 30.....	18	do 18.....	7	do 10.....	20
do 31.....	30	do 19.....	9	do 11.....	32
1896.		do 20.....	19	do 12.....	28
Jan. 1.....	26	do 21.....	20	do 13.....	20
do 2.....	20	do 22.....	7	do 14.....	19
do 3.....	14	do 23.....	8	do 15.....	17
do 4.....	24	do 24.....	20	do 16.....	24
do 5.....	5	do 25.....	5	do 17.....	29
do 6.....	6	do 26.....	3	do 18.....	32
do 7.....	22	do 27.....	9	do 19.....	22
do 8.....	23	do 28.....	14	do 20.....	29
do 9.....	0	do 29.....	27	do 21.....	20
do 10.....	8	Mar. 1.....	29	do 22.....	26
do 11.....	4	do 2.....	34	do 23.....	27
do 12.....	30	do 3.....	36	do 24.....	21
do 13.....	30	do 4.....	31	do 25.....	21
do 14.....	30	do 5.....	30	do 26.....	24
do 15.....	28	do 6.....	29	do 27.....	27
do 16.....	26	do 7.....	24	do 28.....	29
do 17.....	5	do 8.....	27	do 29.....	28
do 18.....	4	do 9.....	33	do 30.....	29
do 19.....	9	do 10.....	21		
		do 11.....	19		

NOTE.—The black figures denote below zero.

Lowest temperature, 1895, 12th December;	highest, 1st December.	
do	1896, 29th January	do 12th January.
do	1896, 17th February	do 11th February.
do	1896, 24th March	do 27th March.
do	1896, 7th April	do 11th April.

Respectfully submitted.

MICHAEL COLTON, *Lightkeeper.*
H. J. McHUGH, *Superintendent.*

APPENDIX
TELEGRAPH, SEMAPHORE AND SIGNAL
RIVER AND GULF
SOUTH SHORE OF THE

Signal Stations.	Telegraph Offices.	Lighthouse.	Flag Stations.	Semaphore Station.	Marine Miles from Quebec.	Telegraph Co. working Lines.
1 L'Islet	Tel. Office		Flag.		41	Great North-western Co...
2 Rivière du Loup.....	do	Lighthouse...	do		94 ³ / ₄	do
3 Father Point.....	do	do	do		157 ¹ / ₂	do
4 Little Metis.....	do	do	do		176 ¹ / ₂	do
5 Matane.....	do	do	do		199 ¹ / ₂	do
6 Cape Chatte.....	do	do	do		233 ¹ / ₂	do
7 Martin River.....	do	do	do		258 ¹ / ₂	do
8 Cape Magdalen.....	do	do	do		291 ¹ / ₂	do
9 Fame Point.....	do	do	do		320 ¹ / ₂	do
10 Cape Rosier.....	do	do	do		343 ¹ / ₂	do

NORTH SHORE OF THE

11 Port Neuf	Tel. Office	Lighthouse...	Flag.		144 ¹ / ₂	Dom. Govt. and G.N.W.Co
12 Manicouagan	do		do		180	do do
13 Pointe de Monts.	do	Lighthouse...	do		205	do do

GASPÉ COAST

14 Cape Despair	Tel. Office	Lighthouse...	Flag.		372 ³ / ₄	Great North-western Co...
15 Pointe Maquereau....	do	do	do		395 ³ / ₄	do

COAST OF NEW

16 Point Escuminac.....	Tel. Office	Lighthouse...	Flag.		450	Dom. Govt. and G.N.W.Co
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ISLAND OF

17 West Point.....	Tel. Office	Lighthouse...	Flag.		323	Dom. Govt. and G.N.W.Co
18 South-west Point.....	do	do	do		356 ¹ / ₂	do do
19 South Point.....	do	do	do		411	do do
20 Heath Point.....	do	do	do		432 ¹ / ₂	do do

MAGDALEN

21 Grosse Isle.	Tel. Office	Lighthouse...	Flag.		472 ³ / ₄	D.Govt., W.U.&G.N.W.Co
22 Amherst Island	do	do	do		477 ¹ / ₂	do do

CAPE BRETON

23 Meat Cove.....	Tel. Office	Lighthouse...	Flag.		526 ³ / ₄	D.Govt., W.U.&G.N.W.Co
24 Low Point.....	do	do	do	Semaphore..	585	do do

ST. PAUL'S

25 Main Station.....	Telephone	Lighthouse...	Flag.		531	D.Govt., W.U.&G.N.W.Co
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NEWFOU

26 Cape Ray	Tel. Office	Lighthouse...	Flag.		552 ³ / ₄	D.Govt., Anglo-Amer.Cable Co., W.U. & G.N.W.Co
27 Cape Race.....	do	do	do		820	do do

Marine and Fisheries—Marine Branch.

C.

STATIONS, MARINE DEPARTMENT, CANADA.

OF ST. LAWRENCE.

RIVER ST. LAWRENCE.

Rate per ten words and additional words.	Date when established.	Name of Agent.	Post Office.	County.	Province.	Salary per annum from Marine Dept.
25c. & 1c.	Oct. 28, '79.	Mrs. J. B. E. Fortin....	L'Islet.....	L'Islet.....	Que...	\$50
do	Nov. 16, '81.	L. T. Puize.....	Rivière du Loup (en bas).....	Temiscouata.....	do ..	50
do	Nov. 22, '79.	John McWilliams.....	Father Point.....	Rimouski.....	do ..	50
do	Nov. 17, '79.	Jules Martin.....	Little Métis.....	do ..	do ..	50
do	Nov. 5, '79.	P. Desjardins.....	Matane.....	do ..	do ..	50
do	Sept. 19, '79.	Trefé Côté.....	Cape Chatte.....	Gaspé.....	do ..	50
do	Sept. 23, '79.	Jean Gauthier.....	Martin River.....	do ..	do ..	50
do	Oct. 9, '79.	J. F. Sasseville.....	Cape Magdalen.....	do ..	do ..	50
do	Oct. 14, '80.	James Ascah.....	Fox River.....	do ..	do ..	50
do	Oct. 20, '79.	E. Costin.....	Cape Posier.....	do ..	do ..	50

RIVER ST. LAWRENCE.

40c. & 2c.	June 1, '83.	Dorelas Tremblay.....	Port Neuf (en bas).....	Saguenay.....	Que..	\$50
do	Aug. 15, '83.	A. Laussier.....	Manicouagan.....	do ..	do ..	
do	Oct. 19, '83.	V. Faffard.....	Pointe de Monts.....	do ..	do ..	50

OF THE GULF.

25c. & 1c.	June 17, '80.	James Beck.....	Cape Despair.....	Gaspé.....	Que..	\$50
do	May 22, '80.	Auguste Bertrand.....	Port Daniel.....	do ..	do ..	50

BRUNSWICK.

40c. & 2c.	July 2, '85.	K. McLennan.....	Point Escuminac.....	Northumberland	N.B..	
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ANTICOSTI.

75c. & 6c.	Oct. 1, '81.	Auguste Malouin.....	Anticosti Id. via Gaspé.....	Gaspé.....	Que..	
do	Oct. 18, '80.	E. Pope.....	do ..	do ..	do ..	
do	July 27, '81.	Alphonse Nadeau.....	do ..	do ..	do ..	
do	July 20, '81.	Z. Gagné.....	do ..	do ..	do ..	

ISLANDS.

\$1.00 & 8c.	Aug. 17, '80.	A. Le Bourdais.....	Magdalen Id. via Pictou.....	Gaspé.....	Que..	
do	June 11, '81.	William Cormier.....	do N.S.....	do ..	do ..	

NOVA SCOTIA.

55c. & 3c.	Nov. 7, '81.	A. R. MacDonald.....	Meat Cove, C.B.....	Victoria.....	N.S..	
30c. & 2c.	Aug. 1, '81.	J. G. Peters.....	Low Point, C.B.....	do ..	do ..	\$50

ISLAND.

80c. & 5c.	1890.....	John McLeod.....	North Sydney, C.B.	Victoria.....	N.S..	
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NDLAND.

\$1.05 & 10c	Nov. 9, '82.	E. R. Renuie.....	Cape Ray.....	Newfoundland..	Nfld..	\$50
do	1890.....	P. Myrrick.....	Cape Race.....	do ..	do ..	

H. J. McHUGH, *Supt. Signal Service.*

PORT OF HALIFAX, N.S.,
PARTICULARS of Vessels Signalled during

Year or Month.	English Men-of-War. Troopships.			Foreign Men-of-War.			Steamers, 1st class.			Steamers, 2nd class.		
	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.
July.....	3	3	0	1	1	0	16	14	2	80	80	0
August.....	2	2	0	0	0	0	16	11	5	64	64	0
September.....	6	5	1	0	0	0	17	11	6	70	70	0
October.....	2	2	0	0	0	0	13	9	4	74	74	0
November.....	1	1	0	0	0	0	20	17	3	53	53	0
December.....	1	1	0	0	0	0	19	15	4	47	45	2
January.....	0	0	0	0	0	0	15	14	1	50	49	1
February.....	0	0	0	0	0	0	19	18	1	45	43	2
March.....	0	0	0	0	0	0	22	21	1	34	34	0
April.....	1	1	0	0	0	0	35	25	10	36	36	0
May.....	4	4	0	2	2	0	18	16	2	71	68	3
June.....	3	3	0	0	0	0	11	11	0	68	62	6
Totals.....	23	22	1	3	3	0	221	182	39	692	678	14

N. B.—Besides those sailing vessels reported a large number arrived during the night of which no

Marine and Fisheries—Marine Branch.

SIGNAL SERVICE.

the year ending 30th June, 1896.

Ships.			Barques.			Barquentines.			Brigs.			Brigantines.			Schooners, 3-masted or wearing Private Signals.			Monthly Totals.		
Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.
0	0	0	3	3	0	1	1	0	0	0	0	7	5	2	13	10	3	124	117	7
0	0	0	3	2	1	3	1	2	0	0	0	5	4	1	9	4	5	102	88	14
1	1	0	1	1	0	3	1	2	0	0	0	7	5	2	13	11	2	118	105	13
0	0	0	0	0	0	1	1	0	0	0	0	7	7	0	9	9	0	107	103	4
0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	3	3	0	84	81	3
0	0	0	0	0	0	1	1	0	0	0	0	3	1	0	2	2	0	73	65	8
0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	65	63	2
0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	65	62	3
0	0	0	3	3	0	0	0	0	0	0	0	2	2	0	2	2	0	64	63	1
0	0	0	3	3	0	0	9	0	0	0	0	0	0	0	5	4	1	80	69	11
0	0	0	6	5	1	0	0	0	0	0	0	3	3	0	10	10	0	14	108	6
0	0	0	13	12	1	1	1	0	0	0	0	5	4	1	18	9	9	119	102	17
1	1	0	32	29	3	11	7	4	0	0	0	42	34	6	84	64	20	1,115	1,026	89

notice was taken.

H. V. KENT, Capt. R. E.,
Superintendent of Signals.

APPENDIX No. 9.
LIVE STOCK SHIPMENTS.

Record of Live Stock shipped from Port of Montreal during season of 1896.

Number	Date.	Steamer.	Destination.	SHEEP.		CATTLE.			HORSES.		SWINE.		Hay for Feed. Lbs.	Grain for Feed. Lbs.	Number of Men.
				Shipped.	Lost.	Fat.	Stockers.	Total.	Lost.	Fees collected. \$ cts.	Shipped.	Lost.			
1	1896, May 2.	Mongolian	Liverpool					577		8.66	49				
2	do	Pomeranian	Glasgow					411		6.17	*83				
3	do	Lake Winnipeg	Liverpool					610		9.15	100				
4	do	Concordia	Glasgow	833				403		10.22	2				
5	do	Merrimac	Bristol					310		4.65	65				
6	do	Montevidean	London					338		5.07	147				
7	May 9.	Ottoman	Liverpool	2,020				572		18.68	20				
8	do	Memnon	London					118		1.77	51				
9	May 10.	Sarnia	Havre			400		400		6.00	400				
10	do	Fremona	London					329		4.94	109				
11	May 11.	State of Georgia	Newcastle	301				230		4.96					
12	do	Sberian	Glasgow					406		6.09	115				
13	do	Lake Huron	Liverpool					258		3.87	26				
14	do	Parkmore	do					501		7.52	68				
15	May 14.	Tritonia	Glasgow	501				422		8.84	82				
16	do	Pelaciana	Manchester					202		3.03					
17	do	Hurona	Dunkirk					677		10.16					
18	May 15.	Memphis	Bristol					238		3.57	20				
19	do	Numidian	Liverpool					529		7.94	105				
20	do	Assaye	London					361		5.42	86				
21	do	Bellona	Dunkirk					464		6.96	142				
22	do	Grecian	Glasgow					444		6.66	62				
23	May 20.	Canadian	London					397		5.96	134				
24	do	Barrowmore	Liverpool					540		8.10	63				
25	May 21.	Amazynthia	Glasgow					405		6.08	9				
26	do	Etolia	Bristol					300		4.52					

Marine and Fisheries—Marine Branch.

28	do	23.	Angloman.....	Liverpool.....					12.99	84				
29	do	24.	Brazilian.....	London.....					4.86	202				
30	do	25.	Sarmatian.....	Glasgow.....					6.05	90				
31	do	26.	Lake Superior.....	Liverpool.....					8.55	30				
32	do	28.	Escalona.....	Newcastle.....	150				4.05	40				
33	do	28.	Alicides.....	Glasgow.....	611				9.35	40				
34	May	29.	Lycia.....	Bristol.....					4.35					
35	do	30.	Avlona.....	Dunkirk.....					5.27					
36	do	30.	Laurentian.....	Liverpool.....		10			5.00	37				
37	do	30.	Scotsman.....	do.....	1,502				13.00	128				
	do	37	Gerona.....	London.....		30			3.63	116				
					5,918		14,387		252.09	2,184				646
37	May,	1895			4,450		15,523		521.11	1,997				
44	do	1894			9,370		14,341		523.93	982				
33	do	1893			101		15,336		306.72	296				
41	do	1892			391		16,287	424	334.22	511				

* Vancouver. † Labrador.

38	June	2.	Scandinavian.....	Glasgow.....					6.54	101				
39	do	3.	Orniston.....	London.....					4.44	233	2			
40	do	4.	Mayumba.....	do.....					3.45					
41	do	4.	Warwick.....	Glasgow.....	509	4			8.75	25				
42	do	6.	Mongolian.....	Liverpool.....					4.47	102				
43	do	7.	Loango.....	Bristol.....	19				5.37					
44	do	7.	Lake Winnipeg.....	Liverpool.....					7.68	58				
45	do	10.	Pomeranian.....	Glasgow.....					6.74	152	1			
46	do	11.	Concordia.....	do.....	501				8.98	10				
47	do	11.	Merrimac.....	Bristol.....	26				4.80					
48	do	13.	Ottoman.....	Liverpool.....					14.01	74				
49	do	14.	Iona.....	London.....					7.82	48				
50	do	14.	Parkmore.....	Liverpool.....					7.86	136				
51	do	14.	Montevidean.....	London.....					6.20	77				
52	do	14.	Dunmere Head.....	Belfast.....						41				
										*30				
53	do	15.	Montezuman.....	London.....					6.23	458	5			
54	do	16.	Siberian.....	Glasgow.....					6.98	88	1			
55	do	17.	Lake Huron.....	Liverpool.....					6.00	56	1			
56	do	17.	Oregon.....	Dunkirk.....			327		5.63					
57	do	18.	Tritonia.....	Glasgow.....	800	9			10.32	81				
58	do	19.	Memphis.....	Bristol.....					4.89					
59	do	20.	Barrowmore.....	Liverpool.....					8.96	63				
60	do	20.	Numidian.....	do.....	280				4.50	106				
61	do	21.	State of Georgia.....	Newcastle.....	424				5.71	140				
62	do	23.	Grecian.....	Glasgow.....					6.36	58				
63	do	23.	Memnon.....	London.....					4.82	41				

RECORD of Live Stock Shipped from Port of Montreal during season of 1896.

Number.	Date.	Steamer.	Destination.	SHEEP.		CATTLE.			HORSES.		SWINE.		Hay for feed.	Grain for Feed.	Number of Men.
				Shipped.	Lost.	Fat.	Stockers.	Total.	Lost.	Fees collected.	Shipped.	Lost.			
1896.															
64	do 24.	Durham City	do					274	4	4	11				
65	do 25.	Canadian	do	68				478	4	7	51	42			
66	do 26.	Amazynthia	Glasgow	490	1			388		8	27				
67	do 27.	Etolia	Bristol					299	1	4	49				
68	do 26.	Hurona	London					422		6	33	131			
69	do 27.	Angtonian	Liverpool					840	5	12	60	131			
70	do 28.	Assaye	London					428		6	42	70			
71	do 30.	Sarnatian	Glasgow	311				420		7	86	479			
		Total for June.		3,148	14	13,833	120	13,953	32	225	13	2,531		1,012,670	603
		Reprinted May 31 '96		5,918	91	14,387	440	14,827	21	282	09	2,184		1,442,820	646
		Total for same to date		9,066	105	28,220	560	28,780	53	477	22	4,715		2,455,490	1,249
		Same date 1895		18,720	106	29,466	364	29,830	58	1,082	10	4,440			
		do 1894		16,055	55			20,090	19	1,083	93	1,521			
		do 1893		218				33,389	34	764	70	572			

* 30 on former trip. † on Labrador. ‡ And 1 moose.

72	July 1.	Lake Superior	Liverpool	196				415		7	21	11			
73	do 2.	Bellona.	London.	172				426		7	25	58			
74	do 3.	Lycia	Bristol					302		4	53	20			
75	do 4.	Brazilian.	London.	56				526		8	17	30			
76	do 5.	Alcides	Glasgow	383				423		8	12	40			
77	July 3.	Raymore Head.	Belfast.									2			
78	do 4.	Vancouver	Liverpool							12	23				
79	July 4.	Laurentian	do					815				63			
80	do 7.	Scandinavian	Glasgow	56				417		6	54				
81	do 8.	Lake Winnipeg	Liverpool	134				600		9	67				
82	do 9.	Warwick	Glasgow	321				431		7	93	3			
83	do 9.	Fremona.	London.	136				392		6	56	13			

Marine and Fisheries—Marine Branch.

84	July 10	Queensmore	Bristol	360	*	7 08	61				
85	do 11	Mongolian	Liverpool					18			
86		Scotsman	do	117	747	11 21	36				
87	July 12	Gerona	London	686	120	2 39	123				
88		Ormskton	do	91	456	10 27	18				
89	July 14	Pomeranian	Glasgow		417	6 72	67				
90	do 15	Parkmore	Liverpool		669	10 04					
91	do 16	Lake Ontario	do		337	5 06	10				
92		Meganic	London	1,188	564	14 40	182				
93		Concordia	Glasgow	391	424	8 32	6				
94	July 17	Escalona	Newcastle	178	220	4 19					
95	do 18	Loango	London	145	102	2 31					
96	do 18	Ottoman	Liverpool		784	11 76		37			
97		Sarnia	Havre		360	5 40					
98	July 19	Merrimac	Bristol		309	4 64					
99	do 21	Siberian	Glasgow	163	374	6 43	48				
100	do 22	Montevidean	London	559	362	8 23	69				
101		Lake Huron	Liverpool	142	655	10 54	4				
102	July 23	Tritonia	Glasgow	156	357	6 14	28				
103	do 24	Labrador	Liverpool		547	9 61	40				
104	do 25	Numidian	do	280	243	5 33	61				
105		Avlona	Newcastle	335	670	10 05					
106	July 26	Barrowmore	Liverpool		670	10 05					
107		Iona	London		345	5 18	89				
108		Memphis	Bristol	540	289	7 04	1				
109		Rosarian	London	1,882	257	13 27	38				
110	July 28	Greccian	Glasgow	146	406	6 82	44				
111	do 30	Amarynthia	do	429	415	8 38	5				
112	do 31	Montezuma	London	926	+201	7 65	74				
				10,138	15,719	286 67	1,244		4,751,248	1,444,081	710
				9,066	28,780	477 22	4,715		7,753,675	2,455,490	1,249
				19,204	44,499	763 89	5,959		12,504,923	3,899,571	1,959
110		Same date, 1895		42,892		1,767 73	6,642				
118		do 1894		32,257		1,611 28	2,528				
159		do 1893		667		1,140 11	882				

*Took 389 cattle at Quebec, sent down from Montreal, ship drawing too much water. †345 cattle and 149 sheep sent to Quebec on there, on account of draught of ship. ‡Total sent to Quebec, 684 cattle, 149 sheep.

RECORD of Live Stock shipped from Port of Montreal during season of 1896.

Number.	Date	Steamer.	Destination.	SHEEP.		CATTLE.			HORSES.		SWINE.		Hay for Feed. Lbs.	Grain for Feed. Lbs.	Number of Men.	
				Shipped.	Lost.	Rat.	Stockers.	Total.	Lost.	Fees Collected. \$ cts.	Shipped.	Lost.				Shipped.	Lost.
113	1896.															
114	Aug. 1.	Anglo-man	Liverpool	518	4			984						16 60		
115	do 2.	Feleiana	Manchester	378	1			348						7 11		
116	do 2.	Canadian	London	1,106	2			397	2					11 49	1	
117	do 3.	Memnon	Bristol	131	1			272						7 74		
118	do 4.	State of Georgia	Newcastle	431				240						5 76		
119	do 4.	Sarmatia	Glasgow	295				415						7 71	56	
120	do 5.	Irishmen Head	Dublin	995	2			386						7 27	15	
121	do 6.	Lake Superior	Liverpool	854				432						10 75	31	
122	do 7.	Alcides	Glasgow					584						8 76	105	
123	do 8.	Hurona	London												42	
124	do 8.	Vancouver	Liverpool	72				802						12 39		
125	do 8.	Laurentian	do	535	2			248	1					6 40		
126	do 9.	Lycia	Bristol	616				443	3					9 73		
127	do 10.	Belona	Havre	1,154	5			379						11 46	35	
128	do 10.	Brazilian	London	1,278	5			398						12 36	40	
129	do 11.	Assaye	do	1,757	2			442	3					10 42	76	
130	do 12.	Scandinavian	Glasgow	100	2			608	1					9 62	1	
131	do 13.	Lake Winnipeg	Hope	464	2			449	1					9 06	9	
132	do 14.	Warwick	Glasgow					650						9 75	22	
133	do 14.	Scotsman	Liverpool	562	1			562						11 24	29	
134	do 15.	do	do	197	1			430						7 44		
135	do 15.	Mongolian	London	509	1			144	+					4 71		
136	do 16.	Fremona	Dunkirk	330	6			707	1					8 49	48	
137	do 16.	Oregon	London	939				550						15 31	57	
138	do 17.	Ornisston	do	117				232						4 07		
139	do 18.	Queensmore	Bristol	677				282						11 64	36	
140	do 19.	Ekolia	Glasgow	247				282						5 47	40	
141	do 20.	Pomeranian	Liverpool			643	80	723						10 85		
142	do 21.	Lake Ontario	do	178				266						4 88	1	
143	do 22.	Rossmore	Newcastle	529				521						10 47	40	
144	do 22.	Escalona	Liverpool	324				355						6 95		
145	do 23.	Memorial	Bristol					190						2 85		
146	do 25.	Frey	London	147				422						7 12	26	
		Siberian	Glasgow													

Marine and Fisheries—Marine Branch.

147	do	25.	Montevidean.	London.	1,984					152	12	131		
148	do	26.	Lake Huron.	Liverpool	953					417	11	20		
149	do	27.	Tritonia	Glasgow	994					423	11	20		
150	do	28.	Barrowmore	Liverpool	321					326	12	36		
151	do	28.	Gerona.	London.	697					575	8	88		
152	do	28.	SMegantic.	do	913					308	13	20		
153	do	29.	Memphis.	Bristol.	872					548	8	98		
154	do	29.	Nunuidian	Liverpool	987					267	13	16		
155	do	29.	Labrador.	do	728						7	65		
156	do	30.	Rosarian.	London.	728							150		
			a Total for August.		22,189					18,103	381	35		842
			b Previously reported		19,024					44,499	763	89		1,959
			Total, Aug. 31, 1896.		41,393					62,512	1,145	24		7,255
			do	1895.	72,341					60,216	2,529	89		8,281
			do	1894.	60,977					55,332	2,270	41		3,174
			do	1893	712					60,836	1,593	05		1,123

* 147 more cattle sent by rail to Quebec to go on there. † No report. ‡ 57 cattle by rail to Quebec to go on there. § 237 cattle sent by rail to Quebec to go on there.

α 739 cattle sent by rail to Quebec to go on there.

β 684 do 149 sheep do do

γ 1,483 do 149 do do do

157	Sept.	1.	Grecian	Glasgow.	387	1				424	1	8	30	22	0
158	do	3.	Anaryuthia	do	180		10			448		7	62		
159	do	3.	Memnon.	Bristol	315		15			308	1	4	62		
160	Sept.	4.	*Angloman.	Liverpool	802		5			813		13	77	20	0
161	do	5.	Lake Superior	do	388					350		9	26	108	0
162	do	6.	Loango.	Bristol	1,774	12				175		4	32		
163	Sept.	6.	Canadian.	London.	388		5			74	2	9	98	120	1
164	do	8.	Sarmatian.	Glasgow.	1,774	12				434		6	51	76	1
165	do	10.	Alcides.	do	27	1				339	1	5	09	20	1
166	do	11.	Lycia.	Bristol	325		110			300	1	4	64		
167	do	11.	Feliciana.	Manchester.	1,260					496		9	07		
168	Sept.	12.	Sarnia.	Havre.	2,264	8				240		9	90		
169	do	12.	Laurentian.	Liverpool	387	4				407		6	11		
170	Sept.	13.	Montezuma	London.	1,875		60			360	2	16	67	256	2
171	do	13.	Hurons.	do	406	2				606	3	9	09	141	
172	do	13.	State of Georgia.	Newcastle	387					252		5	47		
173	do	13.	Brazilian.	London.	1,875	4				95	1	10	81		82
174	Sept.	15.	Scandinavian	Glasgow.	75					323		5	23		40
175	do	16.	Lake Winnipeg.	Liverpool	406	2				217		5	27		37
176	do	17.	Warwick.	Glasgow.	200					200		3	00		200
177	do	17.	Etolia.	Bristol	296					296		4	44		4

Record of Live Stock shipped from Port of Montreal during season of 1896.

Number	Date	Steamer	Destination	SHEEP.		CATTLE.			HORSES.		SWINE.		Hay for Feed.	Grain for Feed.	Number of Men.	
				Shipped	Lost	Fat.	Stockers	Total	Lost	Fees collected.	Shipped	Lost				Shipped	Lost
	1895.															
178	Sept. 19.	Mongolian	Liverpool					202		33						
179		Scotsman	do			10		226	1	47	1					
180		Assaye	London.	1,483				251		71						
181	Sept. 20.	Orminston	do	939				142								
182		Rosmore	Liverpool					838								
183		Iona	London.	663				233		155						
184	Sept. 23.	Pomeranian	Glasgow			10		427		55						
185		Carlisle City	Liverpool	523		20		278		54						
186	Sept. 24.	Concordia	Glasgow					241								
187		Fremona	London.					452								
188	Sept. 25.	Parkmore	Liverpool					606		13	09					
189		Queensmore	London.					5		168						
190	Sept. 26.	Ottoman	Liverpool					377		26						
191	do 27.	Merrimac	Bristol					344								
192	do 29	Ganges	Newcastle			30		221								
193	do	Siberian	Glasgow					425		22						
194	do 30.	Lake Huron	Liverpool					135		46						
		¶Total for September, 1896.		15,396		12,288		12,563		265	49					609
		§Reported August 31, 1896.		41,363	214	61,522		62,512	105	1,145	24					2,801
	Sept. 30.	¶Total for the season		56,789		73,810	1,265	75,075		1,410	73			17,646,621	4,326,724	
188		Same date, 1895.		112,165	524	73,620	2,255	75,870	120	3,397	90					
193		do 1894.		90,703	678			69,880	69	3,004	11					
191		do 1893.		905				70,540	115	1,886	13					
214		do 1892.		15,967				86,877	117	1,737	54					

*150 cattle sent from here to go on at Quebec. †176 cattle and 100 sheep sent to Quebec to go on there. ‡250 cattle, 1,411 sheep and 88 horses sent to Quebec. §576 cattle, 1,571 sheep and 88 horses sent by rail to Quebec. ¶1,483 cattle and 149 sheep sent by rail to Quebec. ††2,059 cattle, 1,720 sheep and 88 horses sent by rail to Quebec to go on there. These numbers are not taken into account in our reports.

Marine and Fisheries—Marine Branch.

195	Oct.	1.	Memphis	Bristol	276			4 14		
196	do	2.	Pretoria	Glasgow	452			6 48		
197	do	3.	Nunclian	Liverpool	200	10		3 00		
198	do	4.	Barrowmore	do	521			10 91		
199	Oct.	5.	Frey	do	185			8 77		
200	do	6.	Montevidean	do	136			8 77	134	
201	do	7.	Gréta Holme	Boulogne	171			3 64	17	
202	Oct.	8.	Greentan	Glasgow	359	15		5 09	49	
203	do	9.	Lake Superior	Liverpool	266			4 46	5	
204	do	10.	Amarynthia	Glasgow	268			4 02		
205	do	11.	Bangor Head	Belfast	262			7 20	19	
206	Oct.	12.	Gerona	do	255	20		4 60	97	
207	do	13.	* Angloman	Liverpool	189			5 32	15	
208	do	14.	† Megantic	London	163			6 84		
209	do	15.	Rosarian	do	236			2 45	10	
210	do	16.	Manitoban	Glasgow	228			5 48		
211	Oct.	17.	Lycia	Bristol	23			3 42	22	
212	Oct.	18.	Sarmatian	Glasgow	211			1 51	56	
213	do	19.	Lake Ontario	Liverpool	202			3 17	26	
214	do	20.	Aleides	Glasgow	108			3 00		
215	do	21.	Canadian	do	200			4 51		
216	do	22.	Leango	Bristol	300			4 50		
217	Oct.	23.	Mennon	Liverpool	202			3 03		
218	do	24.	Warwick	Glasgow	189			2 84		
219	do	25.	Scandinavian	do	451			6 77		
220	do	26.	Laurentian	Liverpool	166	30		3 27		
221	do	27.	Avlona	Newcastle	464			10 60	27	
222	Oct.	28.	Buenos Ayrean	Glasgow	85			8 71	21	
223	do	29.	Brazilian	do	259			5 59	39	
224	do	30.	Lake Winnipeg	Liverpool	272			4 08		
225	do	31.	Barrowmore	do	199			6 53		
226	do	32.	Durham City	Havre	301			4 52	2	
227	do	33.	Etolia	Bristol	500			7 50	69	
228	do	34.	Hurona	do	42			0 63	34	
229	do	35.	* Scotsman	Liverpool	710			10 65		
230	do	36.	Rossmore	do	183			2 90	10	
231	Oct.	37.	Mongolian	do	701			15 06	120	
232	do	38.	Montezuma	London	385			5 78	86	
233	Oct.	39.	Pomeranian	Glasgow	167			3 25		
234	do	40.	Escalona	Newcastle	341			8 17		
235	do	41.	Carlisle City	Liverpool	530	5		12 38		
236	do	42.	Parkmore	do	186	20		5 63	3	
237	do	43.	Ormiston	London	258			3 87		
238	do	44.	Concordian	Glasgow	3			1 43	14	
239	do	45.	|| Ottoman	Liverpool	275					

RECORD of Live Stock Shipped from Port of Montreal during season of 1896.

Number.	Date.	Steamer.	Destination.	SHEEP.		CATTLE.				HORSES.		SWINE.		Hay for Feed. Lbs.	Grain for Feed. Lbs.	Number of Men.	
				Shipped.	Lost.	Fat.	Stockers.	Total.	Lost.	Fees collected.	Shipped.	Lost.	Shipped.				Lost.
1896.																	
241		Merrimac	Bristol						386								
242		Iona	London						495								
				226													
				13,323		12,248	156	12,404									598
		<i>a</i> Shipped in October		56,789		73,810	1,265	1,410	73								3,410
		<i>b</i> Reported September 30, 1896															
		<i>c</i> Total to date, 1896		70,112		86,058	1,421	87,479									4,008
		Same date, 1895		171,252				88,460									
		do 1894		119,341				79,390									
		do 1893		1,781				80,495									
		do 1892		15,914				95,192									

* 373 sheep and 47 cattle went on board at Quebec. † 574 cattle went on board at Quebec.
 †† 618 cattle sent to Quebec. *a* 2,036 sheep and 1,482 cattle sent to Quebec. *b* 1,720 sheep, 2,059 cattle and 88 horses sent to Quebec. *c* 3,756 sheep, 3,541 cattle and 88 horses sent to Quebec.

243	Nov. 3.	Hibernian	Glasgow						333								
244	do 4.	Laque Huron	Liverpool	165				280									
245	do 5.	Barrowmore	do	647				530									
246	do 6.	Memphis	Bristol					350									
247	do 7.	Fremona	London					461									
248	do 8.	Numidian	Liverpool					207									
249	do 9.	Labrador	do														
250	Nov. 8.	Amarynthia	Glasgow					254									
251	do 9.	Queensmore	London	890				738									
252	do 11.	Montreal	do	523				175									
253	do 11.	Angoman	Liverpool					500									
254	do 11.	Lake Superior	do	305			15	249									
255	Nov. 12.	Manitoba	Glasgow					295									
256	do 13.	Aleides	do					212									
257		Lycia	Bristol	288				198									

Marine and Fisheries—Marine Branch.

258	Ganges.....	London.....	214	3 21	7	214	108	7 15	7	388	2,720,704	483,921	400
259	Nov. 15. Saranatian.....	do	108	7 15	44	200	290	4 35	44	10,033	25,493,453	5,227,122	4,008
260	do 17. Scandinavian.....	Glasgow	200	4 35	22	446	692	10 15	22	77			
261	do 18. Assaye.....	London.....	446	10 15	101	285	697	6 45	101				
262	Cervona.....	do	285	6 45	57	360	637	7 77	57				
263	Tritonia.....	Glasgow	360	7 77		40	637	0 60					
264	Lake Ontario.....	Liverpool	40	0 60		181	537	5 41					
265	Nov. 19. Laurentian.....	London.....	181	5 41		303	537	4 55					
266	Rosarian.....	do	303	4 55		128	637	3 65					
267	Bellona.....	do	128	3 65	2	204	637	3 06	2				
268	Nov. 20. Loango.....	Glasgow	204	3 06		180	637	2 70					
269	Warwick.....	London.....	180	2 70		372	637	5 58					
270	Frey.....	do	372	5 58		191	637	3 89	1				
271	Nov. 21. Caspian.....	Glasgow	191	3 89		455	637	6 83	20				
272	Mennon.....	Bristol	455	6 83					33				
273	Nov. 22. Gerona.....	London.....											
274	Gerta Holne.....	Boulogne.											
	Shipped in November, 1896.....		8,969	166 62	388	8,969	6,408	15	15	388	2,720,704	483,921	400
	Previously reported.....		87,479	400 1, 63 56	10,033	87,479	70,112	1,421	1,421	10,033	25,493,453	5,227,122	4,008
	Total for season 1896.....		96,448	1,830 18	10,421	96,448	76,520	1,436	1,436	10,421	28,214,157	5,711,043	4,408
249	Total for 1895.....		94,972	4,955 23	13,303	94,972	210,607						4,809
254	do 1894.....		86,635	3,987 53	5,623	86,635	139,780						4,156
265	do 1893.....		83,332	2,297 94	1,680	83,332	3,783						3,388
260	do 1892.....		98,731	1,984 70	1,739	98,731	15,914						3,863

* And 200 cattle sent to Quebec. The 3,756 sheep, 3,741 cattle, 88 horses which went to Quebec and were put on board there have not been included in these figures. No returns of lost at sea received for November as yet.

POPE and MORGAN,
Inspectors.

Montreal, November 23rd, 1896.

RECORD of Live Stock shipped from Port of Halifax during month of June, 1896.

Number.	Date.	Steamer.	Destination.	SHEEP.		CATTLE.			HORSES.		SWINE.		Hay, for Feed. Lbs.	Grain, for Feed. Lbs.	Number Men.	
				Shipped.	Lost.	Pat.	Stockers.	Total.	Lost.	Shipped.	Lost.	Shipped.				Lost.
1	1896. June 27	St. John City	London													
2	Dec. 19	Numidian	Liverpool							421						

* 1 roan horse owned by Col. Shannon. Certificate from Mr. Jakeman, V.S., produced. Horse marked V.R. with red paint.

† The horses were inspected by Mr. Jakeman, V.S., and marked V.R. with paint.

DAVID HUNTER,
Port Warden.

Marine and Fisheries—Marine Branch.

Record of Live Stock shipped from Port of St. John.

Number.	Date.	Steamer.	Destination.	SHEEP.		CATTLE.				HORSES.		SWINE.		Hay for Feed.	Grain for Feed.	Number of Men.	
				Shipped.	Lost.	Fat.	Stockers.	Total.	Lost.	Fees collected.	Shipped.	Lost.	Shipped.				Lost.
1885.																	
1	Dec. 12.	Lake Superior	Liverpool	1,843	*31										12 000		*8
2	do 28.	Lake Ontario	do	542	*3	75				18 43	75			52 000	12 000		*8
3	do 30.	Concordia	Glasgow	431	*31	302				7 67	66			29 260	11 710		*3
		Total								13 37	28			80 000	40 000		+14
1886.																	
4	Jan. 9.	Lake Winnipeg	Liverpool	2,816	65					39 47	169			161 650	63 710		25
5	do 20.	Warwick	Glasgow	40	*7	125				4 15				29 705	11 880		5
6	do 23.	Lake Superior	Liverpool	137		248				8 81	12			62 970	23 820		*13
7	do 31.	Lake Ontario	do	883	+17	164				4 92	20			34 760	14 630		6
		Total				107				12 04	188			45 000	20 000		+9
				1,060	24					29 92	220			172 425	70 330		33
1887.																	
8	Feb. 8.	Concordia	Glasgow			226				6 78				54 240	14 000		9
9	do 13.	Oregon	London.														
10	do 20.	Lake Winnipeg	Liverpool	18		384				11 70	18			97 000	20 000		15
11	do 25.	Sarmia	London.								108						
		Total								18 48	198			157 240	34 000		24
1888.																	
12	Mar. 5.	Lake Huron	Liverpool			445				13 35	80			90 125	40 050		*18
13	do 8.	Warwick	Glasgow	602	*4	340				16 22	17			98 000	24 600		*16
14	do 11.	Lake Ontario	Liverpool	656	*10	200				12 56	108			65 000	17 000		*11
15	do 18.	Lake Superior	do	419	*4	331					91			83 925	33 570		*15
16	do 26.	Concordia	Glasgow	1,002	+73	340				26 22	18			132 120	46 400		+19
		Total								82 47	314			469 170	161 620		79
1889.																	
17	April 2.	Lake Winnipeg	Liverpool	125		438				14 39	35			101 200	40 646		18
18	do 9.	Lake Huron	do	498		275				13 24	48			60 750	26 000		14

Record of Live Stock shipped from Port of St. John—Concluded.

Number.	Date.	Steamer.	Destination.	SHEEP.		CATTLE.			HORSES.		SWINE.		Hay for Feed. Lbs.	Grain for Feed. Lbs.	Number of Men.
				Shipped.	Lost.	Fat.	Stockers.	Total.	Lost.	Shipped.	Lost.	Shipped.				Lost.
1896.															
19	April 15.	Lake Ontario.	Liverpool			385				38			85 875	34 650	15
20	do 16.	Warwick.	Glasgow			599				68			96 000	33 200	+15
21	do 16.	Oregon.	London.			496				51					
22	do 23.	Lake Superior	Liverpool					346		30			85 650	34 640	15
		Total				1,719			1,759	270			429 475	169 136	77

* Died at sea. † Died at sea, heavy storm. ‡ No returns of losses for the month of April yet.

TOTAL number of sheep, cattle and horses shipped to the United Kingdom from Montreal, Quebec, St. John and Halifax during the season of 1896, and from St. John during December, 1895.

	Sheep.	Cattle.	Horses.
Montreal.....	76,112	96,448	10,421
Quebec.....	3,756	3,741	88
St. John.....	8,892	5,046	11,071
Halifax.....			22
Totals.....	88,760	105,285	21,602

Marine and Fisheries—Marine Branch.

APPENDIX No. 10.

STATEMENT relating to the Wharfs under the control of the Department, on
30th June, 1896.

Locality.	Wharfinger.	Date of Appointment of Wharfinger.	Remuneration Allowed.	Amount deposited to credit of Receiver General.
<i>Ontario.</i>				\$ cts.
Cockburn Island.....	Alfred Monck	May 30, 1889.	25 p.c. of collections.....	67 70
Goderich.....	W. Marlton	Feb. 14, 1894.	25 do *	267 09
Kingsville.....	A. E. Malott	Nov. 6, 1895.	25 do	21 91
Morpeth.....	C. Stammers.....	Aug. 1, 1894.	25 do	45 67
Rondeau.....	W. R. Fellowes.....	Dec. 17, 1888.	25 do	59 97
Sault Ste. Marie.....	Vacant.....		\$100 per annum do	
Southampton.....	Geo. McVittie.....	Aug. 16, 1895.	25 p.c. of collections.....	34 81
Summerstown.....	Under lease.....			
Thessalon, Algoma.....	Sam'l Hazen.....	May 13, 1896.	25 p.c. of collections.....	
Warton.....	H. R. A. Ely.....	Dec. 10, 1890.	25 do	88 99
				586 14
<i>Quebec.</i>				
Agnes.....	L. A. Roy.....	Nov. 27, 1891.	25 p.c. of collections.....	7 92
Anse St. John.....	F. Lavoie.....	Mar. 13, 1895.	25 do	120 32
Baie St. Paul.....	Vacant.....		25 do	
Baie St. Paul, Isolated Block.	A. Simard.....	Aug. 25, 1891.	25 do	176 76
Beauport.....	H. Grenier.....	July 1, 1895.	25 do	
Berthier.....	Jos. Bouffard.....	April 26, 1895.	25 do	56 03
Carleton.....	Jos. Cauchon.....	June 4, 1889.	\$50 per annum.....	64 14
Cascades.....	Nérée Moreau.....	Aug. 20, 1892.	25 p.c. of collections.....	
Chicoutimi.....	Juste Ouellette.....	May 2, 1893.	25 do	193 75
Echo Vale, Lake Megantic.....	D. P. Matheson.....	May 16, 1894.	25 do	16 00
Grand River.....	John Carberry.....	Sept. 23, 1892.	25 do	161 43
Isle aux Grues.....	Jos. Painchaud.....	Feb. 17, 1890.	25 do	1 27
Lacolle.....	R. J. Robinson.....	Mar. 8, 1894.	25 do	19 29
Les Eboulements.....	M. Tremblay.....	Sept. 4, 1894.	25 do	59 00
L'Islet.....	Octave Morin.....	Feb. 3, 1893.	25 do	
Longueuil.....	D. Brissette.....	Mar. 23, 1893.	25 do	47 21
Magog.....	David Pippin.....	June 12, 1896.	25 do	
Matane.....	E. Chouinard.....	July 2, 1895.	25 do	
Murray Bay.....	Elie Maltais.....	Aug. 15, 1893.	25 do	146 79
New Carlisle.....	John C. Hall.....	June 4, 1889.	25 do	165 24
Percé.....	T. W. Flynn.....	Jan. 19, 1893.	25 do	32 28
Port Daniel.....	John Enright.....	Sept. 11, 1890.	\$50 per annum.....	70 24
Rimouski.....	Chas. Lepage.....	July 24, 1894.	25 p.c. of collections.....	
Rivière Ouelle.....	J. H. dit Beau lieu.....	Nov. 28, 1892.	25 do	1 61
Rivière du Loup.....	Louis Pinze.....	Sept. 16, 1891.	25 do	183 83
St. Alphonse de Bagotville.....	Abel Tremblay.....	July 7, 1891.	25 do	310 73
St. Jean d'Orléans.....	Chas. Langlois.....	Dec. 16, 1892.	25 do	65 50
Ste. Cécile du Bic.....	L. N. Cote.....	July 20, 1891.	25 do	177 86
St. Laurent d'Orléans.....	Ed. Chabot.....	Aug. 25, 1894.	25 do	40 27
Tadoussac.....	L. N. Catellier.....	July 20, 1895.	25 do	150 94
Trois Pistoles.....	D. Damour.....	May 10, 1895.	25 do	
St. Thomas de Montmagny.....	T. Gendreau.....	Nov. 9, 1894.	25 do	8 28
				2,281 69

* Commission on collections not to exceed \$200 per annum.

STATEMENT relating to Wharfs, &c.—Continued.

Locality.	Wharfinger.	Date of Appointment of Wharfinger.	Remuneration Allowed.	Amount deposited to credit of Receiver General.
				\$ cts.
<i>Nova Scotia.</i>				
Arissig.....	John McInnis	Aug. 27, 1892.	25 p. c. of collections...	
Avonport.....	Robert Shaw	Nov. 23, 1898.	25 do	
Barrington.....	S. W. Crowell	Aug. 12, 1891.	25 do	169 26
Bayfield.....	W. McDonald	Oct. 30, 1894.	25 do	42 62
Belliveau's Cove.....	St. Clair Thérieau.....	Nov. 24, 1892.	25 do	186 33
Broad Cove.....	John Teal	June 12, 1893.	25 do	
Broad Cove Marsh.....	Hugh McDonald.....	Oct. 19, 1892.	25 do	
Brooklyn.....	F. T. Gardiner.....	do 20, 1892.	20 do	
Canada Creek.....	C. E. Eaton	Nov. 23, 1888.	25 do	
Cape Cove.....	M. A. Doucette.....	Dec. 7, 1891.	25 do	15 37
Centreville.....	W. M. B. Dakin.....	Aug. 25, 1888.	25 do	76 30
Chipman's Brook.....	Jas. Misaner.....	Nov. 23, 1888.	25 do	
Church Point.....	Chas. F. Belliveau.....	Aug. 20, 1892.	25 do	49 19
Cow Bay.....	Arch. McKinnon	Apr. 15, 1879.	7½ do	435 76
Cranberry Head.....	Abram Thurston.....	Feb. 16, 1889.	25 do	
Crabbens Pier.....	A. R. Boyd.....	Oct. 2, 1895.	25 do	
Delap's Cove.....	R. W. McColl.....	Nov. 28, 1889.	25 do	
Digby.....	H. B. Short	Jan. 9, 1891.	25 do	1,137 08
Eagle Head.....	Nathan Leslie	do 9, 1889.	25 do	
East Bay.....	Donald McInnis (Ronald's son).	Apr. 5, 1886.	50 do	
East River, Sheet Harbour.....	Malcolm McFarlane.	May, 20, 1890.	25 do	
Grand Narrows, Victoria Co.	Vacant.....		25 do	
Grand Narrows, Cape Breton Co.....	E. A. McNeill	Nov. 6, 1888.	25 do	
Hall's Harbour.....	Sydney Roscoe.....	do 23, 1888.	25 do	
Hampton.....	Judson Foster	Aug. 25, 1888.	25 do	55 98
Harbourville.....	F. Morris	June 8, 1894.	25 do	31 12
Irish Cove.....	Colin Cash	do 28, 1895.	25 do	31 20
Lismore.....	D. A. McKinnon.....	July 5, 1895.	25 do	
Maitland, Hants Co.....	W. B. Smith	June 8, 1894.	25 do	
Maitland, Yarmouth Co.....	J. N. Sanders	Sept. 20, 1894.	25 do	31 20
Margaretsville.....	T. J. Downie.....	Aug. 25, 1888.	25 do	57 78
Metegan Cove.....	H. F. Deveau.....	Sept. 15, 1888.	20 do	79 24
Metegan River.....	Urbain Doucette.....	Jan. 3, 1883.	25 do	114 33
Militia Point.....	D. McIntosh.....	Aug. 20, 1892.	25 do	
Morden.....	John Redgate.....	Nov. 16, 1893.	25 do	12 21
Ogilvie.....	M. Donnellan	July 13, 1893.	25 do	25 65
Parrsboro'.....	Thompson Tipping.....	do 26, 1888.	25 do	49 13
Pickett's Wharf.....	Andrew Bishop.....	Dec. 24, 1884.	25 do	
Plympton.....	Wm. Smith.....	Aug. 8, 1890.	25 do	
Point Brulé.....	David Stevenson.....	Nov. 23, 1888.	25 do	
Port George.....	W. Crawford.....	June 7, 1894.	25 do	137 48
Port Hood.....	A. V. McDougald.....	May 17, 1892.	25 do	133 29
Port Lorne.....	Samuel Beardsley.....	Aug. 25, 1888.	25 do	50 95
Salmon River.....	J. M. Deveau.....	Nov. 25, 1890.	25 do	
Saulniersville.....	John T. Saulnier.....	Aug. 25, 1888.	25 do	43 17
Tancook Island.....	Amos Hubley.....	Oct. 28, 1893.	25 do	
Tracadie.....	J. M. Hall.....	Nov. 6, 1888.	25 do	
Tusket Wedge.....	Jas Cothreau.....	Feb. 16, 1889.	25 do	
Victoria.....	William Brown.....	do 11, 1889.	25 do	8 65
Wallace.....	Don Mckenzie.....	Dec. 16, 1892.	25 do	
West Pubnico.....	W. H. D'Entremont.	Sept. 20, 1893.	25 do	
West River, Sheet Harbour.....	Malcolm McFarlane.	do 3, 1889.	25 do	
White Point.....	Elisha West.....	Jan. 9, 1889.	25 do	
				3,173 29
<i>New Brunswick.</i>				
Buctouche.....	J. J. LeBlanc.....	May 2, 1892.	25 do	13 99
Campbellton.....	Alfred J. Venner.....	June 10, 1893.	25 do	303 04
Cape Tormentine.....	W. B. Welsh.....	Apr. 28, 1894.	25 do	303 78
Clifton, Stonehaven.....	S. Paynes.....	Nov. 9, 1894.	25 do	20 44
Dalhousie.....	W. J. Smith.....	June 27, 1891.	25 do	140 74

Marine and Fisheries—Marine Branch.

STATEMENT relating to Wharfs, &c.—*Concluded.*

Locality.	Wharfinger.	Date of Appointment of Wharfinger.	Remuneration Allowed.	Amount deposited to credit of Receiver General.
<i>New Brunswick—Concluded.</i>				\$ cts.
Edgett's Landing	Thos. Barnett	July 5, 1895	25 p.c. of collections	66 76
Hopewell Cape	Wm. Hamilton	Apr. 9, 1890	25 do	60 21
Quaco	W. H. Rourke	July 15, 1892	25 do	
St. Louis	C. Frigand	Oct. 29, 1895	25 do	
				908 96
<i>Prince Edward Island.</i>				
Annardale	James Taylor	July 2, 1885	25 do	
Bay View	Joseph Harrington	Oct. 2, 1885	25 do	8 30
Belfast	Thos. McLennan	July 21, 1890	25 do	84 89
Brush Wharf	Levi R. Ings	Sept. 18, 1885	25 do	121 62
Campbell's Cove	Angus McIntyre	Oct. 17, 1888	25 do	
Chapel Point	Ronald McCormack	Sept. 18, 1885	25 do	
China Point	W. S. N. Crane	do 18, 1885	25 do	9 28
Clifton	Wm. McKay	do 22, 1886	25 do	
Crapaud and Victoria Pier	James Dea	May 12, 1890	25 do	
Georgetown	James Burke	July 2, 1885	25 do	16 91
Hickey's Wharf	R. Webster	do 31, 1891	25 do	12 00
Higgin's Shore	G. G. Henry	Nov. 9, 1891	25 do	
Hurd's Point	R. Robblee	Oct. 6, 1888	25 do	16 39
Kier's Shore	W. Hodgson	June 10, 1895	25 do	58 90
Lambert	Angus McQueen	Oct. 24, 1891	25 do	59 63
Lewis Point	David Lewis	June 10, 1895	25 do	71 58
McGee's Island	Norman Gallant	Nov. 9, 1891	25 do	
Mink River	B. Clow	June 30, 1892	25 do	
Murray Harbour, South	J. McKinnon	Jan. 27, 1896	25 do	
Nine Mile Creek	Edward Harrington	Oct. 29, 1885	25 do	
North Cardigan	Donald McIntyre	July 2, 1885	25 do	29 39
Pinette	Alex. Young	June 15, 1896	25 do	
Pownal	Alex. McKee	Oct. 2, 1885	25 do	57 03
St. Mary's Bay	Benj. Lewellin	Apr. 22, 1893	25 do	18 18
South Rustico, Oyster Bed Bridge	D. Gallant	Feb'y 23, 1895	25 do	22 84
Stevens and Montague	Angus McQueen	Oct. 24, 1891	25 do	
Sturgeon River	Beanard Kearney	Sept. 18, 1885	25 do	24 95
Tignish River	Geo. Conroy	Oct. 2, 1891	25 do	54 46
Vernon River	J. G. McKenzie	do 19, 1885	25 do	77 26
Wood Island	M. H. McMillan	May 16, 1889	25 do	15 67
				847 16

RECAPITULATION.

Ontario	\$ cts.
Quebec	586 14
Nova Scotia	2,281 69
New Brunswick	3,173 29
Prince Edward Island	908 96
	847 16

Total wharfage dues collected 7,797 24

ADD—Fees received by undermentioned harbour masters in excess of remuneration allowed:—

Harbour Master—Fort William, Ont	\$16 50
do Port Arthur	6 00
do St. John's, Que.	95 00
do Vancouver, B.C.	23 50
	146 00

Total Revenue from Wharfs and Harbours 7,943 24

APPENDIX

STATEMENT of Expenditure by the Marine Department

	1868.	1869.	1870.	1871.	1872.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Maintenance of lights--					
Above Montreal	40,561 28	42,306 69	46,289 05	44,054 01	57,609 16
Montreal District	23,053 56	25,762 54	21,699 49	22,453 52	22,369 00
Below Quebec	45,615 65	41,651 73	43,730 61	31,582 75	41,936 00
Nova Scotia	46,460 72	56,394 88	43,682 86	76,230 77	67,862 24
New Brunswick	20,488 00	23,893 00	27,485 14	20,542 29	23,369 12
Prince Edward Island					
British Columbia					
Construction--					
Above Montreal	3,136 15		2,976 83	8,770 55	6,940 45
Quebec	7,323 75	7,492 59	1,543 06		57,818 35
Nova Scotia	22,041 42	6,905 80	18,967 23	10,948 31	34,760 12
New Brunswick			11,555 91	8,735 73	9,561 14
Prince Edward Island					
British Columbia					
Dominion steamers--					
Quebec	69,026 73	37,176 02	34,549 49	59,797 05	47,500 00
Nova Scotia	14,778 92	26,603 94	19,759 96	13,139 86	20,999 63
New Brunswick					
Prince Edward Island					
British Columbia					12,115 96
Examinations of masters and mates			908 12	1,407 66	4,312 07
Hudson's Bay expedition					
Investigations into wrecks			140 00		874 00
Marine Hospital, Quebec	19,977 36	19,221 45	21,618 73	19,823 18	21,000 00
Marine Hospitals	1,070 86	15,615 71	15,652 62	15,728 93	23,536 16
Meteorological Service	8,200 00	8,950 00	8,950 00	9,379 82	12,618 15
Registration of Canadian shipping					
Removal of obstructions			2,350 07	1,000 00	
Rewards for saving life					2,284 32
Signal Service					
Steamboat inspection	7,106 93	7,999 00	7,396 96	8,321 00	8,500 00
Survey, Georgian Bay					
Water Police, Montreal					
do Quebec	27,445 35	10,238 71	9,423 31	8,030 00	10,000 00
do Quebec		12,623 59	9,038 62	9,370 73	10,348 00
Civil Government	15,083 88	18,064 25	19,401 05	20,220 96	22,644 52
Steam communication--					
Between Quebec and Maritime Provinces					
Between Prince Edward Island and Mainland					
Purchase of steamer to replace--					
"Glendon"					
"Lady Head"					
Winter Mail Service, P.E.I.					
Tidal observations					
Gratuities					
Survey, Burrard Inlet					
Export cattle trade					
	371,070 56	360,899 90	367,129 11	389,537 12	518,958 49

APPENDIX

STATEMENT of Expenditure by the Marine Department

	1882.	1883.	1884.	1885.	1886.	1887.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Maintenance of lights—						
Above Montreal	71,048 50	70,116 68	70,788 27	70,697 89	85,718 98	75,690 74
Montreal District	21,643 05	22,260 32	22,946 43	23,262 94	33,289 28	16,735 49
Below Quebec	91,098 66	102,784 99	101,302 35	118,856 94	131,095 29	131,540 80
Nova Scotia	137,846 15	150,793 17	142,909 72	137,439 40	143,153 24	117,708 53
New Brunswick	66,073 00	75,947 92	86,670 70	92,130 28	76,046 63	96,425 28
Prince Edward Island	16,985 72	17,907 27	19,059 62	20,218 83	22,282 52	17,852 13
British Columbia	17,803 00	18,349 06	18,107 54	15,457 76	14,783 75	16,230 43
Cape Race						4,453 25
Construction—						
Above Montreal	13,581 00	9,782 27	18,432 63	27,977 42	36,678 16	18,383 20
Quebec	3,731 31	9,672 50	3,168 48	4,354 87	5,877 84	1,260 00
Nova Scotia	13,355 00	9,422 75	12,489 35	4,352 42	5,905 17	5,330 89
New Brunswick	2,253 80	1,022 57	2,868 70	7,667 42	2,421 66	5,280 75
Prince Edward Island	3,092 00	1,934 49	2,158 60	879 40		384 60
British Columbia	3,237 90	1,005 26	9,830 38	5,223 11	4,942 70	321 84
Queen's Printer						26 58
Dominion steamers—						
Quebec	44,923 98	45,156 13	43,019 13	51,092 98	51,485 03	50,714 52
Nova Scotia	31,049 74	37,841 07	27,726 60	42,921 27	30,283 27	32,287 10
New Brunswick					24,633 26	14,337 23
Prince Edward Island	23,911 97	19,680 00	19,539 52	33,962 54	20,927 58	19,987 67
British Columbia	8,504 61	25,484 00	16,111 83	12,485 07	13,430 69	10,809 07
Department						13,288 83
Examinations of masters and mates	3,982 00	4,021 20	5,580 79	6,656 44	5,239 28	4,858 98
Hudson's Bay expedition			480 69	71,374 69	35,217 10	14,762 61
Investigations into wrecks	863 19	875 64	830 12	385 15	592 63	520 14
Marine Hospital, Quebec	19,938 12	19,998 53	19,990 34	19,996 68	16,047 95	19,706 96
Marine Hospitals	33,162 45	29,880 78	31,401 30	45,371 29	32,229 02	32,545 35
Meteorological Service	47,464 07	51,990 25	56,418 16	56,625 46	56,898 33	57,140 74
Registration of Canadian shipping	2,013 28	168 84	189 27	237 88	157 13	233 13
Removal of obstructions	1,116 51	35 80	342 76	2,259 21	1,237 34	4,190 83
Rewards for saving life	2,212 00	2,534 60	2,614 91	5,221 15	8,147 22	7,363 94
Signal Service		3,365 33	6,704 17	3,881 05	4,622 00	5,082 17
Steamboat inspection	14,835 00	16,209 00	21,893 28	23,235 04	21,775 57	22,837 80
Hydrographic surveys		77 81	26,745 54	20,454 68	17,759 36	21,592 55
Water Police, Montreal	21,994 74	15,798 24	19,021 93	17,683 59	20,933 75	17,413 47
do Quebec	20,321 82	22,520 41	22,958 79	20,399 33	22,922 32	22,935 65
Civil Government	36,789 46	37,988 39	38,775 00	29,900 83	30,453 57	37,193 62
Steam communication—						
Between Quebec and Maritime Provinces						
Between Prince Edward Island and Mainland						
Repairs to wharf						
Purchase of steamer to replace—						
"Glendon"		395 55	56,164 71	47,238 03		
"Lady Head"						
Winter Mail Service, P.E.I.					5,985 42	6,312 93
Tidal observations						
Gratuities						
Survey, Burrard Inlet						
Export cattle trade						
Survey, Bay of Quinté						
Relief of distressed Canadians						
Manning ships						
Widow of late A. Warner						
McDonald Bros.						
Parliamentary Returns						
Investigating effect of Chicago drainage canal						
John McDonald						
	774,831 53	825,010 82	927,241 61	1,029,901 14	980,120 59	917,557 31

Marine and Fisheries—Marine Branch.

No. 11—Concluded.

from Confederation to 30th June, 1896—Concluded.

1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
85,588 70	72,621 23	84,035 65	93,180 72	87,033 61	87,598 15	78,090 69	82,541 16	87,256 28
17,510 17	12,285 79							
108,278 67	112,690 20	118,750 70	122,471 89	116,531 27	120,404 19	124,348 80	124,763 81	124,143 66
133,009 92	140,197 15	139,459 56	139,916 83	148,815 26	150,445 26	137,339 73	140,877 53	123,234 65
73,465 49	78,285 79	61,608 91	61,089 31	66,886 69	71,079 46	59,917 96	66,654 46	63,018 64
14,796 62	19,118 51	16,968 80	19,000 46	17,069 98	16,819 64	15,569 39	17,976 67	17,988 15
19,604 63	16,877 12	16,411 49	19,595 22	26,858 68	24,413 27	27,240 77	21,734 18	24,770 44
5,124 20	7,358 01							
6,341 97	8,623 76							
2,287 86	12,203 06		9,796 28	21,704 05	8,766 62	12,581 15	2,699 40	11,993 84
5,533 48	6,039 91		3,723 14	809 27	10,097 18	4,743 13	3,004 14	3,300 00
1,542 61	2,966 36	23,863 09	4,696 94	1,965 16	4,381 24	3,104 77	4,737 03	1,842 94
			208 16	1,845 35	1,271 15	115 45	1,597 89	200 00
			410 00	1 56		1,604 00		
6,918 00	1,890 00		14,417 25	9,478 81	2,958 61	6,357 43	180 83	225 50
	40 14							
150,659 19	126,629 33	114,956 20	111,437 03	145,899 61	163,097 46	178,183 97	169,661 64	145,315 28
5,063 96	4,381 04	4,117 83	4,255 24	6,363 88	4,116 99	3,745 33	2,757 29	4,062 82
165 00								
513 91	516 67	888 94	1,172 77	603 21	643 49	850 81	351 15	483 98
18,777 62	18,643 14	10,279 08	751 75					
30,667 67	33,689 20	31,450 03	33,303 37	34,106 83	35,757 07	38,403 94	38,589 05	36,682 96
59,986 10	58,577 07	58,452 10	62,457 10	67,138 06	64,165 60	66,440 96	64,588 34	66,600 29
897 02	179 21	647 52	1,207 07	462 59	1,476 19	394 00	207 40	517 60
2,500 94	3,603 65	5,737 26	3,633 65	2,878 68	1,554 53	202 02	2,217 36	456 38
6,825 48	5,503 44	8,150 92	4,952 20	6,398 93	7,432 64	8,014 67	6,591 34	8,004 38
4,441 59	5,092 54	4,976 80	4,700 79	5,014 42	5,040 58	4,668 93	5,311 74	5,338 76
21,430 45	22,313 03	20,989 52	22,183 76	22,736 59	24,386 95	25,961 36	26,385 88	26,321 27
19,424 14	17,808 46	17,969 23	17,677 51	16,451 10	17,542 11	31,461 76	12,653 28	15,099 63
18,725 95	16,948 82	13,167 00	573 80					
18,553 57	14,698 68	8,620 61	7,279 85	6,161 60	5,436 23			
32,728 78	43,501 96	42,835 78	43,253 67	43,195 31	56,477 27	54,988 88	71,373 82	
	143,505 60							
					84 90	1,007 65	824 38	2,644 69
7,740 25	1,842 47	2,752 67	7,012 70	3,309 44	4,376 96	6,497 03	6,138 18	7,779 69
		244 75	1,888 71	711 59	5,099 17	10,172 61	11,507 24	9,627 45
	200 00	80 00	1,025 00			3,261 32		
			1,690 12	2,580 45				
			520 85	1,411 57	1,711 73	1,350 83	2,268 74	2,887 24
					2,085 45			
							7 30	
							500 00	746 89
							160 00	
							4,000 00	
								291 08
								2,500 00
								200 00
883,250 85	1,023,801 34	807,417 53	886,410 11	861,426 80	898,720 03	906,654 34	895,828 28	793,634 49

APPENDIX No. 12.

REPORT OF ALFRED OGDEN ON LIFE SAVING STATIONS.

BEDFORD, N.S., 20th October, 1896.

F. GOURDEAU, Esq.,
Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit herewith my report of inspection of life saving stations in the provinces of Nova Scotia and New Brunswick for the year 1896.

Pictou Island Station.

I inspected this station on the 27th June last, while on the island on business in connection with the Bay View Lobster Hatchery, and found the boat, boathouse and all appliances in first rate order.

Last spring the launch-ways were damaged by gales, but were soon after repaired at a trifling cost.

The old cork jackets referred to in my previous reports as being "tender and uncomfortable to the wearer" have not been replaced by new ones as I recommended.

Devils Island Station.

Inspected 30th September, boat and all appliances in good order. Coxswain died on the 17th September, and his successor had not been appointed, but the remainder of the crew had kept up the practice of drill as usual. One axe, 1-3 gallon water can and 1 iron bucket are required.

Port Mouton Island Station.

I arrived at this station 9th October, by government steamer "Lanedowne."

The boat and building are in good order but the launch-ways are in a very bad condition and will require to be newly constructed, at cost of about \$40 or \$50. In rough weather it is almost impossible to launch the boat without damage, and quite impossible to haul it up.

This is a rough place to keep a boat and a very important station, and strong substantial launch-ways should be constructed and avoid risk of loosing the boat by being smashed upon the rocks.

Blanche Station.

Inspected 9th October, boat, boat house and all appliances in good order, clean and tidy. The coxswain and crew of this station are always on the alert for wrecks, and is considered to be about the best on the coast. Twelve fathoms, 15 thread hemp rope is required for life lines and about 40 fathoms do., 9 thread for oar, lanyards.

Marine and Fisheries—Marine Branch.

Cape Sable Island.

Visited 9th October, at the station there is only a small metallic boat 15 keel, 5 feet 2 inches beam, with air-tight compartments forward and aft, together with air tubes running fore and aft between the compartments, on each side.

This boat was originally on board the steamer "Chesapeake" and has been on the island for about 33 years. It is heavy and unsuitable for the place.

I would recommend that a Beebe McLellan boat be supplied for this station with an organized crew which can be mustered from Hawk settlement (which is about 1 mile from the boat house) inside of an hour. The inhabitants are all fishermen and some excellent oarsmen are among them.

There are but three men living upon Cape Sable Islands, at the lighthouse.

Hawk passage, is about $\frac{1}{4}$ of a mile wide and about $\frac{3}{4}$ of a mile from the boat house and lighthouse.

There are no cork jackets at this station, I had recommended them in former reports, and think that it is important that they should be supplied.

Seal Island Station.

Inspected 10th October last, boat and all appliances in perfect order. Launched boat, exercised crew in rough water and was well pleased with the manner in which they handled it.

The boat at the west side of the island is kept in good order, but there are no cork jackets for the men. I would recommend that 6 jackets be supplied at once.

This Island is some 14 miles from the main land. There are 400 sheep and 10 head of horned cattle on the island.

The improvements to the dwelling house of the coxswain and crew, which I recommended last year, have not been made, as the materials had not been supplied.

Mud Island Station.

Inspected 10th October. This island is about 12 miles from the mainland, and is owned by the Mud Island Lobster Company, who receive a small subsidy from the department for supplying and maintaining a large dory 17 feet bottom, 21 feet on top, 6 feet beam and $2\frac{1}{4}$ feet hold. It has air-tight compartments forward and aft, is light, easily handled, and an excellent sea boat, and in good order.

There has been a hand trumpet on the island, which was of great value to the small and large craft approaching the island, but for some years it has been useless and has gone to destruction. I would recommend that a new one costing about \$15 be supplied at this station.

There are 4 men residing on the island in winter, and about 50 men in summer. There are 500 sheep and 3 cows also.

Yarmouth Station.

Inspected 10th October. Coxswain and crew were all absent, but I obtained the key of the boat-house and found everything in good order, except the launch-ways, which require repairs to the extent of about \$4 or \$5. I would recommend that the coxswain be authorized to make necessary repairs.

Cape Tormentine, N.B., Station.

Inspected 13th October. The boat and all appliances were in good order. In my report of 1894, I recommended that the following articles, which are absolutely necessary, be supplied :

Wood launch-ways, 150 feet long, 8 x 4 inch timber covered with flat iron 2 inches wide by $\frac{3}{8}$ inch thick, for the cradle or trolley to run upon; 1 double-barrel

winch; 200 feet 3½-inch manilla rope; two 8½-inch patent single blocks; 40 fathoms 9 thread hemp heaving line; one 3-gallon water keg; 1 can kerosine oil and lamp wicks; none of which have been supplied.

At the present time the boat cannot be safely launched except at high water, and cannot be hauled up at all at low water. Should the boat be required during a storm, with the wind upon shore and the tide low, I have doubts about the boat being got off at all.

This is an important station and I hope efforts will be made to make it efficient.

Scattarie Island Station.

I visited this station on the 3rd November by Dominion government steamer "Aberdeen." All of the crew were present, having just returned from practice in rough water. The boat and all appliances are kept in first-rate order.

As I reported last year, the windlass is not powerful enough for the work it has to do, and I would recommend that a double barrel winch and a 12-inch single block with steel bush and pin be supplied.

Six 3-inch brass scupper hinges will be required next season.

On this island there are 30 families of fishermen, who have 100 sheep and 25 head of horned cattle.

St. Paul's Island.

I inspected this station on the 7th November and found everything kept in good order.

There are two surf boats only at this station, one of which is new. The other is old and has been repaired many times; it is weak and some of the timbers are broken. Another boat is required, and as there are but four men at the main station, the surf boats are heavy for them to handle. I would recommend that a double dory with air-tight compartments fore and aft be supplied, and in the event of a wreck this dory could be launched and rowed off shore when a surf boat could not.

At Trinity Cove (north side) there is a boathouse and house of refuge, containing stove, fuel and oil, and there is telephonic communication with the main station.

The superintendent informs me that the old boat at this station is not the property of the government, and I am of the opinion that a dory, same as above described, would be suitable for this station also.

At the main station there is an old gun for throwing lines, but the superintendent informs me that it does not work well, and that Capt. Bloomfield Douglas, R.N.R., had tried it and pronounced it unfit for the place, and so reported to the department.

I would recommend that a new gun of modern pattern be sent to replace this one.

This island is 14 miles from Cape Breton Island. Together with the superintendent there are 6 men, 2 of which are lightkeepers, which leaves but 4 men at the main station.

I found a supply of provisions and clothing at the main station as follows:—

Ten barrels flour, 16 barrels bread, 5 barrels beef, 5 barrels pork, 1 barrel beans, 1 box coffee, ½ chest tea, 7 gallons molasses, 11 blankets, 20 pairs pants, 20 coats, 20 caps, 20 shirts, 20 pairs brogans, 20 pairs socks.

White Head Station.

Inspected 14th November, boat, boathouse and all appliances in excellent order. The crew were all present.

Paint and oil, 2 lanterns, 1 can kerosine are required.

Marine and Fisheries—Marine Branch.

Herring Cove Station.

Inspected 27th November. Everything about this station is kept in good order. The boat is clean and nicely painted. Two new lanterns are required here to replace those which were broken last autumn while at wreck.

Duncan's Cove Station.

Inspected 27th November. Everything about this station is in good order, and nothing is required.

Sable Island.

I arrived by D.G.S.S. "Newfield" at the main station on the morning of the 12th December, and while supplies were being landed from the steamer, I had an opportunity of inspecting the boats and appliances.

Two new guns for throwing lines have recently been sent to the island from the agency at Halifax, but for want of fuse the superintendent had not been able to test them; he would, however, do so soon, as the fuse was then being landed from the "Newfield."

A portion of the launch-ways had recently been washed away, but materials were on hand to repair the old and construct new ones.

All of the boats were nicely painted and in first-rate order, all appliances well cared for and in their proper places.

The old despatch boat, which I reported upon in 1894 as being weak and unfit for the service, is still at the station, and I think should be replaced by a stronger one.

There is at the Marine and Fisheries wharf, Halifax, a very fine boat, constructed by Messrs. Embri & Sons, Port Hawksbury, N.S., for the Dominion Government, and was exhibited at the World's Fair, Chicago, which in my opinion is just what is required at Sable Island for the purpose of communicating with the mainland in case of emergency. This boat is strong, well built, an excellent sea boat, a good sailer, and of suitable size. It is partly open, but a hatch-deck can be easily and cheaply fitted. I would suggest that this boat, which has for three years been lying upon the wharf in Halifax, be sent to the island to replace the despatch boat now there.

The superintendent informs me that there are 50 persons on the island, including employees and their families.

The stock and provisions on hand consists of 100 horses, 90 horned cattle, 30 barrels flour, 10 barrels each of beef, pork, bread, beans and meal, and a good supply of hay, oats, potatoes and turnips.

I had no opportunity of visiting the other stations on the island, as it was night before the supplies were all landed from the "Newfield," and the steamer then sailed for the mainland.

At the houses of refuge and staff quarters I found everything clean and in good order.

I am sir,

Your obedient servant,

ALFRED OGDEN.

STATEMENT relative to Life-Boat Stations

Stations.	Established.	Coxswain.	Number of Crew.	Salary of Coxswain.	Wages of Crew.
Blanche, N.S.	Sept.—, 1895	W. A. B. Smith.	6	\$75 per annum and \$1.50 for each drill	\$1.50 each drill, twice a month.
Cape Sable, N.S.		Lightkeeper	No organized crew.		
Cobourg, Ont.	Nov. 7, 1882	D. Rooney.	6	\$75 per annum and \$1.50 for each drill	\$1.50 each drill, twice a month.
Collingwood, Ont.	Sept. 2, 1885	P. Doherty.	6	do ..	do ..
Devil's Island, N.S.	1885, reorganized in 1890.	F. Edward	6	do ..	do ..
Duncan's Cove, N.S.	1886	R. E. Monk	6	do ..	do ..
Goderich, Ont.	Oct. 21, 1886	Wm. Babb.	6	do ..	do ..
Herring Cove, N.S.		J. Dempsey.	No organized crew.		
Mud Island, N.S.		J. Pitman.	do	\$80	
Peléé Island, Ont.		A. Henning.	6	\$75 per annum and \$1.50 for each drill	\$1.50 each drill, twice a month.
Pictou Island, N.S.	Nov. 23, 1889	D. McLean.	6	do ..	do ..
Poplar Point, Ont.	Apl. 20, 1883	L. Spafford.	6	do ..	do ..
Port Hope, Ont.	Nov. 6, 1889	C. R. Nixon.	6	do ..	do ..
Port Mouton, N.S.	do —, 1889	J. Maxwell.	6	do ..	do ..
Port Rowan, Ont.	Oct. 19, 1883	Richard Clark	6	do ..	do ..
Port Stanley, Ont.	June 25, 1885	Wm. Berry.	6	do ..	do ..
Sable Island, N.S.	1885	Supt. Humane Establishment.	From staff of Humane Establishment.	Paid as superintendent and staff of Humane Establishment.	
Scatterie, N.S.	1885, reorganized in 1890.	J. N. Brown	6	\$75 per annum and \$1.50 for each drill	\$1.50 each drill, twice a month.
Seal Island, N.S.	1880	W. Trefry.	7	\$250 per annum.	\$100 each per annum.
St. Paul's Island, N.S.		Supt. Humane Establishment.	No organized crew.		
Tormentine Cape, N.B.		W. B. Walsh, Bayfield.			
Toronto, Ont.	Mar. 1, 1883	W. Ward.	6	\$75 per annum and \$1.50 for each drill	\$1.50 each drill, twice a month.
Wellington, Ont.	do 17, 1883	H. McCullough.	6	do ..	do ..
Whitehead, N.S.	June 6, 1890	H. P. Monroe.	6	do ..	do ..
Yarmouth, N.S.	1886, reorganized in 1889.	John H. Gavel.	6	do ..	do ..

Marine and Fisheries—Marine Branch.

maintained by the Dominion Government.

Value of Boat.	Description of Boat.	Equipment.	Where built.
\$			
575	Self-righting and self-bailing, 25 ft. over all, 8 ft. beam, Dobbins' pattern.	Full equipment, as required in regulation boat-house.	Dartmouth, N.S.
.....	Metallic life-boat, 16 ft. keel, 5 ft. beam....	Ordinary outfit.	
575	Self-righting and self-bailing, 25 ft. over all, 8 ft. beam, Dobbins' pattern.	Full equipment, as required in regulation boat-house.	Goderich, Ont.
575	do do	do do	do
575	do do	do do	Dartmouth, N.S.
575	do do	do do	do
575	do do	do do	Goderich, Ont.
....	Metallic life-boat, 28 ft. keel, 6 ft. beam....	Full equipment.....	New York.
....	Fishing boats and dorys (not Government property).	.....
575	Self-righting and self-bailing, 25 ft. over all, 7 ft. beam, Dobbins' pattern.	Full equipment, as required in regulation boat-house.	Goderich, Ont.
575	do do	do do	Dartmouth, N.S.
550	Self-righting and self-bailing, 26 ft. over all, 7 ft. beam, Dobbins' pattern.	do do	Buffalo, U.S.
620	do do ...	do do	Goderich, Ont.
575	do do ...	do do	Dartmouth, N.S.
....	Surf-boat, 26 ft. long, 6½ ft. beam.....	Full equipment and boat-house.	Buffalo, U.S.
575	Self-righting and self-bailing, 25 ft. over all, 7 ft. beam.	do do ...	Goderich, Ont.
.....	The two Dobbins' pattern boats were exchanged in 1893 for one Beebe surf-boat and carriages, and one Beebe McLellan self-bailing life-boat.	Boat-house, full equipments, &c.	
.....	Self-righting, &c., same as others, Dobbins' pattern, and clinker built ships' life-boat, 21 feet keel.	Full equipment and boat-house.	Dartmouth, N.S.
....	Beebe McLellan boat on east side and a surf-boat on the west.	do do	Halifax, N.S.
.....	Two surf-boats, one 25 ft. over all, 6½ ft. beam, the other 23 ft. long, 4 ft. 8 in. beam.	.....	do
.....			
575	Self-righting, &c., same as others, Dobbins' pattern.	Full equipment and boat-house.	Goderich, Ont.
1,400	do do ...	do do	Buffalo, U.S.
575	do do	do do	Dartmouth, N.S.
575	do do	do do	do

APPENDIX No. 13

REWARDS FOR SAVING LIFE.

List of persons to whom rewards have been granted by the Government of Canada, for the fiscal year ended 30th June, 1896, for gallant and humane services rendered in life saving from shipwrecked vessels, or by British and Foreign Governments for similar services rendered by Canadian vessels in saving life from shipwrecked British and Foreign vessels for the same period.

Names and Designations of Persons.	Nature of Services Rendered.	Date of Services Rendered.	Description of Reward.
Captain D. Smith, master of the barque "Kate F. Troop," of St. John, N.B.	Rescue of the barque "Torguato" of Castellanare in Italy, shipwrecked in the Atlantic Ocean.	.....	A commemoration medal from the Italian Government.
Patrick Murphy of Quebec...	Bravery in rescue of several persons from drowning on different occasions.	.....	A silver watch and \$25.
Captain Gaetano fu Gio Batta, master of the Italian barque "Orsola."	Rescuing at great risk the master and 11 of the crew of the barque "Lotus" of Pictou, N.S., sunk in the Bay of Biscay.	March 24, 1894	A gold medal to master, £17 paid for subsistence of crew and expenses incurred in landing crew at St. Vincent, Cape de Verde Islands; £15 paid for boat destroyed in rescuing crew.
Alex. McDonald, John McDonald, Alex. McDonald and John McQuarrie, of Little Mabou, N.S.	Saving at considerable risk a young boy and his sister, whose boat had upset.	Aug. 27, 1894.	A silver watch to each of the four men, value \$20 each.
Ronald McDonald, John McDonald, Alex. Gillis and Lewis McDonald.	Humane and gallant services in the rescue of two persons whose boat had capsized in a squall near Port Hood, N.S.	Sept. 26, 1894.	A silver watch to each man, value \$20 each.
G. E. Pettis, master, Pleman Benzanson, 1st mate, John Leiburgh, Christian Gouley and Chas. Olsen, seamen of schooner "Gypsum Prince" of Windsor, N.S.	Heroic services in rescuing the captain and crew of the American schooner "B. H. Jones."	March 18, 1895	A gold watch and chain to master, a gold medal to mate and each of the three seamen, awarded by the President of the United States.
Captain C. E. Dixon, master of schooner "Osceola" of Windsor, N.S.	Promptness and energy displayed at the collision of the vessel with the steamer "Miramichi" and saving the lives of two passengers on the steamer.	Aug. 14, 1895.	A letter of thanks from the Minister of Marine and Fisheries.
Jas. A. Greenlaw, Eben Greenlaw, Frank Greenlaw, Edward Greenlaw, Harry Parker, Clarence Cline, Lorenzo Lambert, of Deer Island, St. Andrews, N.B.	Rescuing two persons in danger of drowning from the capsizing of their boat in a squall.	Sept. 16, 1895.	A letter of thanks from the Minister of Marine and Fisheries.
Samuel Walters, master, W. S. Stubbs, chief officer, R. Collins, G. Welsh, T. Redmond, G. Maguire, O. Dahlstrom and J. Hayes, seamen of SS. "Sachem" of Liverpool, G.B.	Services in rescue of brigantine "Gertrude" of Halifax, wrecked in a hurricane on a voyage from St. John's, Nfld., to Sydney. C.B.	Oct. 11, 1895.	A binocular glass to master, value £5; a gold watch to chief officer, value £15; £2 stg. to each of the seamen; £8.2.0d. was paid for subsistence expenses of shipwrecked crew on board the rescuing vessel.

Marine and Fisheries—Marine Branch.

REWARDS for Saving Life—*Concluded.*

Names and Designations of Persons.	Nature of Service rendered.	Date of Service Rendered.	Description of Reward.
Christen Cjernlosen, master of the ship "Prudhoe" of Arendal, Germany.	Kindness and humanity shown to the shipwrecked crew of the barque "Flora" of Charlottetown, P. E. I., rescued at sea.	Oct. 27, 1895.	A letter of thanks and commendation to master from the Minister of Marine and Fisheries.
Don Jose Calle, master. Don Domingo Arretequi, first officer, Faustino Totorica, Valentine Eu-Liera, Foze Oyarbude and Vicente Galiano, seamen.	Rescuing after three attempts made at considerable risk of life, the crew of the schooner "Annie G. O'Leary," of Halifax, and kind and humane treatment given to shipwrecked crew.	Nov. 30, 1895.	A binocular glass to master, value £5; a gold watch to 1st officer, value £15, and £10 to each of the four seamen.
George Selig of Vogler's Cove, N.S.	Bravery and humane exertions in the rescue of two persons whose boat had capsized in a squall at Tobias Island on the coast of Lunenburg, N.S.	Dec. 3, 1895.	A binocular glass, value \$12.

Marine and Fisheries—Marine Branch.

APPENDIX No. 15.

COMPARATIVE STATEMENT OF LIGHTHOUSES, &c.

DISTRICT.	Light-stations.	Lights.	Keepers.	Light-ships.	Fog-whistles.	Fog-horns.	Fog-bells.	Fog-guns or bombs.	Whistling-buoys.	Bell-buoys.	Gas-buoys.	Steamers.
	*	*										
Province of Ontario.....	181	229	174	3	2	11	2			5	2	
Light-ships.....	3	3										
Province of Quebec.....	117	154	138	8	2	9		9			10	2
Light-ships.....	8	8			3		1				(4 with bells)	
Province of Nova Scotia.....	170	176	175	1	10	6	2	1	16	13		2
Fog-alarms.....	2	2										
Light-ships.....	1	1										
Province of New Brunswick....	93	119	101	1	4	8		1	4	3		1
Fog-alarms.....	3	3										
Light-ships.....	1	1										
Province of P. E. Island.....	35	55	41			1			3	1		S.S.
Province of British Columbia..	15	19	17		1	5	4			1		"Stanley."
	629	770	646	13	22	40	9	11	23	23	12	2

*Light-ships and fog-alarms where there are no lights are in these two columns included in the total number of light-stations and lights in the Dominion.

60 Victoria.

Sessional Papers (No. 11A.)

A. 1897

TWENTY-NINTH ANNUAL REPORT

OF THE

DEPARTMENT OF MARINE AND FISHERIES

1896

FISHERIES

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

PRINTED BY S. E. DAWSON, PRINTER TO THE QUEEN'S MOST
EXCELLENT MAJESTY

1897

[No. 11a—1897.]

Marine and Fisheries—Fisheries Branch.

To His Excellency the Right Honourable SIR JOHN HAMILTON-CAMPBELL GORDON, EARL
OF ABERDEEN, *Governor General of Canada, etc., etc.*

MAY IT PLEASE YOUR EXCELLENCY :

I have the honour to submit herewith, for the information of Your Excellency and the Legislature of Canada, the Twenty-Ninth Annual Report of the Department of Marine and Fisheries, Fisheries Branch.

I have the honour to be,

Your Excellency's most obedient servant,

LOUIS HENRY DAVIES,

Minister of Marine and Fisheries.

DEPARTMENT OF MARINE AND FISHERIES,

OTTAWA, 31st December, 1896.

Marine and Fisheries—Fisheries Branch.

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REPORT OF THE DEPUTY MINISTER.

To the Honourable

LOUIS H. DAVIES,

Minister of Marine and Fisheries.

SIR,—I have the honour to submit the following report on the transactions of the Fisheries Branch of this department for the fiscal year ending on the 30th of June, 1896.

The usual statements of revenue and expenditure, of Fishing Bounty claims, Fisheries Protection Service, Intelligence Bureau, Behring Sea Question, Oyster Culture, etc., are included in this report. Three reports of a special nature by the Commissioner of Fisheries, treating of "The Life History of the Lobster," "The Eggs of Fishes," and "The Place of the Carp in Fish Culture," together form supplement No. I. and are issued separately. In connection with the reports just mentioned by Professor Prince, a report upon the canning of lobsters, with special reference to "blackening" or "smut," by Professors McPhail and Bruere, of Montreal, will be published as supplement No. II. The last named report embodies the results of an inquiry, authorized by this department, into the causes leading to a deterioration in the quality of canned lobsters. The important bearing of such an investigation as this upon an extensive Canadian industry may be judged from the fact that the annual loss to the trade is estimated at not less than half a million dollars per annum, though by some well-informed packers, it is put as high as \$900,000 per annum. The department's action in sanctioning a scientific investigation into a matter of such vast economic importance has excited widespread interest, and the presentation of the results in this report, is the first opportunity of placing it before those engaged, or in any way interested, in the lobster industry.

The appendices named follow in order :—

- No. 1. Expenditure and Revenue.
- " 2. Fishing Bounties.
- " 3 to 10. Inspectors' reports and Statistics of Fisheries of the different provinces of the Dominion.
- " 11. Fisheries Protection Service and Intelligence Bureau.
- " 12. Fish Culture, followed by Oyster Culture report.
- " 13. Behring Sea Question.
- " 14. Schedule of Fishery Officers in Canada.

EXPENDITURE AND REVENUE.

The total expenditure for the different fisheries services during the fiscal year ending 30th June, 1896, aggregated \$420,805. This comprises Fisheries proper \$96,961. Fish-breeding, \$38,050; Fisheries Protection Service, \$102,021; Fishing Bounty,

\$163,567 and miscellaneous expenditure \$20,203. The details of these different expenses will be found in Appendix 1 of this report.

The total fisheries revenue during the same period from fishery licenses, fines, etc., amounts to nearly \$100,000. (See page 7.)

FISHING BOUNTIES.

The sum of \$163,567 was paid during the year 1895 to the deep-sea fishermen of the maritime provinces. Of this amount \$76,182 were divided amongst 907 vessels manned by 6,250 men, and \$87,385 distributed to 24,558 fishermen using 13,873 boats. All the names of these claimants for the bounty were comprised in the 14,780 claims paid for that year. Since its inception (1892), this department has paid over two million dollars as fishing bounty to encourage the Canadian fishermen in the development of our sea fisheries.

A complete list of all vessels having received fishing bounty will be found in Appendix 2, as well as other information governing the payment of such claims.

GENERAL STATISTICS OF FISHERIES.

EXTENT OF COAST.

The fisheries of Canada are the most extensive in the world, comprising an immense sea-coast line, besides innumerable lakes and rivers. The eastern sea-coast of the maritime provinces from the Bay of Fundy to the Straits of Belle Isle, covers a distance of 5,600 miles and that of British Columbia is given at 7,180 miles, that is more than double that of Great Britain and Ireland.

While the salt water inshore area, not including minor indentations, cover more than 1,500 square miles, the fresh water area of that part of the great lakes belonging to Canada is computed at 72,700 square miles not including the numerous lakes of Manitoba and the Territories, all stocked with excellent species of food fish.

VALUE OF THE FISHERIES.

For the year 1895 the value of the Canadian fisheries is computed at \$20,199,338, being a decrease of over half a million dollars as compared with the previous year. This amount is subdivided by provinces as follows:—

Provinces.	Value.	Increase.	Decrease.
	\$	\$	\$
Nova Scotia.....	6,213,131		334,256
New Brunswick.....	4,403,158	51,629	
British Columbia.....	4,401,354	450,876	
Quebec.....	1,867,920		435,466
Ontario.....	1,584,473		75,494
Prince Edward Island.....	976,836		112,901
Manitoba and North-west Territories.....	752,466		34,621

Marine and Fisheries—Fisheries Branch.

With the exception of British Columbia, showing a surplus of nearly half a million dollars, and New Brunswick, which shows a slight increase, all the other provinces have yielded less than last year. The different inspectors of fisheries severally explain these various fluctuations in their respective reports comprised in Appendices 3 to 10, from which the brief summaries given below, have been compiled.

The above does not include the large quantity of fish consumed by the Indian population of British Columbia and the North-west Territories, estimated at over two million dollars.

KINDS OF FISH.

Between the years 1869 and 1895 the five principal commercial fisheries have yielded as follows :—

Cod	\$102,813,832
Herring	51,463,298
Lobsters.....	46,759,098
Salmon.....	41,738,791
Mackerel.....	36,862,092

The following table shows the relative values of the principal kinds of commercial fishes for 1895, indicating their increase or decrease in comparison with the preceding year.

For the first time in the history of our Canadian fisheries, salmon, an anadromous fish, has supplanted in the graduated table his deep-sea cousin the cod. While the value of the latter has declined by over half a million dollars, the value of the former has increased by about the same amount, thus reversing the difference of a million dollars which existed in 1894 between the two species. Other most important fluctuations are the large increase in herring and sardines and the falling off in mackerel and lobsters.

Kinds of Fish.	Amount.	Increase.	Decrease.
	\$	\$	\$
Salmon.....	3,732,717	505,278	
Cod.....	3,638,519		595,712
Herring.....	2,786,516	220,786	
Lobster.....	2,210,096		160,536
Whitefish.....	767,307		112,343
Mackerel.....	736,655		172,215
Trout.....	702,589		55,558
Smelts.....	451,108	46,225	
Haddock.....	444,703		71,844
Sardines.....	423,492	137,736	
Pickarel.....	303,296	10,030	
Halibut.....	270,901	16,749	
Hake.....	210,856		93,796
Alewives.....	192,432		61,472
Oysters.....	192,292	10,184	
Sturgeon.....	155,176	36,121	
Eels.....	151,436	27,341	
Pollock.....	148,767		73,127
Tom Cod or Frost Fish.....	138,525	47,710	
Pike.....	103,325		
Shad.....	98,181	5,749	

The quantity of fish used as bait is valued at \$352,047 and that of fish oils at \$248,246.

SUMMARIZED EXTRACTS FROM INSPECTORS' REPORTS.

NOVA SCOTIA.

The large deficit noticed in the value of the Nova Scotia fisheries is caused by the diminution of mackerel, lobsters, and especially the cod family.

Inspector A. C. Bertram, of Cape Breton, states that although cod seem as plentiful as ever in the deep sea, they were scarcer on the coast, and unless fishermen exchange their boats for medium sized schooners to enable them to utilise the best grounds, the capture of this valuable fish is bound to diminish. An attempt in that direction has been made in North Sydney. A company has been organized to equip a few vessels suitable to deep sea pursuits. The decline in mackerel is attributed to excessive purse-seining by foreign vessels. Fortunately the good herring catch partly compensated for the deficiency in other branches. Thus Cape Breton summer herring, reputed to be unequalled in size and quality on any other coast of North America, forms not only a staple article of food, but a profitable commercial investment. The lobster packing season began early and proved a remunerative one, showing a surplus of more than a quarter million cans over the previous yield.

Inspector R. Hockin reports a diminution in the general value of the fisheries of *District No. 2* of about $5\frac{1}{2}$ per cent. The prominent features of the fishing season was the abundance of herring of good quality frequenting that coast, and had the prices justified a more vigorous prosecution of this branch of industry, the yield would have been much larger. Mackerel fishing was almost a failure; less than a thousand barrels were captured against 27,000 barrels in 1891. While salmon and alewives have decreased, shad and smelts show improvement. Of the cod family, haddock alone shows an increase. A shortage of about 9 per cent is reported in the lobster pack.

In District No. 3, Inspector L. S. Ford also reports a falling off in the general yield of the fisheries, which is ascribed to scarcity of fish and want of bait at opportune moments. The special attention given to the lobster industry is also detrimental to other branches. The grand bank fishermen generally fare well enough, but boat fishing has not been a success.

NEW BRUNSWICK.

The surplus value noted in the fisheries of the above named province is attributed entirely to *District No. 2*. viz.: the Northumberland Strait Coast, where *Inspector Chapman*, values the catch at over a quarter of a million dollars in excess of the previous one. This betterment is ascribed to smelt fishery, which, notwithstanding the enormous drain of past years, has still yielded one million pounds more than in 1894, and to herring and cod which show fair improvement on this part of the coast. The prices of packed lobsters were high, but the quantity did not quite attain that of the year before.

Inspector Pratt, reports a shortage in the fisheries of Charlotte county, owing to a less vigorous prosecution of this industry and to the low prices of fish throughout the season. Herring and sardine are the staple fish of this district, in fact they form two-thirds of the whole production, and in spite of the enormous quantity taken each year they are still plentiful in the Bay of Fundy and their yield would have been larger had the demand justified a larger production. The strike in the sardine canneries in the

Marine and Fisheries—Fisheries Branch.

midst of the fishing season also contributed to the decline. This officer speaks highly of the Campobello Fish Fair Society, which encourages and stimulates their fishermen by an annual exhibition of fishery products as well as fishing implements. Suitable prizes are awarded to the successful competitors. The annual gatherings of practical men discussing the improved methods to attain the best results, will not only engender a better feeling among them all, but will prove generally beneficial by elevating the standard of boats, implements and commercial fish products. It would be advantageous if this example found imitators elsewhere.

Inspector Miles, of the St. John River District, also reports a slight falling off in these inland fisheries. At times in the spring, the Bay of Fundy is the only place where fresh bait is procurable and then many barrels of alewives are disposed of to Nova Scotia fishermen for that purpose. The pickled and smoke fish are mostly exported to the West Indies and United States.

PRINCE EDWARD ISLAND.

The Inspector for the above named province reports a shortage in the most important branches of their fisheries viz.: Mackerel, cod, herring, lobsters and hake, aggregating over \$100,000. Mackerel were scarce throughout the season. The lobster fishery was as usual prosecuted with vigour and results are considered satisfactory. Herring were abundant on that coast until June, but being of an inferior quality were mostly used for bait. In the first part of the season cod were scarce and of a small size, later on they somewhat improved, but not sufficiently to recover the lost ground. Hake were plentiful but not much sought after. Oysters show a slight improvement over the preceding year. The beds of Queen's county yielded more in proportion than those of Richmond Bay.

QUEBEC.

Officer Wm. Wakeham reports a diminution of 33 per cent in the yield of the Gulf division fisheries. Cod was scarce in the early part of the season and the rough weather in the fall prevented even an average catch of that staple fish.

The decline in salmon is more attributed to the June gales than to the scarcity of fish. Sportsmen generally reported good angling, and the guardians have noticed that the pools were full of breeding fish. Although more exertions were made, the lobster pack of 1895 falls short of the previous one. The season began early and looked promising, but these crustaceans became so scarce that many canneries even closed before the allotted time. Herring were plentiful, especially in the vicinity of the Magdalen Islands.

The inland districts of Quebec have yielded about an average catch.

ONTARIO.

The total yield of the fisheries of this province is very slightly less than the previous one. The falling off noticed in trout and whitefish is compensated by the surplus in herring, pickerel and pike. With the exception of Lake Ontario, which held its own in fishing matters; all the other great lakes seem to have declined from 8 to 12 per cent. Even if the annual production is nearly the same, it now requires much more

gear and implements than formerly to attain even an inferior result. Over two million fathoms of gill-nets and 420 pound-nets were used on the Canadian side of the Great Lakes, employing 83 tugs or vessels and 1,346 boats manned by over three thousand men.

The importance of the fisheries of these inland waters would rather startle a salt water fisherman, naturally inclined to belittle them. For instance, in 1895, over five and a half million pounds of salmon-trout were caught in lakes Superior and Huron and six and a half million pounds of herring and nearly two million pounds of pickerel in lakes Erie and Ontario.

The fisheries of Lake of the Woods have developed so rapidly as to deserve classification with the other great inland seas. In fact its aggregate value almost equals that of Lake Ontario, and is more than half the product of Lake Superior and over a third the value of Lake Erie. The staple fish of Lake of the Woods is sturgeon, which yielded in 1895, 716,000 lbs., besides producing 65,800 lbs. of caviare and bladders. The synopsis of the overseers' reports in this province will be found in appendix No. 7, page 185.

MANITOBA AND N. W. TERRITORIES.

The inspectors of these Western districts state that the fishing operations of 1895 were not very successful. Owing to the depression in the Western States which are their principal market, the prices of fish ruled low. Winter net fishing was also impeded by the unusual manner in which these lakes froze, the formation of the ice being irregular and uncertain. The staple fish of the West is undoubtedly whitefish, of which over ten million lbs. were reported for that year.

BRITISH COLUMBIA.

The fisheries of this province show an increased value of nearly half a million dollars. Exclusive of fur-seals, the aggregate product of British Columbia fisheries exceeds that of any former year. The salmon canning industry was very successful, in fact it was only surpassed by the famous pack of 1893. The value of the salmon yield alone is reckoned at over two million dollars. Forty-eight canneries were in operation in 1895, thirty-one of which were on the Fraser River.

The fur seal skins are valued at \$713,590. The Canadian catch is 23,115 skins less than that of the previous season. The deep sea fisheries on the Pacific coast have been as yet but little developed, yet over two and a half million lbs. of halibut were captured, one fifth of which it is estimated were exported.

Marine and Fisheries—Fisheries Branch.

RECAPITULATION of the Yield and Value of the Fisheries in the Dominion of Canada
for the Year 1895.

Number.	Kinds of Fish.	Quantity.	Value.	Total Value.
			\$	\$
1	Cod, dried.....	Cwt. 806,415	3,630,279	
2	do tongues and sounds.....	Brls. 824	8,240	3,638,519
3	Salmon, preserved, in cans.....	Lbs. 28,858,897	2,886,479	
4	do fresh.....	" 4,872,770	794,964	
5	do pickled.....	Brls. 3,825	42,312	
6	do smoked.....	Lbs. 56,460	8,962	3,732,717
7	Herring, salted.....	Brls. 511,470	2,301,616	
8	do fresh.....	Lbs. 11,556,085	295,705	
9	do smoked.....	" 10,051,613	203,235	2,800,556
10	Mackerel, salted.....	Brls. 35,554	497,756	
11	do fresh.....	Lbs. 2,063,236	238,899	736,655
12	Lobster, preserved, in cans.....	" 12,345,592	1,666,388	
13	do alive or fresh.....	Tons. 7,374	543,708	2,210,096
14	Hake, dried.....	Cwt. 73,424	186,890	
15	do sounds.....	Lbs. 47,931	23,966	210,856
16	Haddock, dried.....	Cwt. 120,758	422,653	
17	do smoked (finnan haddies).....	Lbs. 231,000	22,050	444,703
18	Pollock, dried.....	Cwt. 59,507		148,767
19	Trout.....	Lbs. 6,926,116	692,189	
20	do.....	Brls. 1,040	10,400	702,589
21	Whitefish.....	Lbs. 14,249,399		767,307
22	Smelts.....	" 9,022,157		451,108
23	Halibut.....	" 3,977,350		270,901
24	Shad.....	Brls. 9,639		98,181
25	Eels.....	Lbs. 909,270	54,556	
26	do.....	Brls. 9,984	96,880	151,436
27	Alewives.....	" 48,108		192,432
28	Sardines.....	" 188,089	377,292	
29	do preserved.....	Cans. 924,000	46,200	423,492
30	Bass.....	Lbs. 1,159,870		85,567
31	Pickrel.....	" 7,673,411		303,246
32	Pike.....	" 3,592,975		103,325
33	Maskinongé.....	" 455,535		27,332
34	Sturgeon.....	" 1,749,520		155,176
35	Squid.....	Brls. 15,055		60,220
36	Flounders.....	Lbs. 252,432		12,622
37	Winninich.....	" 100,000		6,000
38	Oysters.....	Brls. 47,673		192,292
39	Clams.....	" 20,022		69,027
40	Perch.....	Lbs. 1,010,580		29,729
41	Tom-cod or frost-fish.....	" 2,910,510		138,525
42	Oulachons.....	" 594,200		30,625
43	Coarse and mixed fish.....	Brls. 80,850		296,789
44	Home consumption not included above.....	" 1,928,230		269,282
45	Fur seal skins (British Columbia).....	No. 71,359		713,590
46	Hair do.....	" 16,469		18,753
47	Sea otter skins.....	" 16		2,000
48	Beluga (white whale) skins.....	" 205		820
49	Fish oils.....	Galls. 620,613		248,246
50	do used as bait.....	Brls. 234,696		352,047
51	do do manure.....	" 105,209		52,605
52	do guano.....	Tons. 3,615		51,155
	Total for 1895.....			20,199,338
	do 1894.....			20,719,573
	Decrease.....			520,235

STATEMENT of the Production of each Branch of the Fisheries

Number.	Kinds of Fish.	NOVA SCOTIA.		NEW BRUNSWICK.		BRITISH
		Quantity.	Value.	Quantity.	Value.	Quantity.
			\$		\$	
1	Cod, dried..... Cwt.	512,292	2,305,315	93,183	419,324	2,820
2	do tongues and sounds..... Brls.	503	5,030	100	1,000	
3	Salmon, preserved in cans..... Lbs.	3,296	495	8,000	1,200	28,847,101
4	do fresh..... "	420,436	84,087	2,064,395	412,979	1,795,892
5	do pickled..... Brls.	227	3,632	10	160	3,148
6	do smoked..... Lbs.	4,860	972	5,000	1,000	46,600
7	Herring, salted..... Brls.	206,164	927,738	211,654	952,443	
8	do fresh..... Lbs.	1,014,855	10,445	3,055,520	61,110	249,500
9	do smoked..... "	1,139,483	22,790	8,776,000	175,520	27,530
10	Mackerel, salted..... Brls.	19,152	268,128	2,000	28,000	
11	do fresh..... Lbs.	1,399,180	158,612	631,500	75,780	
12	Lobster, preserved in cans..... "	5,712,684	799,775	2,530,700	354,298	
13	do alive or fresh..... Tons	5,944	436,420	1,425	106,875	
14	Hake, dried..... Cwt.	50,824	127,060	15,940	39,850	
15	do sounds..... Lbs.	18,237	9,119	14,282	7,141	
16	Haddock, dried..... Cwt.	96,088	336,308	22,432	78,512	
17	do smoked (Finnan Haddie)..... Lbs.	21,000	1,050	210,000	21,000	
18	Pollock, dried..... Cwt.	43,498	108,745	16,009	45,022	
19	Trout..... Lbs.	151,682	15,169	179,250	17,925	56,350
20	do..... Brls.					
21	Whitefish..... Lbs.					
22	Smelts..... "	473,035	23,652	7,641,300	382,065	58,000
23	Halibut..... "	1,066,245	106,625	244,060	24,406	2,536,700
24	Shad..... Brls.	2,096	20,960	6,640	66,400	
25	Eels..... Lbs.					
26	do..... "	3,569	35,690	5,544	55,440	
27	Alewives..... "	16,478	65,912	30,928	123,712	
28	Sardines..... "			185,025	368,100	
29	do preserved..... Cans			924,000	46,200	
30	Bass..... Lbs.	8,170	817	391,200	39,120	
31	Pickarel..... "			68,045	3,402	
32	Pike..... "					
33	Maskinonge..... "					
34	Sturgeon..... "					375,000
35	Squid..... Brls.	12,568	50,272	1,028	4,112	
36	Flounders..... Lbs.	130,375	6,519	114,557	5,728	
37	Winninish..... "	2,540	10,160	18,070	72,280	1,600
38	Oysters..... Brls.	4,195	28,704	14,301	24,776	
39	Clams..... "					
40	Perch..... Lbs.					
41	Tom Cod or frost-fish..... "	80,510	4,025	2,583,550	129,178	
42	Oulachons..... "					594,200
43	Coarse and mixed fish..... Brls.	6,123	15,816	26,675	58,901	
44	Home consumption not included above.....					
45	Fur, seal skins, B.C..... No.					71,359
46	Hair do..... "	1,350	1,678	25	37	3,650
47	Sea otter skins..... "					16
48	Beluga (white whale) skins..... "					
49	Fish oils..... Galls.	236,399	94,560	78,389	31,356	135,000
50	Fish used as bait..... Brls.	71,379	107,071	83,112	124,668	
51	do manure..... "	23,400	11,700	53,025	26,513	
52	Fish guano..... Tons	721	8,080	909	22,725	50
	Totals.....		6,213,131		4,403,158	

Marine and Fisheries—Fisheries Branch.

in the different Provinces of Canada for the Year 1895.

COLUMBIA		QUEBEC.		ONTARIO.		PRINCE EDWARD ISLAND.		MANITOBA AND N. W. TERRITORIES.		Number.
Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.		
\$		\$		\$		\$		\$		
14,100	180,894	814,023				17,226	77,517			1
	218	2,180				3	30			2
2,884,710						500	75			3
179,589	581,197	116,239				10,850	2,170			4
31,480	440	7,040								5
6,990										6
	48,693	219,119	3,812	17,154	41,147	185,162				7
7,485	2,000	20	7,215,160	216,455	19,050	190				8
2,753	108,600	2,172								9
	7,653	107,142			6,749	94,486				10
					37,556	4,507				11
	1,003,492	140,349			3,099,716	371,966				12
	4	338			1	75				13
					6,690	19,980				14
					15,412	7,706				15
	1,088	3,808			1,150	4,025				16
										17
										18
5,635	523,000	52,300	5,958,284	595,828	49,100	4,910	8,450	422		19
			1,040	10,400						20
	180,495	14,439	3,141,430	249,665			10,927,469	503,203		21
	282,002	14,100			567,820	28,391				22
2,900	122,645	12,265			7,700	770				23
126,835	895	10,741			8	80				24
	778,270	46,696	131,000	7,860						25
	131	1,310			740	4,440				26
					702	2,808				27
	3,064	9,192								28
										29
	95,280	5,717	665,220	39,913						30
	279,766	13,988	3,299,410	164,970			4,031,190	120,936		31
	229,330	11,467	1,229,250	49,170			2,134,395	42,688		32
	101,720	6,103	353,815	21,229						33
18,750	337,690	20,261	800,590	108,035			236,240	8,130		34
	1,451	5,804			8	32				35
8,000	100,000	6,000			7,500	375				36
9,080	944	4,720			25,463	101,852				37
					582	1,746				38
	191,370	5,741	789,760	23,693			29,450	295		39
	240,400	5,020			6,050	302				40
30,625										41
49,095	11,682	35,366	15,015	80,101			22,162	57,510		42
250,000							1,928,230	19,282		43
713,590										44
2,737	11,429	14,286			15	15				45
2,000										46
	205	820								47
54,000	160,465	64,186			10,360	4,144				48
	53,725	30,588			26,480	39,720				49
	28,759	14,380			25	12				50
1,000					1,935	19,350				51
										52
4,401,354		1,867,920		1,584,473		976,836		752,466		

RECAPITULATION

Showing the Total Value of the Fisheries in the respective Provinces of Canada, from 1870 to 1895, inclusive, as compiled from the Annual Reports of the Department of Fisheries.

Years.	Nova Scotia.	New Brunswick.	Prince Edward Island.	Quebec.	Ontario.	British Columbia.	Manitoba and North-west Territories.	Total for Canada.
1870	\$ 4,019,425	\$ 1,131,433	No data	\$ 1,161,551	\$ 264,982	No data	No data	\$ 6,577,391
1871	5,101,030	1,185,033	do	1,093,612	133,524	do	do	7,573,199
1872	6,016,835	1,945,459	do	1,320,189	267,633	do	do	9,570,116
1873	6,577,087	2,285,662	207,595	1,391,564	293,091	do	do	10,754,997
1874	6,652,302	2,685,794	288,863	1,608,660	446,267	do	do	11,681,886
1875	3,573,861	2,427,654	288,927	1,198,759	453,194	do	do	10,350,385
1876	6,029,050	1,953,389	494,967	2,097,668	437,229	do	do	11,117,000
1877	5,527,858	2,133,237	763,036	2,560,147	438,223	104,697	do	12,006,934
1878	6,131,600	2,305,790	840,344	2,664,055	348,122	383,433	do	13,293,678
1879	5,752,937	2,554,722	1,402,301	2,820,395	367,133	925,767	do	13,520,254
1880	6,291,061	2,744,477	1,675,089	2,631,556	444,491	631,766	do	14,499,979
1881	6,214,782	2,930,904	1,955,290	2,751,962	503,963	713,335	do	15,817,162
1882	7,131,418	3,192,339	1,855,687	1,976,516	825,437	1,842,675	do	16,824,082
1883	7,689,374	3,185,674	1,272,468	2,138,997	1,027,033	1,644,646	do	16,958,192
1884	8,763,779	3,730,454	1,085,619	1,694,561	1,133,724	1,358,207	do	17,766,404
1885	8,283,322	4,065,431	1,293,430	1,719,460	1,342,692	1,078,038	do	17,722,973
1886	8,415,362	4,180,227	1,741,991	1,741,382	1,435,998	1,577,348	186,980	18,679,288
1887	8,379,782	3,559,507	1,037,426	1,773,567	1,531,850	1,974,887	129,084	18,386,103
1888	2,941,863	2,941,863	876,862	1,860,912	1,839,869	1,902,195	180,677	17,418,510
1889	6,346,722	3,087,030	866,430	1,876,194	1,963,123	3,348,067	167,679	17,655,256
1890	6,636,444	2,699,055	1,041,109	1,613,119	2,019,637	3,481,432	232,104	17,714,962
1891	7,011,300	3,571,050	1,238,733	2,008,678	1,806,389	3,008,755	332,969	18,977,878
1892	6,340,744	3,203,922	1,179,836	2,236,732	2,042,198	2,849,483	1,088,254	18,941,171
1893	6,407,279	3,746,121	1,133,368	2,218,905	1,694,930	4,443,963	1,042,093	20,686,661
1894	6,547,387	4,351,526	8,119,738	2,303,386	1,650,968	3,950,478	787,087	21,719,573
1895	6,213,131	4,463,158	976,836	1,867,920	1,584,473	4,401,354	752,466	20,199,338
Totals	171,871,472	76,140,890	24,065,965	50,729,547	26,361,133	41,274,997	4,899,303	395,339,230

Marine and Fisheries—Fisheries Branch.

RECAPITULATION

Showing the Number and Value of Fishing Vessels, Boats, Nets and other Fishing Material, as well as the Number of Fishermen in Canada, 1895.

PROVINCES.	FISHERMEN IN		VESSELS.		BOATS.		GILL-NETS AND SEINES.		Value of Pound-nets, Trap-nets, Weirs, &c.	Value of Lobster Plant.	Approximate Value of Freezers, Ice and Smokehouses and other Fixtures not Itemized.	TOTAL VALUE.
	Vessels.	Boats.	Number.	Tonnage.	Value.	Number.	Value.	Fathoms.				
Nova Scotia.....	5,879	19,736	595	25,678	1,205,280	14,986	324,113	2,337,255	208,635	493,520	369,131	3,139,968
New Brunswick.....	968	9,421	274	3,844	123,635	5,393	205,534	568,350	264,295	304,007	419,672	1,710,347
N. Prince Edward Island..	147	3,611	25	771	14,050	1,522	57,080	85,783	10,636	321,838	39,555	479,639
Quebec.....	301	11,942	54	1,771	40,075	7,182	185,993	301,865	91,506	102,323	228,099	804,703
Ontario.....	417	2,842	*83	1,775	237,800	1,346	96,865	2,046,473	133,865	.....	106,160	831,506
British Columbia.....	†2,007	12,478	180	2,700	606,610	2,817	127,750	380,110	.....	.....	1,054,375	2,085,435
Manitoba and N.-W. Ter.	85	1,500	10	1,290	90,840	1,022	17,222	322,500	.....	.....	60,634	202,251
	9,804	61,530										
Totals.....	.....	71,334	1,221	37,829	2,318,290	34,268	1,014,057	6,042,336	708,937	1,221,748	2,277,626	9,253,848

* Mostly all tugs. † Including sealing fleet and crews.

CAPITAL AND MEN ENGAGED IN THE FISHERIES OF CANADA.

The previous detailed table shows that last year no less than 71,334 men were engaged in our fishing industry, using nets and other fishing implements aggregating a capital of about *nine and a quarter million dollars*. Over 1,200 schooners and steam tugs valued at \$2,318,300, manned by 9,800 sailors found employment in this industry besides the 61,500 fishermen using 34,268 boats valued at over one million dollars. Over six million fathoms of nets were fished last year.

The lobster plant alone for that year was valued at \$1,220,000. This embraced 636 canneries fishing at least 1,000,000 traps. This branch of industry alone gave employment to about 12,000 hands.

COMPARATIVE TABLE showing Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries of Canada, together with the Value of Fishing Materials employed, from 1879 to 1895.

YEARS.	VESSELS.			BOATS.		Value of Nets and Seines.	Value of other Fishing Material.	Total of Capital Invested.
	No.	Tonnage.	Value.	No.	Value.			
1879.....	1,183	43,873	1,714,917	25,616	854,289	988,698	456,617	4,014,521
1880.....	1,181	45,323	1,814,688	25,266	716,352	985,978	419,564	3,936,582
1881.....	1,120	48,389	1,765,870	26,108	696,710	970,617	679,852	4,113,049
1882.....	1,140	42,845	1,749,717	26,477	833,137	1,351,193	823,938	4,757,985
1883.....	1,198	48,106	2,023,045	25,825	783,186	1,243,366	1,070,930	5,120,527
1884.....	1,182	42,747	1,866,711	24,287	741,727	1,191,579	1,224,646	5,014,663
1885.....	1,177	48,728	2,021,633	28,472	852,257	1,219,284	2,604,285	6,697,459
1886.....	1,133	44,605	1,890,411	28,187	850,545	1,263,152	2,720,187	6,814,295
1887.....	1,168	44,845	1,989,840	28,092	875,316	1,499,328	2,384,356	6,748,840
1888.....	1,137	33,247	2,017,558	27,384	859,953	1,594,992	2,390,502	6,863,005
1889.....	1,100	44,936	2,064,918	29,555	965,010	1,591,085	2,149,128	6,770,151
1890.....	1,069	43,084	2,152,790	29,803	924,346	1,695,358	2,600,147	7,372,641
1891.....	1,027	39,377	2,125,355	30,438	1,007,815	1,644,892	2,598,124	7,376,186
1892.....	988	37,205	2,112,875	30,513	1,041,972	1,475,043	3,017,945	7,647,835
1893.....	1,104	40,096	2,246,373	31,508	955,109	1,637,707	3,174,404	8,681,557
1894.....	1,178	41,768	2,409,029	34,102	1,009,189	1,921,352	4,099,546	9,439,116
1895.....	1,221	37,829	2,318,290	34,268	1,014,057	1,713,190	4,208,311	9,253,848

Marine and Fisheries—Fisheries Branch.

COMPARATIVE TABLE showing the number of men employed in the Fishing Industry since 1879.

Years.	Number of Men in Vessels.	Number of Men in boats.	Total number of Fishermen.
1879.....	8,818	52,577	61,395
1880.....	8,757	51,900	60,657
1881.....	8,359	50,679	59,056
1882.....	8,498	52,785	61,283
1883.....	9,966	52,259	62,225
1884.....	9,968	51,854	61,822
1885.....	9,539	53,282	62,821
1886.....	8,927	53,073	62,000
1887.....	8,911	55,247	64,158
1888.....	9,574	53,109	62,683
1889.....	9,621	55,382	65,003
1890.....	8,726	55,000	63,726
1891.....	8,666	56,909	65,575
1892.....	8,330	55,348	63,678
1893.....	8,899	58,854	67,753
1894.....	9,525	61,194	70,719
1895.....	9,804	61,530	71,334

INTERNATIONAL FISHERIES COMMISSION.

The report of the joint commission relative to the preservation of the fisheries in waters contiguous to the United States and Canada, which was provided for by a joint agreement between Great Britain and the United States, dated 6th December, 1892, has been completed, having been signed at Washington by the two commissioners on the 31st day of December, 1896.

The first meeting of the commission was held at Washington on the 2nd of March, 1893, at which an understanding was reached respecting the scope and conduct of the inquiries necessary to be made. Owing, however, to the extent of the waters requiring examination, it was found impossible to complete the work within the limit of time originally specified, an extension of the same was accordingly arranged by exchange of notes between the two governments to the 31st December, 1896.

The following fisheries were held to be covered by the terms of the agreement, namely:—The mackerel fisheries of the Atlantic sea coast and the Gulf of St. Lawrence.

and the fisheries in general in the boundary and contiguous waters as follows:— Passamaquoddy Bay and adjacent waters, and the St. John and St. Croix Rivers, situated between the province of New Brunswick and the state of Maine; Lake Memphremagog, between the province of Quebec and the state of Vermont; Lake Champlain, between the province of Quebec and the states of Vermont and New York; the upper part of the St. Lawrence and the chain of great lakes, between the province of Ontario and the border states from New York to Minnesota, inclusive; Rainy Lake and River and Lake of the Woods, between the province of Ontario and Manitoba and the state of Minnesota; Columbia River, which crosses the international boundary line from British Columbia into the state of Washington; the Fraser River, Gulf of Georgia, Puget Sound and Strait of Juan de Fuca, contiguous to British Columbia and the state of Washington. All the waters above named, except Rainy Lake and the Columbia River, were visited by the two representatives conjointly, they carried on such investigations and inquiries respecting the fisheries and the fishery resources of each of them as the time and means at their disposal permitted. In the case of the mackerel fishery, it was found impossible to give, within the time specified, proper consideration and the commissioners were unable to incorporate the subject in their report.

The report which deals exhaustively with the history and conditions of the various fisheries in the waters above enumerated, and the conclusions and regulations vouched and recommended, will be published in a separate volume.

FISHERIES PROTECTION SERVICE.

A complete report by Commander O. G. V. Spain on the operations of the Fisheries Protection Service forms Appendix 11 of this volume. It is pleasing to note that this service has again been carried on without accident and in a very satisfactory manner.

The fleet of cruisers was about the same as the year before and consisted of the following steamers the "Acadia," "La Canadienne," "Stanley," "Curlew," "Constance," "Petrel," "Dolphin" and the schooners "Vigilant," "Kingfisher" and "Osprey." The steamer "Aberdeen" was also employed for a few weeks in this service. The "Petrel" and "Dolphin" cruised on the great lakes of Ontario and all the others on the Atlantic coast. A brief report from Captain Walbran of the "Quadra" on the British Columbia coast will be found on page 247 of this report, all the above named cruisers are now the property of the Federal government. Certain extracts from some of the officers' reports are also published in the above named appendix.

A glance at the long lists of United States vessels boarded by our cruisers or calling at our ports, will be more than sufficient to demonstrate their importance. The number of United States fishing vessels having taken the *modus vivendi* licenses last season was nearly double that of the previous season and the largest since 1892.

Only one seizure of a foreign vessel fishing within the 3-mile limit was reported during the season of 1896. The case is still before the Supreme Court of Canada.

Towards the end of the season Commander Spain gave special attention to the enforcement of the lobster regulations and did very effective work, especially in the Northumberland Straits where a great many illegal traps &c., were seized and destroyed.

The total expenditure for this service during the last fiscal year amounts to \$102,021.

Marine and Fisheries—Fisheries Branch.

FISHERIES INTELLIGENCE BUREAU.

The work of this bureau, also under the charge of the Commander of the Fisheries Protection Service, is fully reported on by Mr. W. M. Hutchins of Halifax, who receives and circulates the daily reports from 55 stations dispersed on the coasts of the maritime provinces.

These reports of the movement of the fish are published in Annex D of Appendix 11.

FISH CULTURE.

The fish-breeding report for the year 1896, by Professor Prince forms Appendix No. 12 of this publication. There are now fifteen government hatcheries in the Dominion, but the Prince Edward Island establishment was not in operation.

Over 200,000,000 fry were hatched and distributed from these hatcheries in 1896, half of which were young lobsters (*Homarus*).

During the summer a successful shipment of live lobsters, oysters and bass was made to the British Columbia waters. This transplanting of shellfish and crustacean from one ocean to another, in satisfactory condition, is a matter of considerable importance, from which beneficial results may be reasonably anticipated.

The total expenditure for this branch of the service during the last fiscal year amounted to \$38,000, being \$1,700 less than in 1895.

OYSTER CULTURE.

A full report on the last season's work of the culture of oysters, by the oyster expert E. Kemp, follows fish-breeding, page 315.

The operations began at Tracadie, N.S., where the areas were completely cleared and the parent oysters planted. The Shediac reserved areas were then examined and found satisfactory. Mr. Kemp afterwards devoted his time in examining the waters of Prince Edward Island for the purpose of ascertaining the most suitable areas for planting and cultivating purposes. The waters of Yarmouth county, N.S., were also inspected for a similar purpose.

BEHRING SEA QUESTION.

This year has been marked by the meeting of the Behring Sea Claims Commission at Victoria, British Columbia, for the purpose of taking evidence preparatory to the assessment of the long pending claims to compensation arising out of the original seizures by the United States Government, which raised the question in 1886 and in subsequent years, prior to the Paris award.

The question generally is treated in an article by Mr. R. N. Venning, which forms appendix 13 to this report, embracing the convention as finally ratified for a settlement of the claims; the Canadian and United States' legislation under which the machinery of the Commission was provided; the personnel of the Commission; the Counsel for both sides and a specimen of the respective pleadings.

The article likewise deals with the various phases of the question arising within the year 1896, including the season's catch with full statistics of the localities in which seals were captured and the daily catches, distinguishing sexes; proposals for changes in the regulations; requests for supplementary arrangements to enforce the present regulations; scientific and expert enquiry into seal life and other features of interest incidental to the question.

CONCLUSION.

Fishing Season of 1896.

To secure the publication of our annual report during the session of Parliament it has been deemed advisable not to wait for the compilation of the fishery statistics of the current year.

Statistics of this kind being of a very varied and complicated nature are as rule difficult to put in final form promptly, and in some countries are several seasons behind time. From the cause just referred to, the present report for the year 1896 contains the catch of fish of 1895, but before it leaves the printer's hands, certain indications of the success or failure of the last season's operations might be deducted from our different officers' reports recently received.

In *Nova Scotia*, an average catch is expected, the falling off in one species will be compensated by the improvement in another. Off the Cape Breton coast, mackerel fishing was again a failure, ascribed to the excessive purse-seining of the spawning fish. The large fat summer herring was scarce. Although more canneries were in operation, still the lobster pack will be inferior to that of 1895. On the Northumberland Strait the yield will also be less than the previous one. Lobster will show the smallest pack for years, but fortunately prices were high. In the western part, the bank fishermen were more successful than the coast fishermen.

In all parts of *New Brunswick*, an increased yield of the fisheries is anticipated. This surplus will be specially noticed in salmon, smelts, herring, cod and even mackerel, which seemed scarce on other parts of the coast. The falling off in the lobster pack will be made up by the remunerative prices realized. The strikes in the sardine industry of Maine somewhat decreased our productions as over 75 per cent of their supply comes from the Canadian waters.

In the *Gulf of St. Lawrence, Quebec*, the yield of fish will be but slightly below the average, unfortunately the actual gain to the fishermen will be much inferior, as prices of fish were very low, many are still holding their dry cod as there was so little demand for it. A heavy gale in October last destroyed 48 fishing boats at Percé. The salmon capture will be the best for years, especially on the south shore. Lobsters are declining and it requires a larger output of plant to keep up the supply. Owing to the failure of the fisheries on some parts of the North Shore, several families would be destitute for the winter and perhaps compelled to seek employment elsewhere; fortunately Mr. Menier, the present proprietor of Anticosti, could employ as many as were willing to go.

Marine and Fisheries—Fisheries Branch.

In *Manitoba Lakes*, commercial fishing will show improvement over the previous year. The new method of shipping whitefish in broken ice without freezing them took rapid strides during the past summer, over one million lbs. being thus distributed from St. Paul to Montreal in refrigerator cars or steamers. Sturgeon is becoming scarce as the demand for it rapidly increases not only for its flesh, but for the caviare manufactured from its roe.

In the *North-west Territories* the quantity of fish taken will be equal to that of previous years. The fishery regulations are reported well observed, not only by the White men but by the Halfbreeds and Indians who now begin to realize that these enactments are adopted in their interests.

The *British Columbia* fishery operations were very successful, especially the salmon canning industry which exceeded the best previous record by nearly 700,000 cans. Of the fifty-five canneries in operation in 1896, thirty-four were in the Fraser River, nineteen on the Northern Rivers and two on Vancouver Island. The halibut and sturgeon fisheries are being steadily developed on the Western Coast, nearly two million lbs. of the former being exported during the season. Notwithstanding that the fur seal catch was 15,000 skins short of the previous year, the prices for them were somewhat lower.

Apart from the administration and control of the fisheries of the Dominion, the Department has never failed to grapple, as far as possible, with the perplexing fishery problems continually arising, and the solution of which is of widespread importance to the country in general.

I have the honour to be, sir,

Your obedient servant,

F. GOURDEAU,
Deputy Minister of Marine and Fisheries.

Marine and Fisheries—Fisheries Branch.

APPENDIX No. I.

EXPENDITURE AND REVENUE.

The total expenditure for all Fisheries Services, except Civil Government, for the fiscal year ending 30th June, 1896, amounted to \$420,805.09, being within the appropriation by over \$5,000.

The total fisheries revenue, during the same period from rents, license fees, fines and sales, including the *modus vivendi* licenses to United States vessels amounted to \$91,549.76. This also comprises the fines imposed on the foreign schooners "J. L. Nicholson" and "Grace L. Fears," as well as the sale of the condemned tugs "Telephone" and "Grace."

Service.	Expenditure	Vote.
	\$ cts.	\$ cts.
Fisheries.....	96,961 72	97,400 00
Fish-breeding.....	38,050 41	40,000 00
Fisheries protection service.....	102,021 72	102,393 31
Fishing bounty.....	163,567 99	160,000 00
Miscellaneous expenditure.....	20,203 25	26,709 05
Total.....	420,805 09	426,502 36

The details will be found in the Auditor General's report under the proper headings.

In addition to the above, the following summary shows the salaries and disbursements of fishery officers in the several provinces, together with the expenses for maintenance of the different fish-breeding establishments throughout the Dominion :—

Service.	Expenditure	Vote.
	\$ cts.	\$ cts.
Fisheries, Ontario.....	24,917 48	22,000 00
do Quebec.....	11,870 43	13,000 00
do New Brunswick.....	20,526 56	20,000 00
do Nova Scotia.....	23,049 41	20,000 00
do Prince Edward Island.....	3,555 87	3,500 00
do Manitoba.....	3,952 18	2,500 00
do North-west Territories.....	2,963 02	3,500 00
do British Columbia.....	6,226 77	7,900 00
Total.....	96,961 72	92,400 00
Sup. vote.....		5,000 00

SALARIES and Disbursements of Fisheries Officers—*Concluded.*

Service.	Expenditure	Vote.
	\$ cts.	\$ cts.
Fish-breeding, Ottawa hatchery.	1,097 31	
do Newcastle do	3,747 03	
do Sandwich do	4,624 03	
do Tadoussac do	2,711 13	
do Gaspé do	1,993 21	
do Magog do	855 06	
do Restigouche do	2,701 10	
do Bedford do	1,223 58	
do Bay View do	3,225 95	
do Sydney do	560 86	
do Miramichi do	1,860 00	
do St. John Riv. do	4,691 62	
do Fraser Riv. do	2,817 02	
do Selkirk do	2,865 69	
General account.	3,075 83	
Total	38,050 41	40,000 00

This expenditure by provinces is subdivided as follows :—

EXPENDITURE.

Ontario.	\$ cts.	\$ cts.
Salaries of officers.	16,279 03	
Disbursements of officers.	7,430 82	
Miscellaneous.	1,207 63	
Total		24,917 48
<i>Quebec.</i>		
Salaries of officers.	7,797 52	
Disbursements of officers.	3,980 12	
Miscellaneous.	92 79	
Total		11,870 43
<i>New Brunswick.</i>		
Salaries of officers.	13,131 21	
Disbursements of officers.	6,387 63	
Miscellaneous.	1,007 72	
Total		20,526 56
<i>Nova Scotia.</i>		
Salaries of officers.	15,339 20	
Disbursements of officers.	7,643 52	
Miscellaneous.	66 59	
Total		23,049 41
<i>Prince Edward Island.</i>		
Salaries of officers.	2,787 81	
Disbursements of officers.	740 03	
Miscellaneous.	27 93	
Total		3,555 87

Marine and Fisheries—Fisheries Branch.

EXPENDITURE—*Concluded.*

	\$ cts.	\$ cts.
<i>Manitoba.</i>		
Salaries of officers.....	1,836 50	
Disbursements of officers.....	433 49	
Miscellaneous.....	1,582 19	
Total		3,852 18
<i>North-west Territories.</i>		
Salaries of officers.....	1,690 29	
Disbursements of officers.....	1,264 31	
Miscellaneous.....	8 42	
Total		2,963 02
<i>British Columbia.</i>		
Salaries of officers.....	4,149 63	
Disbursements of officers.....	1,093 25	
Miscellaneous.....	983 89	
Total		6,226 77
Grand total.....		96,961 72

FISH-BREEDING.

<i>Newcastle Hatchery.</i>		
Salaries.....	1,000 00	
Miscellaneous expenditure.....	2,747 03	
Total.....		3,747 03
<i>Sandwich Hatchery.</i>		
Salaries.....	900 00	
Miscellaneous expenditure.....	3,724 03	
Total.....		4,624 03
<i>Ottawa Hatchery.</i>		
Salaries.....	641 63	
Miscellaneous expenditure.....	455 69	
Total.....		1,097 32
<i>Tadoussac Hatchery.</i>		
Salaries.....	650 00	
Miscellaneous expenditure.....	2,061 13	
Total.....		2,711 13
<i>Gaspé Hatchery.</i>		
Salaries.....	470 53	
Miscellaneous expenditure.....	1,522 68	
Total.....		1,993 21

FISH-BREEDING—Continued.

	\$ cts.	\$ cts.
<i>Magog Hatchery.</i>		
Salaries	575 00	
Miscellaneous expenditure.	280 06	
Total.....		855 06
<i>Restigouche Hatchery.</i>		
Salaries	700 00	
Miscellaneous expenditure.....	2,001 10	
Total.....		2,701 10
<i>Bedford Hatchery.</i>		
Salaries.....	450 00	
Miscellaneous expenditure.	773 58	
Total.....		1,223 58
<i>Bayview Hatchery.</i>		
Salaries.....	500 00	
Miscellaneous expenditure.....	2,725 95	
Total.....		3,225 95
<i>Sydney Hatchery.</i>		
Salaries.....	360 00	
Miscellaneous expenditure.....	200 86	
Total.....		560 86
<i>Miramichi Hatchery.</i>		
Salaries.....	812 53	
Miscellaneous expenditure.....	1,048 46	
Total.....		1,860 99
<i>St. John River Hatchery.</i>		
Salaries.....	600 00	
Miscellaneous expenditure.....	4,091 62	
Total.....		4,691 62
<i>Selkirk Hatchery.</i>		
Miscellaneous expenditure.....		2,865 69
<i>Fraser River Hatchery.</i>		
Salaries.....	130 00	
Miscellaneous expenditure.....	2,687 02	
Total.....		2,817 02
<i>General Account.</i>		
Miscellaneous expenditure.....		3,075 83
Total, Fish-breeding		38,050 41
Total salaries and disbursements of fishery officers.....		69,961 72

Marine and Fisheries—Fisheries Branch.

MISCELLANEOUS.

MISCELLANEOUS.	\$ cts.	\$ cts.
Building fish-ways	1,722 40	
Legal and incidental expenses.....	4,982 24	
Canadian fisheries exhibits and Ottawa hatchery.....	149 14	
Expenditure in connection with the distribution of fishing bounties	4,951 05	
Surveys of oyster beds.....	5,143 68	
Behring Sea (A. L. Belyea).....	577 40	
International Fisheries Commission	1,945 69	
Issuing licenses to United States fishing vessels.....	278 55	
W. B. Deacon.....	93 15	
S. Wilmot.....	45 55	
E. Hackett.....	214 40	
Total.....		20,103 25
Grand total		155,115 38

FISHERIES PROTECTION SERVICE—1895-96.

<i>Steamer "Acadia."</i>		
Wages of officers and men	8,183 42	
Provisions	2,621 13	
Fuel	2,134 20	
Repairs.....	1,123 38	
Miscellaneous expenditure.....	5,919 38	
Total.....		19,986 51
<i>Steamer "La Canadienne."</i>		
Wages of officers and men	8,533 59	
Provisions	2,614 23	
Fuel	1,623 56	
Repairs.....	2,715 89	
Miscellaneous expenditure	5,174 51	
Total		20,661 78
<i>Steamer "Stanley."</i>		
Wages of officers and men	3,552 21	
Provisions	1,293 18	
Fuel.....	817 87	
Miscellaneous expenditure	1,194 40	
Total		6,873 65
<i>Steamer "Curlew."</i>		
Wages of officers and men.....	5,875 42	
Provisions	1,793 03	
Fuel	1,610 07	
Repairs	471 52	
Miscellaneous expenditure.....	2,259 39	
Total		12,009 43
<i>Steamer "Petrel."</i>		
Wages of officers and men	5,669 89	
Provisions	2,139 70	
Fuel	1,477 52	
Miscellaneous expenditure	2,409 13	
Total.....		12,696 24

FISHERIES PROTECTION SERVICE, &c.—*Concluded.*

	\$	cts.	\$	cts.
<i>Steamer "Constance."</i>				
Wages of officers and men	6,284	72		
Provisions	2,048	12		
Fuel	7,055	12		
Repairs	393	29		
Miscellaneous expenditure	3,271	30		
Total			19,051	55
<i>Schooner "Vigilant."</i>				
Wages of officers and men	3,629	66		
Provisions	1,189	85		
Fuel	33	30		
Repairs	24	80		
Miscellaneous expenditure	1,095	38		
Total			5,972	99
<i>Schooner "Kingfisher."</i>				
Wages of officers and men	4,685	92		
Provisions	1,984	97		
Fuel	70	24		
Repairs	382	03		
Miscellaneous expenditure	1,345	74		
Total			8,468	90
<i>Steamer "Dolphin."</i>				
Wages of officers and men	1,934	75		
Provisions	779	25		
Fuel	414	22		
Repairs	414	08		
Miscellaneous	1,057	40		
Total			4,599	70
<i>Steamer "Aberdeen."</i>				
Wages, &c., officers and men			1,042	09
Fisheries Intelligence Bureau			3,053	63
General account, Fisheries Protection Service—				
Wages, &c.	4,433	75		
Miscellaneous	3,694	77		
Total			8,128	52
Total			122,544	99
Less—Amount paid for steamer "Constance" by Customs Department			20,523	27
Net total			102,021	72

Marine and Fisheries—Fisheries Branch.

STATEMENT of Fisheries Revenue paid to the credit of the Receiver General of Canada,
for the Fiscal Year ended 30th June, 1896.

	\$	cts.
Ontario, rents, license fees, fines, &c	35,681	68
Quebec do do	8,160	98
Nova Scotia do do	6,180	93
New Brunswick, rents, license fees, fines, &c	10,696	88
P. E. Island do do	2,161	85
Manitoba do do	1,670	19
N. W. Territories do do	586	50
British Columbia do do	26,410	75
Less—Refunds	91,549	76
	2,727	10
Licenses to U. S. fishing vessels	88,822	66
	7,351	50
Total	96,174	16

COMPARATIVE Statement of Expenditure and Revenue of the

	1885-86.		1886-87.	
	Expendi- ture.	Revenue.	Expendi- ture.	Revenue.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Ontario	17,900 74	15,917 62	19,534 01	15,063 57
Quebec	13,938 21	2,963 75	14,966 55	3,804 66
New Brunswick	15,719 36	4,078 10	16,944 87	4,417 52
Nova Scotia	17,852 33	2,166 53	18,092 21	1,585 28
Prince Edward Island	3,187 73	40 00	4,044 49	128 00
Manitoba and North-west Territories	1,920 73		2,468 25	5 00
British Columbia	1,878 53	922 50	5,860 72	943 50
Fish-breeding and fish-ways	44,038 80		37,864 22	
Fisheries Protection Service	37,613 30		134,340 12	
Miscellaneous	10,350 43		11,327 77	
Totals	164,400 16	26,088 50	265,443 21	25,947 53
Fishing bounties	161,597 39		160,903 59	
			1891-92.	
Ontario			15,155 83	25,368 90
Quebec			10,917 36	4,742 76
New Brunswick			15,707 98	6,334 83
Nova Scotia			18,755 86	3,357 42
Prince Edward Island			1,835 65	166 00
Manitoba and North-west Territories			3,593 43	1,079 00
British Columbia			6,158 17	8,192 48
Fish-breeding and fish-ways			43,957 74	178 00
Fisheries Protection Service			93,397 40	
Miscellaneous			17,449 06	
Totals			226,928 48	49,719 39
Fishing bounties			156,892 25	

Marine and Fisheries—Fisheries Branch.

Fisheries Department, from 1st July, 1885, to 30th June, 1896.

1887-88.		1888-89.		1889-90.		1890-91.	
Expendi- ture.	Revenue.	Expendi- ture.	Revenue.	Expendi- ture.	Revenue.	Expendi- ture.	Revenue.
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
19,860 52	18,251 25	19,264 98	24,266 06	14,539 87	23,666 96	15,540 30	26,517 70
13,463 37	5,394 99	12,991 63	3,390 79	9,670 94	5,409 81	10,666 98	3,642 14
20,533 20	7,625 64	20,298 00	8,282 88	14,914 95	8,834 35	16,082 77	7,193 69
18,308 02	3,905 44	20,201 09	2,744 23	17,395 24	5,424 95	17,844 19	5,582 65
3,402 51	.....	3,746 69	140 00	3,113 21	302 88	3,242 25	667 00
2,816 64	819 25	2,848 16	848 00	3,604 70	794 00	3,609 03	1,234 00
3,661 83	6,934 55	4,333 63	6,416 00	3,634 41	11,367 50	4,320 53	12,859 02
41,082 04	.....	41,315 12	352 50	39,126 91	.....	39,496 45	1,286 50
77,102 98	.....	69,693 82	.....	64,434 66	1,176 38	83,050 16	1,934 49
13,498 56	.....	10,912 18	.....	9,313 92	.....	13,382 28	.....
213,729 67	42,931 12	205,605 30	46,440 46	178,748 81	56,976 83	207,234 94	60,917 19
163,757 92	.....	149,990 63	.....	149,999 85	.....	165,967 22	.....
1892-93.		1893-94.		1894-95.		1895-96.	
20,116 91	30,623 09	22,634 37	28,632 82	21,938 56	33,211 60	24,917 48	35,681 68
11,761 34	7,471 70	11,692 82	7,211 82	12,459 34	8,836 18	11,870 43	8,160 98
15,721 05	7,831 53	18,522 94	8,333 24	21,370 94	11,170 36	20,526 56	10,696 88
19,444 22	6,782 02	20,420 81	5,296 27	23,555 38	7,075 07	23,049 41	6,180 93
2,847 60	304 10	3,078 55	980 15	3,796 58	3,312 30	3,555 87	2,161 85
3,932 96	1,661 68	5,331 29	926 99	6,178 71	2,458 80	6,915 20	2,256 69
5,490 60	40,264 00	5,283 21	25,337 90	6,218 74	23,517 25	6,226 77	26,410 75
47,322 49	.....	45,024 67	.....	39,730 93	.....	38,050 41	.....
106,805 39	.....	115,147 59	.....	100,207 29	.....	102,021 72	.....
100,602 14	.....	34,892 19	.....	24,619 86	.....	20,203 25	.....
334,044 70	94,938 12	282,028 44	76,719 19	260,076 33	89,581 56	257,237 10	91,549 76
159,752 15	.....	158,794 54	.....	160,089 42	.....	163,567 99	.....
				420,165 75		420,805 09	

APPENDIX No. 2.

FISHING BOUNTIES.

The payments made for this service are under the authority of Act 54-55 Vic., cap. 42, intituled: "An Act to encourage the development of the sea fisheries and the building of fishing vessels," which provides for the payment of the sum of \$160,000 annually, under regulations to be made from time to time by the Governor General in Council.

The total number of claims received for the year 1895 was 14,727, being an increase of 231 as compared with 1894.

The total number of claims paid during the year was 14,780, an increase of 430 as compared with the previous year.

The total amount of bounties paid in 1895 was \$163,567.99, of which \$76,182.99 was paid to vessels, and \$87,385 to boats.

The number of vessels which received bounty in 1895 was 907, with a tonnage of 30,156 tons, being an increase of 8 vessels and 572 tons, as compared with 1894.

The number of boats on which bounty was paid was 13,873, and the number of boat-fishermen who received bounty was 24,558, being an increase of 522 boats and 1,426 fishermen, as compared with the previous year.

FISHING BOUNTY REGULATIONS.

The following regulations established by Order in Council No. 2533, on the 24th of August, 1894, govern the payment of the bounty:—

1. Fishermen who have been engaged in deep-sea fishing for fish other than shell-fish, salmon and shad, or fish taken in rivers or mouths of rivers, for at least three months, and have caught not less than 2,500 pounds of sea-fish, shall be entitled to a bounty; provided always that no bounty shall be paid to men fishing in boats measuring less than 13 feet keel, and not more than three men (the owner included) will be allowed as claimants in boats under 20 feet.

2. No bounty shall be paid upon fish caught in trap-nets, pound-nets and weirs, nor upon the fish caught in gill-nets fished by persons who are pursuing other occupations than fishing, and who devote merely an hour or two daily to fishing these nets and are not, as fishermen, steadily engaged in fishing.

3. Only one claim will be allowed in each season, even though the claimant may have fished in two vessels, or in a vessel and a boat or in two boats.

4. The owners of boats measuring not less than 13 feet keel which have been engaged during a period of not less than three months in deep-sea fishing for fish other than shell-fish, salmon or shad, or fish taken in rivers or mouths of river, shall be entitled to a bounty on each such boat.

5. Canadian registered vessels of 10 tons and upwards (up to 80 tons) which have been exclusively engaged during a period of not less than three months in the catch of sea-fish other than shell-fish, salmon or shad, or fish taken in rivers or mouths of rivers, shall be entitled to a bounty to be calculated on the registered tonnage, one-half of which bounty shall be payable to the owner or owners, and the other half to the crew, except in cases where one or more of the crew shall have failed to comply with the regulations, then such share or shares shall not be paid.

6. The three months during which a vessel must have been engaged in fishing, to be entitled to bounty, shall commence on the day the vessel sails from port on her fishing voyage and end the day she returns to port from said voyage.

7. Owners or masters of vessels intending to fish and claim bounty on their vessels must before proceeding on a fishing voyage, procure a license from the nearest collector of customs or fishery overseer, said license to be attached to the claim when sent in for payment.

Marine and Fisheries—Fisheries Branch.

8. Dates and localities of fishing must be stated in the claim, as well as the quantity and kinds of sea-fish caught.

9. Ages of men must be given. Boys under 14 years of age are not eligible as claimants.

10. Claims must be sworn to as true and correct in all their particulars.

11. Claims must be filed on or before the 30th November in each year.

12. Officers authorized to receive claims will supply the requisite blanks free of charge, and after certifying the same will transmit them to the Department of Marine and Fisheries.

13. No claim in which an error has been made by the claimant or claimants shall be amended, after it has been signed and sworn to as correct.

14. Any person or persons detected making returns that are false or fraudulent in any particular will be debarred from any further participation in the bounty and be prosecuted according to the utmost rigour of the law.

15. The amount of the bounty to be paid to fishermen and owners of boats and vessels will be fixed from time to time by the Governor in Council.

16. From and after 1st January, 1895, all vessels fishing under bounty license are required to carry a distinguishing flag, which must be shown at all times during the fishing voyage at the main topmast head. The flag must be four feet square, in equal parts of red and white, joined diagonally from corner to corner. Any case of neglect to carry out this regulation reported to the Department of Marine and Fisheries, will entail the loss of the bounty, unless satisfactory reasons are given for its non-compliance.

The following particulars in connection with bounty payments, show :

1. That the bounty was established in 1882.

2. The number of claims and fishermen paid per year, as follows :—

In	\$	representing	fishermen.
1882	11,972	29,932	fishermen.
1883	13,086	do	33,399 do
1884	12,468	do	31,297 do
1885	14,124	do	33,564 do
1886	14,900	do	33,523 do
1887	15,416	do	34,387 do
1888	15,599	do	34,887 do
1889	17,078	do	38,343 do
1890	17,959	do	39,050 do
1891	18,506	do	38,859 do
1892	14,442	do	29,064 do
1893	13,635	do	28,013 do
1894	14,350	do	29,222 do
1895	14,780	do	30,808 do
Totals		do	464,348 do

3. The amount of bounty paid per year as follows.—

In 1882	\$172,285	47
1883	130,344	85
1884	155,718	98
1885	161,539	39
1886	160,903	59
1887	163,757	92
1888	150,185	53
1889	158,526	54
1890	158,241	01
1891	156,891	85
1892	159,752	14
1893	158,234	10
1894	160,066	80
1895	163,567	99

Total amount of bounty paid \$2,210,016 16

4. The proportion of bounty paid per head, or the basis of payments for each year :
In 1882, vessels were paid at the rate of \$2 per ton, one-half being payable to the owner and the other half to the crew.

Boats were paid on the basis of \$5 per man, one-fifth of which went to the owner and four-fifths to the men.

In 1883 the rate to vessels was \$2 per ton, and paid as in 1882. The basis of payment to boats was \$2.50 per man, one-fifth of which was paid to the owner and four-fifths to the men.

In 1884, vessels were \$2 per ton, as in 1882 and 1883 ; and owners of boats were paid as follows :—

On boats from 14 feet keel to 18 feet keel.....	\$1 00
do 18 do 25 do	1 50
do 25 do upwards	2 00

And boat fishermen \$3 each.

In 1885 vessels were paid \$2 per ton as in previous years. The rate to boats was the same as in 1884, with the admission of boats measuring 13 feet keel. Boat fishermen \$3 each.

In 1886 and 1887 the rate to vessels and boats remained the same as in 1885.

In 1888 vessels were paid at the rate of \$1.50 per ton, one-half to owner and one-half to crew, as formerly. Boats remained the same as in 1885-86-87, and boat fishermen \$3 each.

In 1889 the rate to vessels remained the same as in 1888. Owners of boats were paid \$1 per boat, and boat fishermen \$3 per man. These rates also formed the basis of payments for the years 1890 and 1891.

In 1892 vessels were paid at the rate of \$3 per ton, divided between the owners and the crew, in accordance with the regulations. Owners of boats were paid \$1 per boat, and boat fishermen \$3 each.

In 1893 the rate paid to vessels was \$2.90 per ton, while the rate paid to the owners of boats and to boat fishermen remained the same as in 1892.

In 1894 vessels were paid at the rate of \$2.70 per ton. The rate to boats was the same as has been paid since 1889, viz. : \$1 per boat to the owner thereof, and \$3 each to boat fishermen.

In 1895 vessels were paid at the rate of \$2.60 per ton. Owners of boats received \$1 per boat, and boat fishermen \$3 per man.

The total number of vessels to which bounty was paid since 1882 is 11,418, with a tonnage of 423,465 tons ; the number of crew receiving bounty being 88,067. Average number of men per vessel is 8.

The total number of boats paid is 196,772, and boat fishermen 376,281. Average number of men per boat, 2.

5. The highest bounty paid per head to vessel fishermen was \$21.75 in 1893 ; the lowest 83 cents.

The highest bounty paid per head to boat fishermen was \$4, the lowest being \$2.

The general average paid per head is \$4.75.

Marine and Fisheries—Fisheries Branch.

GENERAL STATEMENT of Fishing Bounty Claims received for the year 1895.

Province.	County.	Number of Claims received.	Number of Claims rejected.	Number of Claims held in abeyance.	Number of Claims paid.
Nova Scotia	Annapolis	193			*196
	Antigonish	126			*127
	Cape Breton	433		1	432
	Colchester				
	Cumberland	8			8
	Digby	309			*311
	Guysborough	1,489	9		*1,482
	Halifax	1,696	4		*1,697
	Inverness	548	1		547
	King's	48		1	47
	Lunenburg	1,095	4		1,091
	Pictou	32			32
	Queen's	288	2		286
	Richmond	996			*1,000
	Shelburne	832	1		*832
Victoria	503	7		*499	
Yarmouth	239		1	238	
	Totals	8,835	28	3	8,825
New Brunswick.....	Charlotte	435			*438
	Gloucester	445	8		*439
	Kent	67			67
	Northumberland	4			4
	Restigouche	1			1
	St. John	27	1		26
	Westmoreland				
	Totals	979	9		975
Prince Edward Island.....	King's	457			*459
	Prince	417		13	*462
	Queen's	105		1	104
	Totals	1,009		14	1,025
Quebec	Bonaventure	826	6		*863
	Gaspé	2,397	1	1	*2,398
	Rimouski	24			24
	Saguenay	657	3	3	*670
	Totals	3,904	10	4	3,955

RECAPITULATION.

Nova Scotia	8,835	28	3	8,825
New Brunswick	979	9		975
Prince Edward Island	1,009		14	1,025
Quebec	3,904	10	4	3,955
Grand Totals	14,727	47	21	14,780

*NOTE.—The number of claims paid includes several applications for previous years which, on inquiry, were found correct. This will explain the difference between claims paid and claims received after deducting those rejected and held in abeyance.

DETAILED STATEMENT showing Fishing Bounties paid to **Vessels** in each County for the Year 1895.

Province.	County.	Number of Vessels.	Tonnage.	Average Tonnage.	Number of Men.	Amount Paid.
						\$ cts.
Nova Scotia	Annapolis.....	11	337	30½	65	798 41
	Antigonish.....	1	11	11	2	28 60
	Cape Breton.....	11	172	15½	49	429 31
	Cumberland.....	3	43	14	5	86 68
	Digby.....	55	1,475	27	388	3,602 68
	Guysborough.....	23	513	22	96	1,235 24
	Halifax.....	71	1,851	26	384	4,451 19
	Inverness.....	25	462	18½	114	1,170 23
	King's.....	5	72	14½	13	172 25
	Lunenburg.....	174	12,221	70	2,162	31,621 70
	Queen's.....	14	595	42½	106	1,469 55
	Richmond.....	77	2,518	32½	573	6,456 82
	Shelburne.....	85	2,533	30	629	6,222 30
	Victoria.....	1	27	27	5	54 60
Yarmouth.....	47	2,188	46½	593	5,526 71	
	Totals.....	603	25,018	41½	5,184	63,326 27
New Brunswick.....	Charlotte.....	46	849	18½	155	2,057 43
	Gloucester.....	179	2,057	11½	565	5,317 87
	Kent.....					
	Northumberland.....	1	11	11	3	28 60
	Restigouche.....	1	26	26	5	60 84
	St. John.....	11	164	15	36	419 58
	Totals.....	238	3,107	13	764	7,884 32
Prince Edward Island...	King's.....	17	501	29½	78	1,230 08
	Prince.....	8	231	29	43	540 37
	Queen's.....	2	37	18½	8	90 68
	Totals.....	27	769	28½	129	1,861 13
Quebec.....	Gaspé.....	3	111	37	23	288 60
	Saguenay.....	36	1,151	32	150	2,822 67
	Totals.....	39	1,262	32½	173	3,111 27

RECAPITULATION.

Nova Scotia	603	25,018	41½	5,184	63,326 27
New Brunswick	238	3,107	13	764	7,884 32
Prince Edward Island	27	769	28½	129	1,861 13
Quebec.....	39	1,262	32½	173	3,111 27
Grand Totals..	907	30,156	33	6,250	76,182 99

Marine and Fisheries—Fisheries Branch.

DETAILED STATEMENT of Fishing Bounties paid to Boats for the year 1895.

Province.	County.	Number of Boats.	Number of Men.	Amount paid.	Total Bounty paid to Vessels and Boats in 1895.
				\$	\$ cts.
Nova Scotia	Annapolis	185	278	1,019	1,817 41
	Antigonish	126	200	726	754 60
	Cape Breton	421	808	2,845	3,274 31
	Cumberland	5	10	35	121 68
	Digby	256	476	1,684	5,286 68
	Guysborough	1,459	2,247	8,100	9,335 24
	Halifax	1,626	2,575	9,351	13,802 19
	Inverness	522	1,190	4,089	5,259 23
	King's	42	68	246	418 25
	Lunenburg	917	1,054	4,081	35,702 70
	Pictou	32	51	185	185 00
	Queen's	272	414	1,514	2,983 55
	Richmond	923	1,407	5,144	11,600 82
	Shelburne	747	1,211	4,380	10,602 30
Victoria	498	835	3,003	3,057 60	
Yarmouth	191	282	1,037	6,563 71	
	Totals	8,222	13,106	47,439	110,765 27
New Brunswick	Charlotte	392	632	2,287	4,344 43
	Gloucester	260	644	2,192	7,509 87
	Kent	67	125	439	439 00
	Northumberland	3	13	42	70 60
	Restigouche				60 84
	St. John	15	20	75	494 58
	Totals	737	1,434	5,035	12,919 32
Prince Edward Island	King's	442	758	2,722	3,952 08
	Prince	454	1,088	3,715	4,255 37
	Queen's	102	295	987	1,077 68
	Totals	998	2,141	7,424	9,285 13
Quebec	Bonaventure	863	1,793	6,263	6,263 00
	Gaspé	2,395	4,731	16,507	16,795 60
	Rimouski	24	35	129	129 00
	Saguenay	634	1,318	4,588	7,410 67
	Totals	3,916	7,877	27,487	30,598 27

RECAPITULATION.

Nova Scotia	8,222	13,106	47,439	110,765 27
New Brunswick	737	1,434	5,035	12,919 32
Prince Edward Island	998	2,141	7,424	9,285 13
Quebec	3,916	7,879	27,487	30,598 27
Grand totals	13,873	24,558	87,385	163,567 99

COMPARATIVE STATEMENT of Fishing Bounties

Number.	Province.	County.	1892.			1893.	
			Vessels.	Boats.	Total.	Vessels.	Boats.
			Amount.	Amount.		Amount.	Amount.
			\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1	Nova Scotia	Annapolis	776 11	761 00	1,537 11	700 52	746 81
2		Antigonish	24 75	789 00	813 75	15 95	559 00
3		Cape Breton	324 51	2,806 00	3,130 51	317 34	2,677 00
4		Colchester					
5		Cumberland				49 30	11 00
6		Digby	4,214 12	1,788 00	6,002 12	4,250 87	1,675 00
7		Guysboro'	1,396 45	7,186 00	8,582 45	964 04	6,964 00
8		Halifax	6,106 71	7,616 00	13,723 71	7,321 32	7,283 00
9		Inverness	737 89	4,123 00	4,860 89	841 00	4,156 00
10		King's	220 20	242 00	462 20	155 25	235 00
11		Lunenburg	31,260 36	4,057 00	35,317 36	31,588 21	3,996 00
12		Pictou		327 00	327 00		137 00
13		Queen's	1,041 61	1,600 00	2,641 61	1,136 34	1,505 00
14		Richmond	6,033 97	4,931 00	10,964 97	6,227 13	4,635 00
15		Shelburne	5,905 46	406 00	10,311 46	5,256 94	4,256 00
16		Victoria	85 00	3,049 00	3,134 00	139 20	2,959 00
17		Yarmouth	6,709 25	895 00	7,604 25	6,560 45	748 00
18		Totals	64,837 39	44,576 00	109,413 39	65,523 86	42,542 81
19	New Brunswick	Charlotte	2,519 65	2,405 00	4,924 65	2,427 24	2,000 00
20		Gloucester	1,513 09	2,955 00	4,468 09	4,634 07	2,338 00
21		Kent	47 50	615 00	662 50	69 01	122 00
22		Northumberland	288 00	97 00	385 00	250 85	48 00
23		Restigouche					
24		St. John	271 87	66 00	337 87	535 92	99 00
25		Westmoreland	71 50	21 00	92 50		
26		Totals	4,711 61	6,159 00	10,870 61	7,917 09	4,607 00
27	P. E. Island	King's	1,102 30	3,364 00	4,466 30	1,345 70	2,578 00
28		Prince	1,276 85	2,673 00	3,949 85	989 02	3,326 50
29		Queen's	250 64	1,116 00	1,366 64	133 40	957 00
30		Totals	2,629 79	7,153 00	9,782 79	2,468 12	6,861 50
31	Quebec	Bonaventure	25 00	6,449 00	6,474 00	24 17	4,720 50
32		Gaspé	363 25	16,692 00	17,055 25	370 71	15,859 00
33		Rimouski		286 00	286 00		321 00
34		Saguenay	1,983 10	3,896 00	5,879 10	2,349 34	4,676 00
35		Témiscouata					
36		Totals	2,371 35	27,323 00	29,694 35	2,744 22	25,576 50

RECAPITU-

37	Nova Scotia		64,837 39	44,576 00	109,413 39	65,523 86	42,542 81
38	New Brunswick		4,711 61	6,159 00	10,870 61	7,917 09	4,607 00
39	P. E. Island		2,629 79	7,153 00	9,782 79	2,468 12	6,861 50
40	Quebec		2,371 35	27,323 00	29,694 35	2,744 22	25,576 50
41		Totals	74,550 14	85,211 00	159,761 14	78,653 29	79,587 81
				Less Refund.....	9 00	Less Refund.....	
					159,752 14		

Marine and Fisheries—Fisheries Branch.

paid for the years 1892 to 1895, inclusive.

Total.	1894.			1895.			Grand Total.	Number.
	Vessels.	Boats.	Total.	Vessels.	Boats.	Total.		
	Amount.	Amount.		Amount.	Amount.			
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	
1,447 33	1,084 91	926 00	2,010 91	798 41	1,019 00	1,817 41	6,812 76	1
574 95	29 70	722 00	751 70	28 60	726 00	754 60	2,895 00	2
2,964 34	471 09	2,690 00	3,161 09	429 31	2,845 60	3,274 31	12,560 25	3
60 30	45 90	22 00	67 90	86 68	35 00	121 68	249 88	4
5,925 87	3,742 56	1,606 00	5,348 56	3,602 68	1,684 00	5,286 68	22,563 23	6
7,928 04	1,338 70	7,796 00	9,134 70	1,235 24	8,100 00	9,335 24	34,980 43	7
14,604 32	5,617 00	8,934 00	14,551 00	4,451 19	9,351 00	13,802 19	56,681 22	8
4,997 00	926 95	4,270 00	5,196 95	1,170 23	4,089 00	5,259 23	20,314 07	9
390 25	329 40	177 00	506 40	172 25	246 00	418 25	1,777 10	10
35,584 21	30,695 14	4,402 00	35,097 14	31,621 70	4,081 00	35,702 70	141,701 41	11
137 00		168 00	168 00		185 00	185 00	817 00	12
2,641 34	1,331 13	1,753 00	3,084 13	1,469 55	1,514 00	2,983 55	11,350 63	13
10,862 13	6,014 42	4,989 00	11,003 42	6,456 82	5,144 00	11,600 82	44,431 34	14
9,512 94	7,215 45	4,237 00	11,452 45	6,222 30	4,380 00	10,602 30	41,879 15	15
3,098 20	37 73	3,088 00	3,125 73	54 60	3,003 00	3,057 60	12,415 53	16
7,308 45	5,920 95	879 00	6,799 95	5,526 71	1,037 00	6,563 71	28,276 36	17
108,066 67	64,801 03	46,659 00	111,460 03	63,326 27	47,439 00	110,765 27	439,705 36	18
4,427 24	2,460 05	2,043 00	4,503 05	2,057 43	2,287 00	4,344 43	28,199 37	19
6,972 07	5,282 52	2,195 00	7,477 52	5,317 87	2,192 00	7,509 87	26,427 55	20
191 01		163 00	163 00		439 00	439 00	1,455 51	21
298 85		47 00	47 00	28 60	42 00	70 60	801 45	22
				60 84		60 84	60 84	23
634 92	445 23	55 00	500 23	419 58	75 00	494 58	1,967 60	24
							92 50	25
12,524 09	8,187 80	4,503 00	12,690 80	7,884 32	5,035 00	12,919 32	49,004 82	26
3,923 70	1,098 19	2,674 00	3,772 19	1,230 08	2,722 00	3,952 08	16,114 27	27
4,315 52	380 70	2,698 00	3,078 70	540 37	3,715 00	4,255 37	15,599 44	28
1,090 40	45 90	979 00	1,024 90	90 68	937 00	1,077 68	4,559 62	29
9,329 62	1,524 79	6,351 00	7,875 79	1,861 13	7,424 00	9,285 13	36,273 33	30
4,744 67	70 20	4,869 00	4,939 20		6,263 00	6,263 00	22,420 87	31
16,229 71	334 80	15,720 00	16,054 80	288 60	16,507 00	16,795 60	66,135 36	32
321 00		105 00	105 00		129 00	129 00	841 00	33
7,025 34	2,407 18	4,534 00	6,941 18	2,822 67	4,588 00	7,410 67	27,256 29	34
								35
28,320 72	2,812 18	25,228 00	28,040 18	3,111 27	27,487 00	30,598 27	116,633 52	36

LATION.

108,066 67	64,801 03	46,659 00	111,460 03	63,326 27	47,439 00	110,765 27	439,705 36	37
12,524 09	8,187 80	4,503 00	12,690 80	7,884 32	5,035 00	12,919 32	49,004 82	38
9,329 62	1,524 79	6,351 00	7,875 79	1,861 13	7,424 00	9,285 13	36,273 33	39
28,320 72	2,812 18	25,228 00	28,040 18	3,111 27	27,487 00	30,598 27	116,633 52	40
158,241 10	77,325 80	82,741 00	160,066 80	76,182 99	87,385 00	163,567 99	641,637 03	41
7 00							16 00	
158,234 10							641,621 03	

COMPARATIVE STATEMENT by Provinces for the Years 1882 to 1895, inclusive, showing :—
 (1) Total number of Fishing Bounty Claims received and paid by the Department of Marine and Fisheries.

	NOVA SCOTIA.		NEW BRUNSWICK.		P. E. ISLAND.		QUEBEC.		TOTAL.	
	Received.	Paid.	Received.	Paid.	Received.	Paid.	Received.	Paid.	Received.	Paid.
1882.....	6,780	6,613	1,257	1,142	1,169	1,100	3,162	3,117	12,318	11,972
1883.....	7,171	7,076	1,693	1,579	1,138	1,106	3,602	3,325	13,604	13,086
1884.....	7,007	6,930	1,252	1,224	923	885	3,470	3,429	12,652	12,468
1885.....	7,646	7,599	1,609	1,588	1,117	1,025	3,943	3,912	14,315	14,124
1886.....	7,639	7,702	1,767	1,763	1,131	1,080	4,275	4,355	14,812	14,900
1887.....	8,262	8,227	1,975	1,958	1,201	1,126	4,138	4,105	15,576	15,416
1888.....	8,481	8,429	2,065	2,026	1,153	834	4,328	4,310	16,027	15,599
1889.....	8,816	8,523	2,428	2,392	1,211	1,511	4,664	4,652	17,119	17,078
1890.....	9,337	9,429	2,522	2,469	1,352	1,237	4,860	4,804	18,071	17,989
1891.....	10,242	10,063	2,831	2,084	1,482	1,446	5,108	4,913	19,663	18,506
1892.....	8,272	8,186	1,067	1,001	1,065	1,051	4,425	4,204	14,829	14,442
1893.....	7,926	7,844	967	881	1,027	1,012	4,059	3,898	13,979	13,635
1894.....	8,640	8,600	925	911	983	963	3,948	3,876	14,496	14,350
1895.....	8,835	8,825	979	975	1,009	1,025	3,904	3,955	14,727	14,780
Totals.....	115,004	114,046	23,337	21,993	15,961	15,421	57,886	56,855	212,188	208,315

Marine and Fisheries—Fisheries Branch.

(2) NUMBER OF VESSELS, TONNAGE AND NUMBER OF MEN ENTITLED TO BOUNTY IN EACH YEAR.

YEAR.	NOVA SCOTIA.			NEW BRUNSWICK.			P. E. ISLAND.			QUEBEC.			TOTAL.		
	No. of Vessels.	Tonnage.	No. of Men.	No. of Vessels.	Tonnage.	No. of Men.	No. of Vessels.	Tonnage.	No. of Men.	No. of Vessels.	Tonnage.	No. of Men.	No. of Vessels.	Tonnage.	No. of Men.
1882	588	22,841	5,343	120	2,171	531	15	389	74	63	2,210	538	786	27,611	6,486
1883	700	29,788	6,288	126	2,102	496	16	450	66	62	2,286	443	904	34,576	7,243
1884	700	29,828	6,327	139	2,289	560	16	582	92	56	1,965	382	911	34,664	7,361
1885	629	27,709	5,897	128	2,120	496	19	597	113	55	1,791	317	831	32,217	6,823
1886	562	25,375	5,022	145	2,628	520	32	1,071	215	52	1,730	320	791	30,804	6,077
1887	566	24,520	4,900	154	2,889	563	38	1,677	338	54	1,883	334	812	30,969	6,135
1888	589	26,006	5,450	150	2,545	544	37	1,245	249	51	1,842	388	827	31,640	6,631
1889	597	27,123	5,684	153	2,590	565	35	1,274	239	48	1,729	330	833	32,716	6,818
1890	540	23,955	4,985	133	2,129	447	32	1,002	203	34	1,182	220	739	28,268	5,805
1891	527	22,780	4,618	124	2,051	411	27	778	155	27	924	168	705	26,533	5,352
1892	507	22,279	4,611	108	1,683	343	30	983	139	23	803	159	668	25,748	5,252
1893	536	23,195	4,780	210	2,922	634	27	910	151	32	952	179	805	27,979	5,744
1894	602	24,735	5,077	238	3,189	721	21	594	114	38	1,066	178	809	29,584	6,090
1895	603	25,018	5,184	238	3,107	764	27	769	129	39	1,262	173	907	30,156	6,250
Totals	8,246	355,154	74,066	2,166	34,415	7,595	372	12,321	2,277	634	21,575	4,129	11,418	423,465	88,067

(3) NUMBER of Boats among which Bounty was distributed, and number of men engaged in boat fishing receiving Bounty.

YEAR.	NOVA SCOTIA.		NEW BRUNSWICK.		P. E. ISLAND.		QUEBEC.		TOTAL.	
	No. of Boats.	No. of Men.	No. of Boats.	No. of Men.	No. of Boats.	No. of Men.	No. of Boats.	No. of Men.	No. of Boats.	No. of Men.
1882	6,043	12,130	1,024	2,530	1,087	3,070	3,071	5,716	11,225	23,446
1883	6,458	13,553	1,453	3,309	1,098	3,106	3,266	6,188	12,275	26,156
1884	6,257	12,669	1,086	2,505	869	2,346	3,344	6,416	11,556	23,936
1885	6,970	13,396	1,460	3,254	1,006	2,606	3,857	7,485	13,293	26,741
1886	7,140	13,351	1,618	3,567	1,048	2,547	4,303	7,981	14,109	27,446
1887	7,662	13,997	1,804	3,994	1,088	2,711	4,051	7,550	14,605	28,252
1888	7,840	14,115	1,876	4,148	797	2,141	4,259	7,852	14,772	28,256
1889	7,926	14,118	2,237	5,032	1,475	3,568	4,602	8,807	16,240	31,525
1890	8,886	15,738	2,324	5,242	1,192	3,024	4,766	9,241	17,168	33,245
1891	9,525	16,552	1,928	4,126	1,383	3,427	4,865	9,402	17,701	33,507
1892	7,679	12,307	893	1,765	1,021	2,047	4,181	7,693	13,774	23,812
1893	7,308	11,748	671	1,314	985	1,962	3,866	7,245	12,830	22,269
1894	7,956	12,899	661	1,281	913	1,813	3,821	7,139	13,351	23,132
1895	8,222	13,106	737	1,424	998	2,141	3,916	7,877	13,873	24,558
Totals	105,872	189,679	19,772	43,501	14,960	36,509	56,168	106,592	196,772	376,281

(4) TOTAL Number of men receiving Bounty in each year.

YEAR.	NOVA SCOTIA.	NEW BRUNSWICK	P. E. ISLAND.	QUEBEC.	TOTAL.
	No. of Men.	No. of Men.	No. of Men.	No. of Men.	
1882	17,473	3,061	3,144	6,254	29,932
1883	19,791	3,805	3,172	6,631	33,399
1884	18,996	3,065	2,438	6,798	31,297
1885	19,293	3,750	2,719	7,802	33,564
1886	18,373	4,087	2,762	8,301	33,523
1887	18,897	4,557	3,049	7,884	34,387
1888	19,565	4,692	2,390	8,240	34,887
1889	19,802	5,597	3,807	9,137	38,343
1890	20,673	5,689	3,227	9,461	39,050
1891	21,170	4,537	3,582	9,570	38,859
1892	16,918	2,108	2,186	7,852	29,064
1893	16,528	1,948	2,113	7,424	28,013
1894	17,976	2,002	1,927	7,317	29,222
1895	18,290	2,198	2,270	8,050	30,808
Totals	263,745	51,096	38,786	110,721	464,348

Marine and Fisheries—Fisheries Branch.

(5) TOTAL annual payments of Fishing Bounty.

Year.	Nova Scotia.	New Brunswick.	P. E. Island.	Quebec.	Total.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1882.....	106,098 72	16,997 00	16,137 00	33,052 75	172,285 47
1883.....	89,432 50	12,395 20	8,577 14	19,940 01	130,344 85
1884.....	104,934 09	13,576 00	9,203 96	28,004 93	155,718 98
1885.....	103,999 73	15,908 25	10,166 65	31,464 76	161,539 39
1886.....	98,789 54	17,894 57	10,935 87	33,283 61	160,903 59
1887.....	99,622 03	19,699 65	12,523 51	31,907 73	163,757 92
1888.....	89,778 90	18,454 92	9,092 96	32,858 75	150,185 53
1889.....	90,142 51	21,026 79	13,994 53	33,362 71	158,526 54
1890.....	91,235 64	21,108 33	11,686 32	34,210 72	158,241 01
1891.....	92,377 42	17,235 96	12,771 30	34,507 17	156,891 85
1892.....	109,410 39	10,864 61	9,782 79	29,694 35	159,752 14
1893.....	108,060 67	12,524 09	9,328 62	28,320 72	158,234 10
1894.....	111,460 03	12,690 80	7,875 79	28,040 18	160,066 80
1895.....	110,765 27	12,919 32	9,285 13	30,598 27	163,567 99
Totals....	1,406,107 44	223,295 49	151,366 57	429,246 66	2,210,016 16

DETAILED STATEMENT of Fishing Bounties paid to Vessels for the Year 1895.

PROVINCE OF NOVA SCOTIA.

ANNAPOLIS COUNTY.

* This denotes that some of the crew did not comply with the regulations and are not included in the column for crew.

Official Number.	Name of Vessel.	Port of Registry.	Tonnage.	Name of Owner or Managing Owner.	Residence.	No. of Crew paid.	Amount of Bounty paid.	
							\$	cts.
94708	Ann Eliza	Digby	62	Arthur W. Longmire.	Hillsburn	*13	155	45
72978	Annie Coggins	do	22	David Hayden	Lower Granville.	*2	36	78
94700	Franklin S. Schenck	do	44	Fred. W. Thorn	Thornville	10	114	40
80001	Florence	St. John, N. B.	15	Edward Quinlan	Victoria Lake	*4	35	10
94706	George J. Tarr	Digby	61	John S. Hayden	Victoria Beach	14	158	60
94693	John H. Kennedy	do	54	Stephen Haynes	do	*9	122	85
83461	Josie L. Day	do	16	Edward Keane	do	*1	24	96
88685	Ladora	St. John, N. B.	12	Stephen Baker	Margaretsville	*2	23	40
83253	Rescue	Annapolis	17	Josiah Burrell	Clementsport	5	44	20

ANTIGONISH COUNTY.

96787	Benecia Boy	Halifax	11	Lawrence Hylan	Harbour au Bouche	2	28	60
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CUMBERLAND COUNTY.

83261	Economist	Digby	14	James E. Ogilvie	Parrsboro'	*2	30	34
75614	Fawn	do	17	do	do	*2	36	84
103022	May	Parrsboro	12	Robert Spicer	Spencer Island	*1	19	50

CAPE BRETON COUNTY

83086	Ada M	Pt. Hawkesbury.	20	Mathew Leblanc	Little Bras d'Or.	*4	43	34
100389	Annie F	Sydney	13	John Farrell	Main-à-Dieu	*3	29	58
85507	Belle of Rome	do	14	C. W. Mann	Gabarouse	4	36	40
100372	Betsy Jane	do	11	Samuel Moore	Little Bras d'Or.	3	28	60
85381	Champion	do	19	John Williams	Louisbourg	5	49	40
75571	Fanny	Liverpool	16	Stephen Colvez	Little Bras d'Or.	6	41	60
100383	Florence L	Sydney	10	Peter Leblanc	do	4	26	00
88531	Ida	do	11	Isiah Leblanc	do	3	28	60
74039	James Henry	do	18	Peter Desveau	do	5	46	80
100380	Mary D	do	27	Simon Devoe	do	*6	65	19
92600	Merit	do	13	Alex. Leblanc	do	6	33	80

DIGBY COUNTY.

94696	Annie M. Sproule	Digby	70	John W. Sproule	Digby	*14	170	64
83258	Alfred	do	29	Edwin Haines	Freport	8	75	40
83431	Acadian	Weymouth	32	Geo. H. Stevens	do	10	83	20
88598	Alph. B. Parker	St. John, N. B.	39	Holland Outhouse	Tiverton	12	101	40
90660	Alice May	Yarmouth	18	Edgar McDormand	Westport	8	46	80
88267	Bessie May	St. John, N. B.	23	E. C. Bowers	Westport	8	59	80
94704	Charles Haskell	Digby	67	Howard Anderson	Digby	*13	157	88

Marine and Fisheries—Fisheries Branch.

DETAILED STATEMENT OF Fishing Bounties paid to Vessels, &c.—Nova Scotia—*Con.*

DIGBY COUNTY—*Concluded.*

Official Number.	Name of Vessel.	Port of Registry.	Tonnage.	Name of Owner or Managing Owner.	Residence.	No. of Crew paid.	Amount of Bounty paid.
							\$ cts.
94698	Carrie H	Digby	20	Augustus Haycock.....	Westport. . .	7	52 00
74331	Condor	Yarmouth	11	Howard Titus	do	5	28 60
75711	Dove	do	20	Joseph Ossinger.....	Tiverton.....	7	52 00
88408	Elihu Burritt	Digby	50	H. B. Allen	Digby	7	130 00
90662	Edward A. Horton.....	do	67	Joseph E. Snow.....	do	*14	163 32
94707	Ernest F. Norwood.....	do	79	do	do	*13	186 16
85683	Edith L.	do	16	R. W. Ford	Westport.....	*2	29 12
77740	Elmer	do	15	James Gower	do	6	39 00
75757	Etta	Yarmouth	17	Clarence Webber.....	do	7	44 20
80797	Ella H	Digby	13	Jno. Whiteneck	Freeport.....	3	33 80
100891	Fleur de Lis	Weymouth	17	Geo. E. Mallett	Gilbert's Cove ..	*3	38 68
74329	Fairy Queen	Yarmouth	13	Wallace Coggins	Westport.....	*2	22 54
80798	Freddie G.	Digby	18	Geo. Gower	do	7	46 80
77963	Freeman Colgate.....	St. Andrews, N.B.	26	Frank Morrell.....	do	*8	63 85
75601	Flash	Digby	10	James A. Peters	do	*	13 00
100535	Fairplay	do	11	Casimir Comeau	Metaghan	*1	17 88
83260	Gazette	do	20	D. & O. Sproule	Digby	*	26 00
100537	Gertie H	do	32	Handly Outhouse	Tiverton.....	10	83 20
90436	Genesta	Barrington	32	George Denton.....	Westport.....	10	83 20
80800	Helen Maud	Digby	20	Charles McDormand ..	do	*7	48 75
88401	Hattie	do	37	Thomas C. Titus.....	do	7	96 20
100064	Isma	St. John, N.B. . .	31	Charles Hicks	do	9	80 60
94709	Jennie B. Thomas ..	Digby	52	Joseph E. Snow.....	Digby	*4	86 92
80604	Jennie C.	Yarmouth	16	Charles Hicks	Westport.....	6	41 60
59388	Letitia	St. Andrews, N.B.	10	P. A. Beliveau	Beliveau Cove ..	4	26 00
100872	Lizzie Blanche.....	Weymouth	21	Jno. Theriault	Sandy Cove.....	7	53 60
85690	Lora T.	Digby	15	Joseph Thurber	Freeport.....	7	39 00
54114	Lone Star	Halifax	29	Amos H. Outhouse ..	Tiverton.....	10	75 40
80881	Lena May	St. Andrews, N.B.	18	Freeman Small	do	*5	38 04
85533	Minnie	Yarmouth	12	Edwin Haines	Freeport.....	6	31 20
85682	Malapert	Digby	23	E. C. Bowers	Westport.....	9	59 80
80794	Minnie C	do	18	Charles Bailey	do	7	46 80
85687	Mabel	do	38	Wm. M. Denton	do	*10	94 31
100487	Mabel B.	do	57	Chas. E. Finigan.....	Freeport.....	11	148 20
94825	On Time	Weymouth	19	Henry Glaven	Westport.....	9	49 40
75714	Prince	Yarmouth	10	Saml. Thurber	Freeport.....	*4	23 40
100539	Rovena	Digby	10	Warren Snow	Smith's Cove	*2	21 67
94709	Roving Lizzie.....	Weymouth	11	Heber Outhouse.....	Tiverton.....	5	28 60
83132	Restless	Digby	25	Jackson Coggins	Westport.....	8	65 00
100609	Swan	Shelburne	56	Edwin Haines	Freeport.....	*11	139 54
85558	S. A. Crowell	Yarmouth	23	Wallace Gower	Westport.....	8	59 80
80784	Silver Cloud	Digby	45	John Clifford	Tiverton.....	13	117 00
38036	Twilight	do	14	Benjamin Taylor	Smith's Cove	3	36 40
75726	Thrush	Yarmouth	13	Frank S. Lent	Freeport.....	5	33 80
94694	Utah and Eunice.....	Digby	33	Edward Haines	do	8	85 50
74317	Willie	Yarmouth	22	Johnston Denton.....	Westport.....	9	57 20
85559	Willie F	do	12	F. B. Lent	do	*2	20 80
88264	Walter J. Clarke.....	Digby	20	Arthur Porter	do	*6	45 50

GUYSBOROUGH COUNTY.

41771	Atalia	Guysborough.....	34	Thos. H. Peeples.....	Pirate Harbour ..	4	88 40
103453	Anna Maud	Arichat	10	Reuben H. Munro	Whitehead.....	3	26 00
43109	Chatham Head	Miranichi	24	Wm. England	Middle Melford..	3	62 40
100445	Carrie O.	Canso	12	Samuel Crant	Whitehead.....	*3	24 96
38418	Dolphin.....	Arichat	36	Wm. S. Peart	Guysborough.....	6	93 60
83180	Friend	Halifax	17	Luke Mannett	Larry's River	5	44 20
85882	G. H. Marryatt.....	do	24	Danl. Fraser	Mulgrave.....	4	62 40
94963	Golden Seal	do	32	Edwd. B. Pelrine.....	Larry's River.....	7	83 20
80999	Guardian Angel.....	Guysborough.....	21	Joseph Fougère, jr. .	do	5	54 60

DETAILED STATEMENT of Fishing Bounties paid to Vessels, &c.—Nova Scotia—*Con.*GUYSBOROUGH COUNTY—*Concluded.*

Official Number.	Name of Vessel.	Port of Registry.	Tonnage.	Name of Owner or Managing Owner.	Residence.	No. of Crew paid.	Amount of Bounty paid.
							\$ cts.
53577	Ilda.....	Pt. Hawkesbury	27	Thomas England.....	Middle Melford.	* 4	58 50
74355	La Mode.....	Pictou.....	26	John O'Neil.....	Auld's Cove.....	* 5	67 60
69964	Lizzie A.....	Pt. Hawkesbury	20	Jno. F. Reeves.....	Mulgrave Stn.....	* 3	45 50
75577	Mary Ann Bell.....	Lunenburg.....	33	Joseph O'Neil.....	Auld's Cove.....	* 5	85 80
83408	M. A. Franklyn.....	Halifax.....	22	Wm. Doiron.....	Charlo's Cove.....	* 5	57 20
88466	Minnie J.....	Arichat.....	10	Perry Munro.....	Whitehead.....	* 3	26 00
69141	Mary Elizabeth.....	Halifax.....	16	R. T. Matthews.....	Crow Harbour.....	* 3	20 80
100442	Nellie.....	Canso.....	41	Boak & Bennett.....	Halifax.....	* 3	73 30
94993	Onward.....	Charlo t t e town, P. E. I.....	15	E. C. Whitman.....	Canso.....	7	39 00
80970	Orion.....	Halifax.....	24	Hubert Richards.....	Charlo's Cove.....	6	62 40
75892	Peter Mitchell.....	Pt. Hawkesbury	26	Wm. P. Power.....	Pirate Harbour.....	* 5	57 60
100231	Pearl.....	Halifax.....	17	Alex. Keating.....	Canso.....	* 2	30 94
92575	Robinetta.....	do.....	14	Reuben H. Munro.....	Whitehead.....	* 4	32 76
100444	Stella May.....	Canso.....	12	James Meagher.....	Canso.....	* 4	28 08

HALIFAX COUNTY.

90866	Alice.....	Halifax.....	12	Abraham Cleveland.....	West Dover.....	* 2	26 00
75448	Annie Gaetz.....	do.....	36	Jno. G. Weston.....	East Jeddore.....	* 9	93 63
100221	Baleka.....	do.....	31	Andrew Gray, jr.....	Sambro.....	7	80 60
94662	Bessie Florence.....	do.....	12	Chas. W. Twohig.....	Pennant.....	3	31 20
90496	Black Prince.....	do.....	18	Jas. W. Slaunwhite.....	Terence Bay.....	4	46 80
100236	Bessie Jennex.....	do.....	80	Wellington Jennex <i>et al</i>	Jeddore.....	*15	201 50
90721	Brilliant Star.....	do.....	36	Peter Hartlin.....	East Jeddore.....	10	98 60
96799	Catherine A. C.....	do.....	17	Hezekiah Cleveland.....	West Dover.....	3	44 20
92566	Carrie M.....	do.....	12	W. H. Munroe.....	Sheet Harbour.....	2	31 20
74071	Condor.....	do.....	20	John Julien <i>et al</i>	W. Chezzetcook.....	* 3	45 50
92602	Caboddel.....	do.....	80	James A. Faquhar.....	Halifax.....	* 1	104 00
85663	Daring.....	do.....	18	Chas. Slaunwhite, sr.....	Terence Bay.....	3	46 80
85655	Daisy.....	do.....	16	Sam'l. Richardson.....	Indian Harbour.....	5	41 60
90726	Ellen Maud.....	do.....	16	Wm. G. Fleming.....	Ketch Harbour.....	* 3	33 28
90481	Ella D.....	do.....	32	Archd. Darrach, sr.....	Herring Cove.....	* 7	78 00
100220	E. J. Smith.....	do.....	11	Jno. J. Smith.....	Sambro.....	3	28 60
85738	Enma F.....	Lunenburg.....	13	Amos Graves.....	East Dover.....	3	33 80
80832	Ella May.....	do.....	16	Judson Dauphinee.....	French Village.....	3	41 60
100248	Excelsior.....	Halifax.....	14	Joseph Prest.....	Spry Bay.....	5	36 40
96785	Eva M. B.....	do.....	45	Daniel Bonang <i>et al</i>	W. Chezzetcook.....	* 9	102 39
92564	Evangeline.....	do.....	23	Henry Young, sr.....	Petpiswick Har.....	4	59 80
85644	Flora.....	Halifax.....	42	Patrick Scallion.....	Herring Cove.....	* 9	103 74
100247	Fairy Queen.....	do.....	11	Geo. H. Nickerson.....	Sambro.....	2	28 60
100259	Florence.....	do.....	15	Caleb Gray.....	do.....	2	39 00
97046	Fredona.....	Liverpool.....	12	Edward Sturmy.....	Spry Bay.....	* 3	27 30
88220	Graudee.....	Halifax.....	14	Jno. P. Slaunwhite.....	Terence Bay.....	3	36 40
100228	Golden Dawn.....	do.....	46	Edw. Conrod, M.O.....	E. Chezzetcook.....	14	119 60
90489	Greenleaf.....	do.....	44	M. Julien, M.O.....	W. do.....	13	114 40
80996	Gertie Bell.....	Guysborough.....	15	Leander York.....	Eastern Passage.....	6	39 00
69097	Highland Jane.....	Halifax.....	32	Geo. Hartlin.....	East Jeddore.....	10	83 20
83306	Iona.....	do.....	26	Andrew Sullivan.....	Herring Cove.....	* 6	59 16
100212	James R.....	do.....	51	C. & A. Mitchell.....	East Jeddore.....	12	132 60
83303	James Ryan.....	Port Medway.....	48	Wm. Harris.....	Halifax.....	* 1	62 40
75605	Little Annie.....	Halifax.....	27	Matthew Lynch.....	Ferguson's Cove.....	* 6	61 44
69105	Lady of the Lake.....	do.....	20	Richard Christian.....	Upper Prospect.....	6	52 00
94661	L. C. Tough.....	do.....	12	Jno. E. Tougi.....	Pennant.....	3	31 20
94665	Louis Luby.....	do.....	41	Wm. J. Lapierre, <i>et al</i>	W. Chezzetcook.....	12	106 60
96789	Lydia A. Mason.....	do.....	39	Peter Mason, <i>et al</i>	Tangier.....	* 4	91 26
100227	May.....	do.....	10	Wm. Heneberry.....	Sambro.....	2	26 00
100254	Myrtle M. Gray.....	do.....	19	James Gray.....	Pennant.....	4	49 40
85664	Mary E.....	do.....	14	Andrew Twohig.....	do.....	* 2	30 34
100580	Maggie E. C.....	Lunenburg.....	20	David F. Covey.....	Hackett's Cove.....	5	52 00

Marine and Fisheries—Fisheries Branch.

DETAILED STATEMENT of Fishing Bounties paid to Vessels, &c.—Nova Scotia—Con.

HALIFAX COUNTY—Concluded.

Official Number.	Name of Vessel.	Port of Registry.	Tonnage.	Name of Owner or Managing Owner.	Residence.	No. of Crew paid.	Amount of Bounty paid.
							¢ cts.
100238	Mary Bell.....	Halifax.....	10	Jno. A. McDonald.....	Harrigan Cove.....	* 2	19 50
46498	Mariner.....	do.....	56½	W. C. & J. H. Henley.	Spry Bay.....	* 8	137 52
96805	Maggie May.....	do.....	62	Jeremiah Fillis, <i>et al.</i>	W. Chezzetcook.....	* 8	123 61
100249	Minnie M.....	do.....	10	John P. Martin.....	Ship Harbour.....	4	26 60
85665	Nellie D.....	do.....	12	Daniel Smith.....	Sambro.....	3	31 20
80841	Nina.....	do.....	13	Wm. E. Murphy.....	Owls Head.....	3	33 80
100245	Oracle.....	do.....	18	Samuel Gray.....	Sambro.....	* 3	40 95
64018	Ocean Bride.....	do.....	23	Geo. Borgal.....	Pleasant Harbr.....	6	59 80
100241	Pansy.....	do.....	32	Geo. Schnair.....	Pennant.....	6	83 20
92571	Primrose.....	do.....	14	Angus Gray.....	do.....	3	36 40
77787	Rescue.....	do.....	20	William Connors.....	East Dover.....	3	52 00
100474	R. Beatrice.....	do.....	19	Isaac Corney.....	West Dover.....	* 4	44 46
100566	Rob S.....	do.....	21	Geo. H. Marryatt.....	Pennant.....	2	54 60
75575	Rising Dawn.....	Lunenburg.....	18	Frederick Boutilier.....	Indian Harbour.....	5	46 80
64869	Sarah L. Oxner.....	Halifax.....	34	Edward Hayes.....	Herring Cove.....	10	88 40
100218	Sarah M. W.....	do.....	14	Hezekiah Wambolt.....	Indian Harbour.....	4	36 40
37519	Safeguide.....	do.....	36	W. C. Henley.....	Spry Bay.....	* 5	80 24
100255	Seaflee.....	do.....	12	James Stevens.....	Clan Harbour.....	3	31 20
103351	True Love.....	do.....	10	Jno. E. Arnold.....	Terence Bay.....	* 3	22 75
75833	Twilight.....	do.....	14	S. Hubly & C. Garrison	Indian Harbour.....	* 3	29 12
77836	T. W. Smith.....	do.....	35	Charles Beaver.....	Spry Bay.....	* 5	78 00
96781	Venture.....	do.....	43	Edward Dempsey.....	Herring Cove.....	11	111 80
97086	Veria G.....	do.....	54	Chas. W. Hart.....	Sambro.....	11	149 39
100260	Violet.....	do.....	12	James H. Smith.....	do.....	3	31 20
90485	Violet West.....	do.....	36	Thomas Gaetz, <i>et al.</i>	Seaforth.....	11	93 60
92578	Willetta.....	do.....	12	Joseph Gray.....	Sambro.....	3	31 20
61904	Water Lily.....	do.....	14	Isaac Morash.....	West Dover.....	* 2	30 34
100226	Willie H. Crosby.....	do.....	65	James Julien, <i>et al.</i>	W. Chezzetcook.....	18	169 00
85378	Zephyr.....	do.....	16	Robt. Slaunwhite.....	Terence Bay.....	5	41 60

INVERNESS COUNTY.

71302	Alice.....	Charlotte town,					
		P.E.I.....	10	Patrick Cormier.....	Cheticamp.....	5	26 00
103313	Catherine.....	Pt. Hawkesbury.	10	Séverin Chiasson.....	do.....	4	26 00
96778	Campania.....	do.....	11	C. Robin, Collas & Co., Ltd.....	Eastern Harbour.....	4	28 60
83244	Claribel.....	Charlotte town,					
		P.E.I.....	19	Chas. Doucet.....	Cheticamp.....	5	49 40
85392	Colibri.....	Pt. Hawkesbury.	18	James Britt.....	Belle Côte.....	* 4	36 78
96767	Dove.....	do.....	49	John Murray.....	Pt. Hawkesbury.....	9	127 40
96768	Elizabeth Ann.....	do.....	11	Magloire Poirier.....	Cheticamp.....	4	28 60
103317	Flying Star.....	do.....	11	P. Desveaux & S. Belfontain.....	do.....	4	28 60
96774	Florence.....	do.....	11	Thomas Poirier.....	do.....	5	28 60
103311	Henry L. Phillips.....	do.....	78	J. C. Skinner.....	Port Hastings.....	* 6	202 80
96763	Lelia Linwood.....	do.....	67	Peter Paint & Sons.....	Pt. Hawkesbury.....	6	87 10
103312	Laura.....	do.....	13	Joseph Aucoin.....	Cheticamp.....	5	33 80
96775	Louise.....	do.....	11	Placide Boudrot.....	do.....	4	28 60
103316	Laura.....	do.....	10	Ubalde Bourgeois.....	do.....	4	26 00
103318	Little Heir.....	do.....	19	Eusebe Chaisson.....	do.....	5	49 40
103315	Lillie.....	do.....	12	Fidèle Chiasson.....	do.....	4	31 20
103314	Mary.....	do.....	10	John Boudrot.....	do.....	4	26 00
69125	May Flower.....	do.....	15	Hyacinthe Chiasson.....	do.....	6	39 00
96769	Mary Lambert.....	do.....	11	Charles Chiasson.....	do.....	4	28 60
96779	Majestic.....	do.....	12	C. Robin, Collas & Co., Ltd.....	do.....	4	31 20
96771	Marie.....	do.....	10	Xavier Roach.....	do.....	4	26 00
96777	Marie Joseph.....	do.....	11	Victor Roach.....	do.....	4	28 60
96770	O. L. B.....	do.....	12	Gabriel Boudrot.....	do.....	4	31 20
96773	Virgin.....	do.....	10	Marcelin Leblanc.....	do.....	4	26 00
96776	Willie B.....	do.....	11	John F. Roach.....	do.....	4	28 60

DETAILED STATEMENT of Fishing Bounties paid to Vessels, &c.—Nova Scotia—Con.

KING'S COUNTY.

Official Number.	Name of Vessel.	Port of Registry.	Tonnage.	Name of Owner or Managing Owner.	Residence.	No. of Crew paid.	Amount of Bounty paid.
							\$ cts.
80093	Anna K.	St. John, N.B.	14	A. E. Spicer	Harbourville	* 3	31 85
77732	Heather Belle.....	Digby	13	Joseph Parker.....	Hall's Harbour.....	3	33 80
103023	Minnie H.	Parrsboro'	12	Edson Bowlby.....	Canada Creek.....	* 1	20 80
77967	Naomi.....	St. Andrew, N.B.	14	Charles Hagerty.....	Black Rock.....	3	36 40
94756	Sarah E. Ells.....	St. John, N.B.	19	Leonard Houghton.....	Hall's Harbour	3	49 40

LUNENBURG COUNTY.

100846	Albatross.....	Lunenburg	26	Abraham Ernst.....	Mahone Bay	5	67 60
100578	Avon.....	do	49	Thos. A. Wilson	Bridgewater.....	*12	118 30
100489	Algoma.....	do	56	Lemuel Publicover	Lahave.....	10	145 60
94790	Abana.....	do	80	James Romkey.....	do	14	208 00
100170	Atlanta.....	do	80	Freeman Anderson.....	Lunenburg	14	208 00
100839	Acalia.....	do	34	David Berringer.....	do	4	88 40
94783	Alaska.....	do	80	Lewis Knickle.....	do	12	208 00
100472	Arcana.....	do	80	Alex. Knickle.....	do	14	208 00
94961	Altona.....	do	67	Henry Moser.....	do	13	174 20
94778	Argosy.....	do	80	Charles Smith.....	do	12	208 00
100838	Blanche A. Colp ..	do	80	C. U. Mader.....	Mahone Bay.....	* 14	208 00
100848	Britannia.....	do	59	Lambert Lohnes.....	Lahave.....	* 8	127 84
100571	Britannia.....	do	80	Charles Smith.....	Lunenburg	14	208 00
94651	Bessie A.....	do	80	M. McGregor.....	Lahave.....	14	208 00
94647	Bonus.....	do	80	Jno. M. Ritcey.....	La Have.....	14	208 00
100163	Beauty.....	do	65	Wm. Sarty.....	do	10	169 00
92637	Bertie C. H.....	do	80	Thomas Hamm.....	Lunenburg	14	208 00
96823	Burnham H.....	do	80	Richard Heckman.....	do	14	208 00
94782	Bona Fides.....	do	80	I. Joseph Rudolph.....	do	14	208 00
96828	Bonanza.....	do	80	Charles Silver.....	do	14	208 00
103421	Blenheim.....	do	80	Charles Smith.....	do	14	208 00
94648	Batavia.....	do	80	L. B. Currie.....	West Dublin.....	14	208 00
103430	Beluga.....	do	80	A. V. Conrad.....	La Have.....	12	208 00
94643	Carrie M. C.....	do	39	Joshua Coolen.....	Fox Point	8	101 40
94645	C. A. Chisholm.....	do	80	Abraham Ernst.....	Mahone Bay.....	11	208 00
94658	C. A. Ernst.....	do	57	do	do	8	148 20
100159	C. U. Mader.....	do	80	C. U. Mader.....	do	14	208 00
100823	Carrie.....	do	60	Adnah Burns.....	Dayspring.....	13	156 00
97081	Carrie.....	do	80	Jno. M. Ritcey.....	La Have.....	14	208 00
100834	Comrade.....	do	80	Norman Reinhardt.....	Getson's Cove.....	14	208 90
90824	Ceto.....	do	80	A. V. Conrad.....	La Have.....	14	208 00
97084	Calla Lily.....	do	62	Edmund Hirtle.....	do	13	161 00
100579	Citizen.....	do	80	M. McGregor.....	do	16	208 00
96825	Cecilia W.....	do	41	Robt. Walfield.....	La Have Islands	8	106 60
90857	Capio.....	do	72	G. N. C. Hawkins.....	Lunenburg	11	187 20
103419	Cordova.....	do	80	Charles Smith.....	do	12	208 00
100570	Clarence F.....	do	52	David Smith.....	do	11	135 20
90869	Clara E. Mason.....	do	80	do	do	14	208 00
103415	Clarence Smith.....	do	80	G. A. Smith.....	do	14	208 00
100483	Curfew.....	do	49	J. D. Sperry.....	Petite Riviere.....	11	127 40
103428	Caldera.....	do	69	Jacob Weagle.....	Dayspring.....	13	179 40
103427	Cymbrian.....	do	60	Dean Fralick.....	La Have.....	13	156 00
88355	D. A. Mader.....	do	80	C. U. Mader.....	Mahone Bay.....	12	208 00
100841	Dora.....	do	80	W. F. Acker.....	Lunenburg	14	208 00
97089	Dictator.....	do	80	S. Watson Oxner.....	do	14	208 00
90834	Diego.....	Port Medway.....	27	Harris Conrad.....	Vogler's Cove.....	* 6	65 19
83308	Ella.....	Liverpool	10	Jennis C. Hanson.....	Mahone Bay.....	2	26 00
103424	Elva M.....	Lunenburg	80	C. U. Mader.....	do	14	208 00
88356	Energy.....	do	80	do	do	13	208 00
100827	Elnora.....	do	52	Henry Gerhardt.....	Kingsbury	*11	129 57
94659	Enterprise.....	do	80	Wm. Cleversey.....	La Have.....	9	208 00
96821	Edgar F. Richards.	do	55	Elias J. Richard.....	do	11	143 00

Marine and Fisheries—Fisheries Branch.

DETAILED STATEMENT of Fishing Bounties paid to **Vessels, &c.**—Nova Scotia—*Con.*

LUNENBURG COUNTY—*Continued.*

Official Number.	Name of Vessel.	Port of Registry.	Tonnage.	Name of Owner or Managing Owner.	Residence.	No. of Crew paid.	Amount of Bounty paid.
							\$ cts.
94650	Elsie	Lunenburg	47	Jno. Schmisser	La Have	7	122 20
94960	Eureka	do	80	Reuben Smith	do	14	208 00
100151	Erminie	do	80	Wm. Young	Lunenburg	13	208 00
100481	Florence	do	29	William Young	Mahone Bay	7	75 40
92638	Florence M.	do	80	J. Alex. Silver	Lunenburg	13	208 00
103198	F. B. Wade	Liverpool	80	L. B. Currie	West Dublin	16	208 00
103429	Fern	Lunenburg	70	Cyrus Walter	La Have	13	182 00
103411	Geneviève	do	80	Abraham Ernst	Mahone Bay	14	208 00
100478	Gladiola	do	52	Kenneth Silver	Dayspring	10	135 20
100850	Grace	do	80	Daniel Getson	Getson's Cove	14	208 00
94958	Genesta	do	80	Reuben Romkey	Lower La Have	14	208 00
97088	Glendale	do	38	Charles Bell	La Have	8	98 80
100488	Gurnet	do	56	Alvin Creaser	do	11	145 60
90862	Grenada	do	80	Alvin Himmelman	do	14	208 00
90582	G. A. Smith	do	80	Jno. M. Ritcey	do	12	208 00
93836	Gleaner	do	80	Samuel Herman	do	14	208 00
94773	Galatea	do	80	Jno. B. Young	do	14	208 00
100576	Glad Tidings	do	80	J. Wm. Young	do	17	208 00
97083	Garland	do	51	J. D. Sperry	Petite Rivière	8	132 60
100825	Georgina	do	34	James Bell, jun.	Dublin Shore	7	88 40
100480	Gallant	do	57	Elias Richard, sen., M.O	Getson's Point	12	148 20
100569	Howard Young	do	80	James Young	Lunenburg	14	208 00
90825	Henry N. Batchelder	Port Medway	80	Henry Selig	Vogler's Cove	17	208 00
100156	Hustler	Lunenburg	44	L. B. Currie	West Dublin	10	114 40
100490	Irene M. B.	do	66	Eli Ernst	Mahone Bay	12	171 60
96837	Irvin G.	do	80	Israel Spindler	Middle South	14	208 00
59475	Jessen	do	69	Jno. W. Haughn	La Have	9	179 40
103414	Jennie Myrtle	do	80	M. McGregor	do	16	208 00
94789	Joseph McGill	do	80	Henry Ritcey	do	16	208 00
94785	J. C. Schwartz	do	80	Charles Hewitt	Lunenburg	14	208 00
96380	J. A. Silver	do	80	Charles L. Silver	do	14	208 00
100164	J. H. Ernst	do	80	S. Watson Oxner	do	14	208 00
100837	J. M. Young	do	80	Wm. Young	do	14	208 00
94654	J. W. Geldert	do	80	Jas. W. Geldert	do	14	208 00
103491	Jennie May	do	80	Martin Westhaver	Martin's Brook	12	208 00
94780	Laurence	do	80	Abraham Ernest	Mahone Bay	18	208 00
94788	Laura C. Zwicker	do	80	do	do	14	208 00
100830	Lorraine C.	do	64	Leander Corkum	La Have	13	166 40
96827	Leopold	do	80	Samuel Ritcey	do	14	208 00
96833	L. E. Young	do	80	Benj. Anderson	Lunenburg	14	208 00
96832	Laura M. Knock	do	80	Benj. Knock	do	14	208 00
103418	Leader	do	80	Alex. Knickle	do	14	208 00
100835	Lottie B.	do	12	Allan R. Morash	do	2	31 20
103420	Luetta	do	80	David Smith	do	14	208 00
90854	Latona	do	80	S. Watson Oxner	do	13	208 00
83316	Lottie	Port Medway	80	S. E. Teel	Vogler's Cove	14	208 00
100562	Millie L. E.	Lunenburg	65	Abraham Ernst	Mahone Bay	12	169 00
103413	Mart-illo	do	65	do	do	10	169 00
96840	Mayflower	do	60	J. H. Dawson	Bridgewater	9	156 00
103422	Mischief	do	80	Thos. A. Wilson	do	16	208 00
83173	Maggie Smith	do	80	Lemuel Smith	Lower La Have	10	208 00
100844	Mystic Tie	do	64	Solomon Conrad	Upper La Have	9	158 08
100574	Melrose	do	71	Alvin Naugler	La Have	14	184 60
100849	Merl M. Parks	do	80	Simon Parks	do	14	208 00
103425	Majestic	do	80	Reuben Ritcey	do	14	208 00
90823	Miletus	Port Medway	80	Jno. Shankle	do	12	208 00
100573	Marsala	Lunenburg	38	James Shankle	do	9	98 80
94642	Minnie C.	do	55	Edmen Walters	do	12	143 00
94772	Molega	do	80	Benj. Anderson	Lunenburg	14	208 00
94775	Malabar	do	80	R. H. Griffith	do	14	208 00
92633	Magnolia	do	80	Joshua Heckman	do	14	208 00
103412	Minnie B.	do	25	Allan R. Morash	do	5	65 00

DETAILED STATEMENT of Fishing Bounties paid to Vessels, &c.—Nova Scotia—*Con.*LUNENBURG COUNTY—*Concluded.*

Official Number.	Name of Vessel.	Port of Registry.	Tonnage.	Name of Owner or Managing Owner.	Residence.	No. of Crew paid.	Amount of Bounty paid.
92640	Minerva	Lunenburg	80	Alex. Strum	Lunenburg	12	208 00
103416	Minnie J. Smith	do	80	Wm. C. Smith	do	16	208 00
92632	Monarch	do	80	J. H. Wilson	do	15	208 00
97100	Maggie M. W.	do	80	do	do	14	208 00
94777	Maurice C. Geldert	do	80	Jno. B. Young	do	14	208 00
100153	Milo	do	80	J. Wm. Young	do	14	208 00
100162	Magic	do	45	J. D. Sperry	Petite Riviere	8	117 00
100840	Maritime	do	59	Albert McKean	Pleasantville	*10	127 85
97032	Minnie Maud	Liverpool	80	Jno. S. Wolf	West Dublin	*16	196 46
103426	Melbourne	Lunenburg	61	Eber Gerhardt	La Have	13	158 60
83342	Nova Zembla	do	79	Joseph Hamm	Mahone Bay	13	205 40
88603	Nokomis	do	80	C. U. Mader	do	14	208 00
100485	Nightingale	do	52	W. D. Haughn	La Have	*10	119 60
100831	Nantasket	do	80	Robert Parks	do	14	208 00
90827	Nyanza	do	80	Elias Walter	Lunenburg	14	208 00
94966	Nicanor	do	79	Davis Westhaver	Martin's Brook	12	205 40
92636	Nonpareil	do	80	John Zinck	Lunenburg	14	208 00
94641	Ovando	do	80	Jeffrey Publicover	La Have	*11	199 34
100577	Oddfellow	do	58	Thomas Hamm	Lunenburg	12	150 80
94779	O. P. Silver	do	80	Obed Silver	do	14	208 00
94786	Ontario	do	80	Benj. C. Smith	do	13	208 00
85562	Oresa	do	13	Wm. Weinacht	do	4	33 80
100157	Orosoco	do	56	Wm. Westhaver	do	11	145 60
100483	Puma	do	58	Arthur Pentz	La Have	13	150 80
100836	Panama	do	80	Henry Adams	Lunenburg	14	208 00
94774	Puritan	do	80	Theophilus Creaser	Ritcey's Cove	14	208 00
100486	Pandora	do	53	Benj. Lohnes	South	12	137 80
103171	Ruby	Shelburne	57	Leander Oxner	Lower La Have	*10	141 47
100672	Rowena	Lunenburg	51	Wm. Schmeiser	La Have	11	132 60
96334	Robert F. Mason	do	80	Martin Mason	Lunenburg	14	208 00
100473	Rapture	do	57	Alvin Moser	South	12	148 20
88349	Senovar	do	80	Nathan Hiltz	Martin's Point	12	208 00
100165	Snow Queen	do	67	Leander Meisner	do	12	174 20
94962	Stella E.	do	80	Reuben Ritcey	La Have	14	208 00
94787	Samoa	do	80	James W. Geldert	Lunenburg	14	208 00
100471	Secret	do	80	Jno. B. Young	do	14	208 00
90868	Sadie	do	79	Thomas Backman	Rosebay	14	205 40
92623	Torridon	do	80	M. McGregor	La Have	14	207 00
100475	Tartar	do	61	W. N. Reinhardt	do	13	158 60
100476	Tokalon	do	52	James Richard	do	* 9	122 92
100575	Tyler	do	54	W. A. Zwicker	Lunenburg	10	140 40
103423	Three Cheers	do	80	Jacob W. Sarty	Pleasantville	*15	195 78
94657	T. W. Langille	do	71	Francis Conrad	Middle South	13	184 60
103417	Uruguay	do	80	Jno. M. Ritcey	LaHave	14	208 00
97098	Urania	do	80	David Heisler	Lunenburg	14	208 00
97099	Union	do	78	Wm. Smeltzer	do	12	202 80
94649	Valenar	do	80	Nathan Hiltz	Martin's Point	12	208 00
100821	Venus	do	76	Jacob Hiltz	Mahone Bay	12	197 60
94956	Venezuela	do	80	Isaac Corkum	LaHave	12	208 00
83164	Valiant	do	80	Anthony Heckman	do	12	208 00
100826	Vandala	do	72	Albert McKean	Pleasantville	10	187 20
94776	Volunteer	do	80	M. McGregor	LaHave	14	208 00
90597	Vivian	do	80	Arthur H. Zwicker	Lunenburg	14	208 00
85635	Vanilla	do	80	James Romkey	LaHave	12	208 00
94967	White-Cloud	do	80	C. U. Mader	Mahone Bay	14	208 00
94953	W. D. Richard	do	80	W. N. Reinhardt	Getson's Cove	*15	201 50
96829	Wisteria	do	80	Freeman Anderson	Lunenburg	14	208 00
100152	Werra	do	80	David Smith	do	14	208 00
100842	W. H. Walters	do	80	Thomas Walter	do	14	208 00
100833	Yucatan	do	80	J. Joseph Rudolph	do	14	208 00

Marine and Fisheries—Fisheries Branch.

DETAILED STATEMENT of Fishing Bounties paid to **Vessels**, &c.—Nova Scotia—*Con.*

QUEEN'S COUNTY.

Official Number.	Name of Vessel.	Port of Registry.	Tonnage.	Name of Owner or Managing Owner.	Residence.	No. of Crew paid.	Amount of Bounty paid.
							\$ cts.
90844	Armada	Guysborough	25	Lysander B. Cohoon	Port Medway	7	65 00
85564	Bessie Williams	Barrington	77	A. W. Hendry	Liverpool	11	200 20
85478	Glenora	Liverpool	76	James C. Inness	do	14	197 60
103191	Jennie B	do	13	Alexander Shankle	Port Matoon	* 3	29 58
103197	Marcella	do	80	A. W. Hendry	Liverpool	*13	179 14
75762	May Queen	do	17	Wm. H. Peterson	do	* 1	26 52
83310	Myosotis	Port Medway	80	Edwin Morine	Port Medway	14	208 00
61916	Only Son	Liverpool	16	Wm. A. Conrad	Liverpool	* 5	38 14
103194	Oressa	do	10	Winot Arnold	Port Matoon	* 2	21 67
90832	Ronald H. C.	Port Medway	55	Lysander B. Cohoon	Port Medway	11	143 00
103193	Startle	Liverpool	11	Albert Wagner	Port Matoon	3	23 60
103199	Trilby	do	12	Wm. Wigglesworth	Liverpool	3	31 20
83495	Utopia	do	30	James C. Inness	do	* 9	189 10
97041	W. H. Smith	do	43	Wm. P. Godfrey	Brooklyn	10	111 80

RICHMOND COUNTY.

69143	Arequippa	Arichat	36	Philip Gruchy	D'Escousse	7	93 60
88456	Alice May	do	39	Wm. LeVesconte	do	10	101 40
77544	Alpha	do	42	do	do	11	109 20
36474	Alexander Fraser	Lunenburg	32	Anselme Samson	do	10	83 20
66681	B. K. Kelly	Halifax	35	Robt. Joyce	do	* 5	83 42
35996	Blue Bell	Arichat	25	Marin Beausejour	Martinique	9	65 00
38301	B. Weir & Co.	do	25	Celestin Cordeau	River Bourgeois	* 7	60 94
54156	British Lady	Port Hawk'sbury	19	Albert Joyce	Riv. Inhabitants	2	49 40
75561	Boreas	Lunenburg	41	John Colford	Port Richmond	5	106 60
88459	Caroline	Arichat	12	Jno. B. Girroir	West Arichat	3	31 20
74100	Candid	do	22	Desiré Burke	River Bourgeois	7	57 20
72061	C. P. M.	do	22	Alexander Burke	do	6	57 20
103452	Charlotte	do	73	David Walker	Basin River Inhabitants	6	189 80
72058	Daisy	Arichat	34	Placide Richard	Arichat	3	88 40
72052	Dayspring	do	52	Chas. Leblanc	West Arichat	4	135 20
77822	Eliza Smith	do	44	Alexander Poirier	L'w'r D'Escousse	12	114 40
75569	Empress	Lunenburg	47	Celestin Poirier	do	*12	117 60
53811	Electric Flash	Halifax	53	Dominique Fougere	Poulaumont	13	137 80
38477	Elizabeth	Arichat	18	Placide Burke	River Bourgeois	7	46 80
83033	Emma Proctor	Port Hawk'sbury	41	Edward Proctor	Riv'r Inhabitants	7	106 60
83395	Elerie	Halifax	29	Lewis Murray	Port Richmond	3	75 40
74116	Fama	do	44	Wm. LeVesconte	D'Escousse	11	114 40
88462	Fannie S.	Arichat	28	Daniel Sampson	River Bourgeois	* 6	67 60
38481	G. H. B.	do	36	Placide Forgeron	West Arichat	4	93 60
88599	Guide	Halifax	38	Edward Poirier	L'w'r D'Escousse	11	98 80
38408	Hector	Arichat	35	George Walker	Basin	5	91 00
90734	Helen M. Crosby	Port Hawk'sbury	64	Wm. Cruickshanks	Port Richmond	16	166 40
88468	Irene	Arichat	12	David M. Gruchy	Petit de Grat	3	31 20
96761	Ida C. Spoffard	Port Hawk'sbury	54	Robert Murray	Port Richmond	7	140 40
88454	Jubilee	Arichat	34	D. Gruchy	D'Escousse	10	88 40
35560	Jacques	Yarmouth	58	Frederic Poirier	do	*13	140 78
38486	Julia	Arichat	20	Louis Burke	River Bourgeois	* 5	47 67
80972	John Vincin	Sydney	17	Peter Burke	do	* 5	40 52
83135	J. B. M.	Halifax	20	Samuel P. Burke	St. Peter's	* 4	43 34
83467	Katie	Arichat	11	David Poirier	L'w'r D'Escousse	3	28 60
80994	L'Esperance	Guysborough	10	Joseph Petitpas	Arichat	3	26 00
72070	Lennox	Arichat	46	D. Gruchy	D'Escousse	12	119 60
37551	Leading Star	Halifax	39	Rémi & Maxime Joyce	do	*11	93 60
88455	Laura Victoria	Arichat	39	John Manger	Cape LaRonde	10	101 40
75875	Lida and Lizzie	do	56	Wm. LeVesconte	D'Escousse	14	145 60
72071	Lumen Diei	do	20	Urbain Sampson	River Bourgeois	6	52 00
74054	Laura E. Douglas	Barrington	39	Joseph Steele	Port Richmond	6	161 40

DETAILED STATEMENT of Fishing Bounties paid to Vessels, &c.—Nova Scotia—Con.

RICHMOND COUNTY—Concluded.

Official Number.	Name of Vessel.	Port of Registry.	Tonnage.	Name of Owner or Managing Owner.	Residence.	No. of Crew paid.	Amount of Bounty paid.	
							\$	cts.
38516	Lady of the Lake.	Arichat.	26	Peter Landry.	St. Peter's.	?	67	60
88464	Mary E.	do	10	Chas. Wolfe.	Arichat.	3	26	00
88463	Maria	do	15	Andrew Boudrot.	Petit de Grat.	3	39	00
38417	Messenger.	do	30	Cleophas Boudrot.	Poulamond.	10	78	00
69969	Morning Light.	Port Hawk'sbury	39	David Walker.	Basin.	4	101	40
38522	Mary.	Arichat.	23	Isaie Boudrot.	River Bourgeois.	7	59	80
72063	May Flower.	do	12	John Burke.	do	6	31	20
88431	Mayflower.	Halifax.	21	Docité Fougère.	do	7	54	60
92066	Mary L.	Arichat.	19	Simon Goyetche.	do	* 5	45	29
83100	Morning Star.	do	13	Albert Boudrot.	Riv'r Inhabitants	* 2	28	17
100240	Merrimac.	Halifax.	58	Albert Martell.	D'Escousse	15	150	80
74365	Nova Stella.	Arichat.	53	Léon U. Poirier.	L'w'r D'Escousse	15	137	80
72148	Neptune.	do	26	Henry Sampson.	River Bourgeois.	8	67	60
54139	Ocean Belle.	Halifax.	20	Isidore Fougère.	Poulamond.	8	52	00
61630	Olive J.	do	57	Jno. Malcolm.	Port Malcolm.	9	148	20
74332	Proditor.	do	54	Désiré Poirier.	L'w'r D'Escousse	15	140	40
72007	Philomene D.	Arichat.	22	James Walker.	Basin.	5	57	20
38462	Partners.	do	26	Thomas Sampson.	River Bourgeois.	8	67	60
73119	Royal.	Halifax.	12	Isaac Dugas.	West Arichat.	2	31	20
88439	Ripple.	do	20	Isidore Boudrot.	Petit de Grat.	4	52	00
75763	Ripple.	Arichat.	17	David McDonald.	Basin.	2	44	20
64033	Ripple.	Port Hawk'sbury	34	Geo. Cruickshanks.	Port Richmond.	5	88	40
88452	R. Ferguson.	Arichat.	24	Maurice Burke.	St. Peter's	7	62	40
37612	Sea Slipper.	Lunenburg	41	Chas. Manger.	Cape La Ronde.	11	106	60
85645	Sissie Bell.	Halifax.	40	Firmin Fougère.	Poulamond.	*10	99	28
51781	S. E. Cove.	do	54	Rémi Fougère.	do	15	140	40
88465	Stella.	Arichat.	46	A. J. Boyd.	River Bourgeois.	12	119	60
92599	Thistle.	Sydney	11	L. Manbouquette.	L'Ardoise	* 2	23	84
38480	Two Brothers.	Arichat.	32	Simon Landry.	River Bourgeois.	9	83	20
61990	Union.	Halifax.	20	Arthur Leblanc.	Arichat.	3	52	00
71034	Vanguard.	do	47	Dom. Boudrot.	Petit de Grat.	* 6	106	94
57662	Village Bride.	do	24	Peter Malcolm.	Port Malcolm.	5	62	40
38523	Victoria.	Arichat.	24	Henry Burke.	St. Peter's	* 6	57	95
94666	Winged Arrow.	Halifax.	56	Paul Leblanc.	Poulamond.	14	145	60
90723	Winnie L.	do	31	John Graham.	Port Malcolm.	8	80	60

SHELburnE COUNTY.

90655	Annina	Yarmouth.	11	James Cox.	South Side.	* 5	26	22
90426	Amanda	Barrington	38	Isaac Nickerson	do	10	98	80
94632	A. C. Greenwood.	Shelburne	15	Hugh M. Perry.	Black Point.	5	39	00
100612	Ardella.	do	10	Lyle Martin.	East Jordan	4	26	00
100620	Alina	do	80	Churchill Locke.	Lockeport	*18	202	53
100617	Altona	do	28	Clifford Locke.	do	8	72	80
193178	Alfred.	do	80	Jno. A. McGowan.	Shelburne	*19	193	84
100813	Blanche	Barrington	24	Jno. T. Duncan.	Clarke's Harbour	9	62	40
97028	Bertha	Yarmouth	10	Edwin Williams	Green Harbour	* 3	22	75
88551	Blanche M. Thorburn	Shelburne	80	Wm. H. Thorburn.	Jordan Bay.	*16	196	46
100604	Bella H. McKinnon	do	35	Clifford Locke.	Lockeport.	9	91	00
94942	Coronilla	do	23	Wm. H. Kenny	Clarke's Harbour	9	59	80
61586	Cepola.	do	80	Wm. A. McDonald	Lockeport.	8	208	00
96970	Charlie Richardson.	do	26	J. B. Harding.	Rockland.	8	67	60
100605	Dawn	Barrington	49	Angus N. Smith.	Barrington	*12	122	50
100819	David James	do	27	J. J. Duncan.	Clarke's Harbour	9	70	20
90855	Delta.	Shelburne	24	Leander McKenzie.	East Jordan	* 3	44	90
83492	Dessie.	Liverpool	11	E. A. Capstick.	Lockeport.	4	28	60
75624	Dwina.	Shelburne	52	Churchill Locke.	do	14	135	20
100613	Dove	do	80	Arthur Hood.	Shelburne	16	208	00
97023	Edwina.	Yarmouth.	11	Leonard Penny.	South Side.	* 3	25	03

Marine and Fisheries—Fisheries Branch.

DETAILED STATEMENT of Fishing Bounties paid to **Vessels, &c.**—Nova Scotia—*Con.*

SHELburne COUNTY—*Continued.*

Official Number.	Name of Vessel.	Port of Registry.	Tonnage.	Name of Owner or Managing Owner.	Residence.	No. of Crew paid.	Amount of Bounty paid.
							¢ cts.
90712	Ella May	Halifax	19	Leander McKenzie	East Jordan	* 3	39 52
96976	Edith	Shelburne	40	Enos Churchill	Lockeport	* 8	98 23
85731	Eva L. H.	do	62	Albert E. Thorburn	Sandy Point	13	161 20
90645	Fly	Yarmouth	15	Chas. M. Wickens	Shag Harbour	4	39 00
85476	Fleetwing	Shelburne	11	Wilson Sperry	Green Harbour	4	28 60
100818	Geneva Ethel	Barrington	29	Chas. E. Kenny	Clarke's Harbour	* 8	71 22
103065	Garnet	Yarmouth	27	Edmund K. Snow	Port La Tour	6	70 20
80831	Glide	Lunenburg	16	Wm. McMillan	Lockeport	6	41 60
100815	Happy Home	Barrington	10	Harvey Slate	Cape Negro	4	26 00
90647	Hattie Emeline	Yarmouth	11	Charles Reynolds	Upper Port La Tour	* 3	21 46
80799	Hattie J.	Digby	16	Isaac Nickerson	Shag Harbour	* 6	36 40
97057	Horace B.	Liverpool	14	Geo. Hiltz	Lockeport	5	36 40
100607	Icelanda	Shelburne	19	Benjamin Hardy	Allandale	5	49 40
103174	Iona	do	15	Wm. L. Ringer	Lockeport	5	39 00
90440	Jennie Frederica	Barrington	40	Peter Kenny	Clarke's Harbour	9	104 00
54132	John Franklin	Halifax	18	F. A. Lockhart	Hantsport	* 6	43 46
88554	Jersey Lily	Shelburne	80	Enos Churchill	Lockeport	* 16	196 46
94941	John Furney	do	80	Geo. H. King	Sandy Point	* 20	208 00
77957	Kedron	Annapolis	22	Churchill Locke	Lockeport	* 7	53 63
73967	Katie	Liverpool	14	do	do	* 5	33 37
100817	Little Dorritt	Barrington	64	Angus N. Smith	Barrington	* 9	136 70
80624	Lima	Yarmouth	12	Wm. Halliday	Bear Point	* 3	23 40
100320	Lena	Barrington	13	Lovitt Nickerson	Clarke's Harbour	7	33 80
90438	Lark	do	13	Samuel Atwood	Oak Park	5	33 80
90429	Lettie May	do	10	David Nickerson	South Side	* 1	17 34
100606	Myra Louise	do	17	Robt. Lowe, sr.	Clarke's Harbour	* 7	41 44
100816	Mattie G. Morrissey	do	24	D. Morrissey	do	9	62 40
88402	Mizpah	Digby	53	E. Gaskill	North Head, Gd. Manan, N.B.	* 9	120 58
100614	Mayflower	Shelburne	11	Uriah Williams	Green Harbour	4	28 60
103175	Myrtle	do	10	Stephen Decker	Little Harbour	4	26 00
103182	Meta	do	18	Clifford Locke	Lockeport	5	46 80
100619	Mary E. Harlow	do	80	do	do	20	208 00
103173	Mabel	do	21	Jno. Matthews	Rockland	7	54 60
83493	Mary C.	Liverpool	80	Wm. McMillan	Lockeport	20	208 00
103177	Mayflower	Shelburne	12	Alfred Swim	do	4	31 20
92568	Mary Kate	Halifax	13	W. B. Lawrence	Shelburne	* 4	28 18
83434	Mary May	Barrington	20	Joseph Crow	Sandy Point	* 6	48 29
103184	Mayflower	Shelburne	26	Nathaniel Vernon	do	* 2	42 26
72977	Nellie H. Ham	Digby	26	Charles Anderson	Clarke's Harbour	* 3	48 29
90439	Oscar F.	Barrington	18	Henry D. Cook	South Side	6	46 80
96977	Oriole	Shelburne	43	Clifford Locke	Lockeport	9	111 80
100820	Ranger	Barrington	11	Thos. K. Nickerson	Doctor's Cove	* 3	25 03
100319	Rob Roy	Yarmouth	12	Freeman Lowe	Clarke's Harbour	7	31 20
92320	Rialto	Shelburne	46	A. E. Thorburn	Sandy Point	* 8	112 96
90648	Stranger	Barrington	15	James C. McGrevy	Centreville	9	39 00
85390	Susan C.	do	21	P. P. Smith	do	* 4	45 50
90433	Ste. Anne	do	11	J. E. Brown	Clarke's Harbour	* 3	22 80
100325	Starlight	Yarmouth	10	Stephen M. Goodwin	do	3	26 00
100616	Sea Slipper	Shelburne	11	James V. Euslow	Green Harbour	4	28 60
85483	Sarah H. Seeton	do	80	Clifford Locke	Lockeport	20	208 00
100814	Three Sisters	Barrington	10	Geo. Crowell	Bear Point	* 2	19 50
90893	Thomas H.	Yarmouth	13	Fred. Nickerson	Clarke's Harbo	* 7	30 06
103179	Tribly	Shelburne	31	Wm. McMillan	Lockeport	9	80 60
96961	Tivoli	do	24	Wm. J. Doane	Red Head	7	62 40
90895	Union St. Pierre	Yarmouth	20	Cyrus Nickerson	Clarke's Harbour	* 6	45 50
100811	Vesta Pearl	Barrington	40	Wm. B. Smith, jr.	do	* 8	93 60
100608	Vesper	Shelburne	13	Churchill Locke	Lockeport	5	33 80
100812	Wyvern	Barrington	25	James E. Swim	Clarke's Harbour	9	65 00
90430	Will Carleton	do	80	Joseph A. Smith	Port La Tour	* 16	208 00
85541	Willie M.	Yarmouth	24	Loran A. Kenney	Shag Harbour	* 6	57 95
100611	Water Sprite	Shelburne	50	Elijah Nickerson	Wood's Harbour	*	65 00

DETAILED STATEMENT of Fishing Bounties paid to Vessels, &c.—Nova Scotia—Con.

SHELburnE COUNTY—Concluded.

Official Number.	Name of Vessel.	Port of Registry.	Tonnage.	Name of Owner or Managing Owner.	Residence.	No. of Crew paid.	Amount of Bounty paid.
77744	Whip-poor-will	Shelburne	17	Jno. Littlewood. . . .	Black Point.	5	44 20
103183	Wren	do	18	Wm. McCarthy.	Shelburne	* 6	43 46
75722	Yuba	Yarmouth	15	Chas. E. Crowell. . . .	Port La Tour.	3	39 00

VICTORIA COUNTY.

100388	Hattie	Sydney	27	Jno. Fitzgerald.	Cape North.	* 5	54 60
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YARMOUTH COUNTY.

94980	Aurore	Yarmouth	80	Leon D'Eon	West Pubnico	18	208 00
94977	Civilian	do	80	Chs. D'Entremont . . .	do	19	208 00
85536	Circassian	do	80	A. P. Stoneman. . . .	Yarmouth	*22	195 52
103063	Defender	do	20	Ambrose D'Entremont	West Pubnico	* 5	44 58
66679	Diploma	do	80	Nicholas D'Entremont	do	19	208 00
90871	Dora	do	63	A. R. Stoneman	Yarmouth	*19	159 71
103053	Eddie C.	do	11	J. F. Harding	Lower Argyle. . . .	3	28 60
97036	Eva	do	10	Gabriel Bourque. . . .	Sluice Point	* 3	22 75
8551	Ethel	do	80	J. H. Porter & Co . . .	Tusket Wedge. . . .	19	208 00
90654	Flora	do	64	David D'Entremont. . .	West Pubnico	20	166 40
94972	Florence.	do	11	Joshua Boudreau . . .	Tusket Wedge. . . .	5	28 60
85503	G. P. Taylor.	do	13	W. A. Killam	Yarmouth	* 4	16 90
90885	Georgina.	do	80	Henry Lewis	do	*21	203 28
100327	Hattie.	do	10	Robt. Ellenwood, M.O.	do	* 5	23 84
85554	Hazel Glen	do	80	Arthur D'Entremont. .	West Pubnico	*20	198 56
80643	Hazel Dell.	do	80	Edward F. Parker . . .	Yarmouth	16	208 00
97026	James Farnham	do	31	Wm. A. Killam	do	* 4	60 46
88587	Jessie May	do	14	Angus Daley	Pubnico Head. . . .	* 5	33 37
90641	Jonathan.	do	69	Zacharie D'Eon	West Pubnico	19	179 40
88581	Kingfisher.	do	47	A. F. Stoneman	Yarmouth	*12	104 25
51972	Lydia Rider	do	57	Ls. P. D'Entremont. . .	West Pubnico	19	148 20
103059	Lady Bourque.	do	11	Uriel Bourque	Sluice Point	4	28 60
80614	Louise.	do	80	J. H. Porter & Co. . . .	Tusket Wedge. . . .	19	208 00
90887	L'Etoile	do	14	do	do	14	124 80
88261	Little Joe	do	18	Edward F. Parker. . . .	Yarmouth.	* 6	43 46
100329	La Rose	do	13	Eli Bourque.	Eel Brook.	* 4	30 42
88583	Mary O'Dell.	do	14	David Smith	Kelly's Cove. . . .	3	36 40
85539	Maggie Jane.	do	12	Wm. Robbins.	Port Maitland. . . .	* 3	27 30
103057	May Flower	do	12	James Blades.	East Pubnico. . . .	5	31 20
74339	Maitland.	do	45	Frank Harris.	Sandford	11	117 00
74322	Morning Star	do	25	J. B. Lewis.	Yarmouth	9	65 00
90659	N. A. Laura.	do	59	Thadé D'Entremont. . .	West Pubnico	19	153 40
88596	N. A. Louis.	do	64	Chas. D'Eon.	do	20	166 40
90892	Nellie.	do	59	J. H. Porter & Co . . .	Tusket Wedge. . . .	19	153 40
85553	Onyx	do	80	Edward F. Parker	Yarmouth	16	208 00
90873	Primrose	do	34	H. P. D'Entremont. . . .	Lower East Pubnico.	*10	84 39
100313	Souvenir.	do	71	S. D. D'Entremont . . .	West Pubnico	20	184 60
100323	Senora.	do	80	M. A. Surette	do	23	208 00
75724	Sea Foam	do	75	J. H. Porter & Co . . .	Tusket Wedge. . . .	*19	190 13
96962	Sun Rise	do	18	J. E. Crosby	Yarmouth	* 2	31 20
88589	Sandford.	do	20	W. A. Killam	do	* 4	40 87
100312	S. C. Hood.	do	12	Timothy Powell.	do	3	31 20
88597	Uncle Sam	do	80	James Amro	West Pubnico	24	208 00
90896	Wapiti	do	80	A. P. Stoneman.	Yarmouth	18	208 00
88260	William C. Allan. . . .	do	11	James E. Morris.	do	* 2	21 46
90897	Wrasse	do	56	A. P. Stoneman.	do	*18	141 77
90882	Will-o'-the-wisp.	do	51	do	do	*19	129 29

Marine and Fisheries—Fisheries Branch.

DETAILED STATEMENT of Fishing Bounties paid to Vessels, &c.—Continued.

PROVINCE OF NEW BRUNSWICK.

CHARLOTTE COUNTY.

Official Number.	Name of Vessel.	Port of Registry.	Tonnage.	Name of Owner or Managing Owner.	Residence.	No. of Crew paid.	Amount of Bounty paid.
							¢ cts.
94727	Aurelia	St. John	22	James Scovil	Grand Manan	* 4	47 68
74326	Dreadnaught	Yarmouth, N.S.	19	Alfred Stanley	Flagg's Cove	3	49 40
103118	Della F. Tarr	St. Andrew's	34	C. H. Greenwood	Wilson's Beach	* 6	82 09
80803	Exenia	Windsor, N.S.	18	Wm. F. Parker	Beaver Harbour	3	46 80
83202	Enchantress	St. Andrew's	10	Peter Dixon	Flagg's Cove	3	26 00
92516	Emma	do	22	Robt. Ellis	Maces Bay	5	57 20
80882	Ella Mabel	do	14	Walter Calder, jr.	Welchpool	3	36 40
92505	Edith R.	do	47	Richardson & Conley	West Isles	7	122 20
94834	Flora Wooster	do	22	Andrew McGee	Back Bay	4	57 20
88276	Falcon	do	12	James Lawson	Flagg's Cove	3	31 20
92511	Fleetwing	do	11	Alden McFarlane	do	* 2	23 84
97146	Free Trade	do	10	Geo. Scott	do	* *	13 00
94835	Georgie Linwood	do	25	Wm. Hawkins	Beaver Harbour	* 4	58 50
97150	Gleaner	do	13	Andrew McGee	Flagg's Cove	2	33 80
92508	Grey Eagle	do	13	N. Mitchell, jr.	Welchpool	3	33 80
59379	Gazette	do	47	Wm. Watt	Flagg's Cove	* 8	109 98
80650	Happy Home	Yarmouth, N.S.	14	John A. Doon	Black's Harbour	* 2	27 30
94839	Harry	St. Andrew's	14	Wm. J. Tucker	Flagg's Cove	3	36 40
83463	Havelock	do	33	Wm. James	Wilson's Beach	5	85 80
92507	Kinetics	do	10	Andrew McGee	Back Bay	* 1	19 50
88273	Lillian E.	do	13	do	do	3	33 80
59395	Little Minnie	do	14	do	do	* 2	27 30
75598	Lizzie Jane	Digby, N.S.	18	Charles Green	Fair Haven	3	46 80
77766	Laconic	Shelburne, N.S.	15	Jno. Dixon	Flagg's Cove	3	39 00
88407	Linnet	Digby, N.S.	15	James Scovil	do	3	39 00
83426	Louisa	St. John	16	Wm. Shaw et al.	Lepreaux	* 4	37 44
59342	Lizzie McGee	St. Andrew's	14	Andrew McGee	Back Bay	* 3	27 31
77965	Lydia B.	do	18	J. M. & W. Calder, jr.	Welchpool	3	46 80
103117	Margaret	do	49	Milton Eldridge et al.	Beaver Harbour	* 9	121 03
85442	Mystery	do	14	C. Dixon & Jno. Moses	Flagg's Cove	3	36 40
92514	Maggie Jane	do	10	John Thomas	do	4	26 00
88277	Maggie Jane	do	18	Thomas Bright	Seely's Cove	* 1	31 20
92509	Mary Jane	do	13	A. & W. Calder	Welchpool	3	33 80
97143	Ocean Gem	do	15	Lewis Frankland	White Hd. Island	* 2	32 50
92518	Peril	do	18	G. Dixon & M. Eldridge	Beaver Harbour	3	46 80
75547	River Rose	Barrington, N.S.	13	John Wills	White Head	* 4	30 42
88272	Simeon H. Bell	St. Andrew's	14	Moses & Chas. Dixon	Flagg's Cove	3	36 40
88414	Trumpet	St. John	20	Geo. U. Wright	Beaver Harbour	3	52 00
97145	Thistle	St. Andrew's	12	Frank Ingersoll	Flagg's Cove	* 3	15 60
59387	Telephone	do	19	James Brown et al.	Wilson's Beach	3	49 40
88282	Veritas	do	10	Simon Leonard	Leonardville	* 1	17 34
103111	Volunteer	do	13	A. W. Ingersoll	Woodw'd's Cove	3	33 80
94832	Venus	do	42	Simon Brown	Wilson's Beach	7	109 20
77969	Wave Queen	do	11	H. W. Foster	Grand Harbour	4	28 60
92512	Water Witch	do	11	R. A. Main	Woodw'd's Cove	* 3	25 03

GLOUCESTER COUNTY.

103275	Anna Helen	Chatham	12	Colin C. Turner	Tracadie	3	31 20
100960	Annie M.	do	11	W. S. Loggie	Chatham	4	28 60
103061	Albatross	do	13	Thomas Ahier	Shippegan	3	33 80
100987	Arabi	do	12	Philip Rive	Caraquet	3	31 20
100990	Alberta	do	11	do	do	3	28 60
96739	Angeline	do	14	Octave Gionet	do	3	36 40
103085	Argentina	do	12	Vital Lanteigne	do	3	31 20
103071	Anglesca	do	12	Hyacinthe LeBoutillier	do	3	31 20

DETAILED STATEMENT of Fishing Bounties paid to Vessels, &c., New Brunswick—
Continued.

GLOUCESTER COUNTY--Continued.

Official Number.	Name of Vessel.	Port of Registry.	Tonnage.	Name of Owner or Managing Owner.	Residence.	No. of Crew paid.	Amount of Bounty paid.
							\$ cts.
100984	Alice	Chatham	11	Chas. DeGruchy	Percé	3	28 60
100309	Adeline Gladys	do	12	Richard Young	Little Lamèque	3	31 20
92419	Anna	do	12	Docite Chiasson	Lamèque	3	31 20
72099	Adeline	do	12	Auguste Poulin	do	3	31 20
80716	Annie	New Carlisle, Q.	10	Robert Rivers	Miscou Lighth'e.	3	22 75
103279	Alice Maud	Chatham	10	Peter Fiott	Caraquet	3	26 00
97194	Alika	do	12	Lange Poulin, sr.	Lamèque	3	31 20
96725	Bessie T.	do	10	Colin C. Turner	Tracadie	3	26 00
103072	Ben Hurr	do	11	John Young	do	4	28 60
100975	Big Bear	do	10	Robert Young & Son	Caraquet	3	26 00
100783	Belle	do	11	do	do	3	28 60
100909	Bluenose	do	11	Joseph Sewell	do	3	28 60
100780	Brittannic	do	12	Colson Hubbard	do	3	31 20
100299	Blanchard	do	12	Peter Fiott	do	3	31 20
100983	Bee	do	11	Chas. DeGruchy	Percé	3	28 60
61431	Bee	do	11	Paul Noel	Lamèque	3	28 60
72079	Betsy	do	13	Sebastien Noel	Little Lamèque	3	33 80
101000	Condor	do	10	Thomas Ahier	Shippegan	3	26 00
103083	Corsair	do	10	do	do	4	26 00
10098	Cassar	do	10	Philip Rive	Caraquet	3	26 00
100774	Calliope	do	12	do	do	4	31 20
100789	Chazalie	do	11	Robt. Young & Son	do	4	28 60
100784	Charlotte	do	13	do	do	3	33 80
103271	Celia	do	11	Dominique Gallien	do	3	28 60
100971	Cyprien	do	10	Eli Sivret	do	3	26 00
100916	Cygnnet	do	12	Geo. Romeril	Paspebiac	3	31 20
96730	Christina	do	11	Chas. DeGruchy	Percé	3	28 60
103076	Dipper	do	11	W. S. Loggie	Chatham	3	28 60
100999	Dove	do	11	Thos. Ahier	Shippegan	3	28 60
100913	Daffodil	do	10	do	do	3	26 00
100915	Dawn	do	12	Geo. Romeril	Paspebiac	3	31 20
100917	Dora	do	11	do	do	3	28 60
92412	Dollie Dutton	do	13	Richard Young	Little Lamèque	4	33 80
100998	Eagle	do	10	Thos. Ahier	Shippegan	4	26 00
100911	Emperor	do	10	do	do	3	26 00
103090	Etna	do	11	Philip Rive	Caraquet	3	28 60
100772	Estelle	do	13	do	do	3	33 80
100905	Evangeline	do	10	do	do	3	26 00
100293	Eliza	do	15	Robert Young & Son	do	3	39 00
100786	Empress	do	12	do	do	12	31 20
100787	Ethel	do	11	do	do	3	28 60
96723	Emma	do	15	Ludger Duguay	Shippegan Island	3	39 00
96737	Elmina	do	11	Jacques Noël, sen	Lamèque	4	28 60
61405	Fly	do	11	Alex. McLaughlin	Tracadie	4	28 60
100977	Fly	do	12	Charles DeGruchy	Percé	3	31 20
96736	Fly	do	14	Richard Young	Little Lamèque	4	36 40
103001	Falcon	do	10	Thomas Ahier	Shippegan	3	26 00
100913	Foam	do	10	do	do	3	26 00
100782	Flying Foam	do	12	R. Young & Son	Caraquet	3	31 20
85699	Four Sisters	do	10	Marcel Caron	do	3	26 00
103077	Fame	do	10	W. S. Loggie & Co	Shippegan	4	26 00
61445	Flavie	do	13	Theophile Duguay	Lamèque	4	33 80
100298	Fisher	do	12	Elie Chiasson	Little Lamèque	4	31 20
92418	Grip	do	12	James Davidson	Tracadie	* 2	26 00
100993	Garfield	do	10	Philip Rive	Caraquet	3	26 00
100964	Gladstone	do	10	do	do	3	26 00
100989	Gladiator	do	11	do	do	3	28 60
100992	Great Mogul	do	11	do	do	* 2	23 84
100790	Guiding Star	do	11	R. Young & Son	do	3	28 60
103086	Gipsy	do	20	J. R. Chiasson	do	3	52 00
100910	Gleaner	do	13	Luc Lanteigne	do	3	33 80
100954	Gazelle	do	10	Colson Hubbard	do	4	26 00

Marine and Fisheries—Fisheries Branch.

DETAILED STATEMENT of Fishing Bounties paid to Vessels, &c.—New Brunswick—
Continued.

GLOUCESTER COUNTY—*Continued.*

Official Number.	Name of Vessel.	Port of Registry.	Tonnage.	Name of Owner or Managing Owner.	Residence.	Nc. of Crew paid.	Amount of Bounty paid.
							\$ cts.
100919	Gazelle	Chatham	12	Geo. Romeril	Paspebiac	3	31 20
100778	Gambetta	do	12	Colson Hubbard	Caraquet	3	31 20
106968	Gem	do	11	Chas. DeGruchy	Percé	3	28 60
96733	Gem	do	12	Richard Young	Little Lamèque	4	31 20
103282	Gilnockie	do	11	Robert Young & Son	Caraquet	3	28 60
100994	Hercules	do	10	Philip Rive	do	3	26 00
100906	Hotspur	do	10	do	do	3	26 00
61425	Hope	do	13	Geo. Romeril	Paspebiac	3	33 80
100956	Harold N.	do	12	W. S. Loggie & Co.	Shippegan	3	31 20
100903	Hope	do	12	Robt. Young & Son	Caraquet	3	31 20
100997	Ivanhoe	do	10	Thomas Ahier	Shippegan	3	26 00
96724	Isabel	do	11	Pierre Noël	Lamèque	3	28 60
100958	John B.	do	11	W. S. Loggie	Chatham	3	28 60
100965	Josephine	do	11	Philip Rive	Caraquet	3	28 60
100969	John Bull	do	10	Joseph Sewell	do	3	26 00
103289	Jersey Lily	do	12	Thomas Ahier	Shippegan	3	31 20
103281	Japan	do	11	R. Young & Son	Caraquet	3	28 60
100981	Kite	do	11	Chas. DeGruchy	Percé	3	28 60
103288	Kite	do	10	Thomas Ahier	Shippegan	3	26 00
103283	Kohinoor	do	13	Philip Rive	Caraquet	3	32 80
103075	Lilly Belle	do	14	W. S. Loggie	Chatham	4	36 40
103003	Lark	do	10	Thomas Ahier	Shippegan	3	26 00
103089	Lady Maud	do	11	Philip Rive	Caraquet	3	28 60
100902	Lord Stanley	do	10	R. Young & Son	do	3	26 00
100972	Lizzie D.	do	11	do	do	3	28 60
100951	Leo	do	13	Hyacinthe Lanteigne	do	4	33 80
100980	Lynx	do	11	Chas. DeGruchy	Percé	3	28 60
103280	Lily	do	11	Peter Fiott	Caraquet	3	28 60
92413	Mary Jane	do	14	Theodore Savoy	Tracadie	4	36 40
88669	Morning Star	do	12	Gustave Gionet	Pokemouche	3	31 20
92420	Mary Louise	do	13	Richard LeBreton	do	* 2	25 36
100781	Mary Louise	do	11	Colson Hubbard	Caraquet	* 2	23 84
100957	Mary R.	do	12	W. S. Loggie	Chatham	3	31 20
100785	Midnight	do	11	Robt. Young & Son	Caraquet	3	28 60
103088	Max	do	10	Maxime Cormier	do	3	26 00
85692	Mary	do	11	Isaie Godin	do	3	28 60
103084	Mary Emma	do	11	Onesime Poulin	do	3	28 60
100295	Marie Louisa	do	18	Joseph Poulin	do	4	46 80
100955	Majestic	do	10	Colson Hubbard	do	3	26 00
100779	Mermaid	do	11	do	do	3	28 60
100300	Mikado	do	13	Peter Fiott	do	3	33 80
61447	Merida	do	13	Andre Aché	Lamèque	4	33 80
72100	Marie	do	11	Onesime Chiasson	do	4	28 60
100292	Marie Joseph	do	12	Lazare Gauvin	Little Lamèque	3	31 20
103278	Marie Celia	do	13	Lange Albert	Blue Cove	4	33 80
100991	MacMahon	do	11	Philip Rive	Caraquet	3	28 60
100970	Nellie	do	11	Dominique Gallien	do	3	28 60
103284	Normandy	do	11	Philip Rive	do	3	28 60
103005	Osprey	do	10	Thomas Ahier	Shippegan	4	26 00
103004	Oriole	do	11	do	do	* 2	23 84
96732	Providence	do	10	J. L. Robichaud	do	4	26 00
72076	Providence	do	12	Thomas Ahier	do	3	31 20
96740	Providence	do	13	Prosper Albert	Caraquet	3	33 80
103080	Parmigan	do	11	Thomas Ahier	Shippegan	3	28 60
100996	Parisian	do	10	Philip Rive	Caraquet	3	26 00
100776	Patrick	do	11	do	do	3	28 60
100904	P. T. S.	do	11	Thomas Sivret	do	3	28 60
100297	Palma	do	14	Olivier Duguay	Lamèque	4	36 40
100967	Queen	do	10	Robert Young & Son	Caraquet	3	26 00
103272	Red Weasel	do	11	John Young	Tracadie	* 2	23 84
103074	Raleigh	do	10	W. S. Loggie	Chatham	3	26 00
103078	Reward	do	13	Jas. DeGrace	Shippegan	3	33 80

DETAILED STATEMENT of Fishing Bounties paid to Vessels, &c.—New Brunswick—
*Continued.*GLOUCESTER COUNTY—*Concluded.*

Official Number.	Name of Vessel.	Port of Registry.	Tonnage.	Name of Owner or Managing Owner.	Residence.	No. of Crew paid.	Amount of Bounty paid.
							\$ cts.
100773	Rupert.....	Chatham.....	12	Philip Rive.....	Caraquet.....	3	31 20
100775	Red Gauntlet.....	do.....	11	do.....	do.....	3	28 60
100908	Rosalie.....	do.....	10	E. LeBoutillier.....	do.....	3	26 00
100952	Replevin.....	do.....	10	Geo. Romeril.....	Paspebiac.....	3	26 00
97191	Rita.....	do.....	12	Chas. DeGruchy.....	Percé.....	3	31 20
100979	Ranger.....	do.....	10	do.....	do.....	3	26 00
96727	Ryse.....	do.....	11	Sinaï Aché.....	Lamèque.....	3	28 60
92404	Rosa.....	do.....	17	F. O. Aché.....	do.....	4	44 20
61438	Rosane.....	do.....	13	Aimé Duguay.....	do.....	3	33 80
103273	Russell.....	do.....	10	Jno. M. Ward.....	Miscou Island.....	3	26 00
103287	Raven.....	do.....	11	Thomas Ahier.....	Shippegan.....	4	28 60
100961	Silver Moon.....	do.....	14	W. S. Loggie.....	Chatham.....	4	36 40
103006	Swallow.....	do.....	11	Thos. Ahier.....	Shippegan.....	3	28 60
100963	Stanley.....	do.....	10	Philip Rive.....	Caraquet.....	3	26 00
100788	Sir Charles.....	do.....	11	R. Young & Son.....	do.....	3	28 60
100901	Sea Flower.....	do.....	12	do.....	do.....	3	31 20
100914	Sea Flower.....	do.....	11	Geo. Romeril.....	Paspebiac.....	3	28 60
100974	Sivret.....	do.....	10	R. Young & Son.....	Caraquet.....	3	26 00
100907	Sarah.....	do.....	10	do.....	do.....	3	26 00
100986	Swift.....	do.....	11	Maxime Cormier.....	do.....	3	28 60
103010	Sarah B.....	do.....	10	J. N. Lanteigne.....	do.....	3	26 00
103087	Stanley.....	do.....	10	Théotime Poulin.....	do.....	3	26 00
100978	Speedy.....	do.....	11	Chas. DeGruchy.....	Percé.....	3	28 60
100982	Snowdrop.....	do.....	11	do.....	do.....	3	28 60
100959	Sea Bird.....	do.....	10	W. S. Loggie & Co.....	Shippegan.....	3	26 00
100308	St. Joseph.....	do.....	12	Adolphe Aché.....	Lamèque.....	4	31 20
74401	Sara.....	do.....	11	Nazaire Noël.....	do.....	3	28 60
96731	Sea Star.....	do.....	13	Joseph Savoy.....	Shippegan.....	3	33 80
92408	Sarah, A. W.....	do.....	15	Robt. J. Wilson.....	Miscou.....	3	39 00
103286	Snipe.....	do.....	11	Thomas Ahier.....	Shippegan.....	4	28 60
103082	Thrush.....	do.....	10	do.....	do.....	3	26 00
100777	Teutonic.....	do.....	11	Colson Hubbard.....	Caraquet.....	3	28 60
100918	Tickler.....	do.....	12	Geo. Romeril.....	Paspebiac.....	3	31 20
96738	Three Brothers.....	do.....	12	Richard Young.....	Little Lamèque.....	4	31 20
100771	Umbria.....	do.....	12	Philip Rive.....	Caraquet.....	3	31 20
103274	Vesuvius.....	do.....	10	Geo. D. Mallet.....	Shippegan.....	3	26 00
100995	Voltaire.....	do.....	10	Philip Rive.....	Caraquet.....	3	26 00
100966	Von Molke.....	do.....	11	do.....	do.....	3	28 60
103285	Valkyrie.....	do.....	12	do.....	do.....	3	31 20
88663	Wm. Sinclair.....	do.....	17	W. S. Loggie.....	Chatham.....	5	44 20
103079	Wren.....	do.....	11	Thos. Ahier.....	Shippegan.....	3	28 60
100973	World's Fair.....	do.....	11	R. Young & Son.....	Caraquet.....	3	28 60
100953	White Wings.....	do.....	10	do.....	do.....	3	26 00
100985	Wasp.....	do.....	12	Chas. DeGruchy.....	Percé.....	3	31 20
96735	White Fish.....	do.....	12	Joseph Savoy.....	Lamèque.....	4	31 20
100920	Zephyr.....	do.....	12	Geo. Romeril.....	Paspebiac.....	3	31 20

NORTHUMBERLAND COUNTY.

83105	Katie Bell.....	Chatham.....	11	Mathurin Breaux.....	Neguac.....	3	28 60
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RESTIGOUCHE COUNTY.

94959	Winnie, G. S.....	Lunenburg, N.S.	26	Donald McGregor.....	Dalhousie.....	*5	60 84
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Marine and Fisheries—Fisheries Branch.

DETAILED STATEMENT of Fishing Bounties paid to Vessels, &c., New Brunswick— *Continued.*

ST. JOHN COUNTY.

Official Number.	Name of Vessel.	Port of Registry.	Tonnage.	Name of Owner or Managing Owner.	Residence.	No. of Crew paid.	Amount of Bounty paid.
							\$ cts.
88270	Alice May.....	St. John.....	10	Jos. Shoebridge.....	St. John.....	2	26 00
88387	Comet.....	Windsor, N.S. . .	10	W. E. Belding.....	Chance Harbour	2	26 00
103114	Edward Morse.....	St. Andrew's.....	32	John Butler.....	Musquash	6	83 20
59373	E. M. Oliver.....	do.....	14	Chas. Harkins.....	Dipper Harbour	3	36 40
88253	E. B. Collwell.....	St. John.....	19	A. Thompson.....	do	5	49 40
103114	Ethel.....	St. Andrew's.....	10	Wm. J. Galbraith.....	Pisarinco.....	3	26 00
77783	Lost Heir.....	St. John.....	15	Hy. Alston.....	do	5	39 00
42089	Lily.....	St. Andrew's.....	10	Francis Campbell.....	Dipper Harbour	2	26 00
59326	Maud Holmes.....	do.....	21	Patrick Murray.....	do	*3	47 78
59322	Sea Flower.....	St. John.....	11	James Thompson.....	Chance Harbour	3	23 60
97149	Winnie.....	St. Andrew's.....	12	Robt. McLellan.....	Dipper Harbour	2	31 20

DETAILED STATEMENT of Fishing Bounties paid to Vessels, &c.—Continued.

PROVINCE OF PRINCE EDWARD ISLAND.

KING'S COUNTY.

Official Number.	Name of Vessel.	Port of Registry.	Tonnage.	Name of Owner or Managing Owner.	Residence.	No. of Crew paid.	Amount of Bounty paid.
96924	Brother and Sister.	Charlottetown . .	26	Wm. Lord	Souris	*5	\$ 57 95
74141	Belle	Guysboro', N.S.	31	Alex. Jackson	Murray Har. N.	4	80 60
69132	Belle of the Bay	do	20	John Gosbee, M. O.	Murray River . .	*	26 00
92675	Can't Help It	Pictou, N.S.	40	John Herring	Murray Har. S.	8	104 00
38335	Elizabeth	Arichat, N.S.	17	Daniel Hemphill	Georgetown . . .	*5	40 52
83196	Ethel Blanche	Pictou, N.S.	17	James Penny, jun.	Murray Har. S.	4	44 20
100691	Francis E. Willard	do	23	Benj. H. Herring	do	*4	53 82
75552	Hannah Eldridge	Halifax, N.S.	57	Henry Dicks	Georgetown . . .	4	148 20
90640	Lorena	Charlottetown . .	11	Peter Stewart	Souris	*3	22 88
69109	Marcella Butler	Halifax, N.S.	38	Jno. Hemphill	Georgetown . . .	4	98 80
90639	Morell	Charlottetown . .	16	Edward Delorey	do	3	41 60
100696	Marion Emerson	Pictou, N.S.	30	Reuben Cahoon	Cape Bear	4	78 00
94667	Nettie M. G	Halifax, N.S.	32	John Cahoon	do	*5	76 27
88350	Orion	Charlottetown . .	28	Aaron Cogswell	Georgetown . . .	14	202 80
96761	Quick	Port Hawkesbury, N.S.	13	Reuben Bisson	Souris	*2	25 36
90488	Wave	Charlottetown . .	19	James Delorey	Georgetown . . .	3	49 40
88228	Welcome	do	33	Walter Millar	Murray Har. N.	*6	79 68

PRINCE COUNTY.

71310	Black Watch	Charlottetown . .	24	Benj. Perry	Alberton	5	62 40
92467	Golden Ball	do	12	Wm. Cousins	Lot 4	2	31 20
80928	L. H. Davies	do	33	Gallant & Pino	Bloomfield	*9	81 51
75891	May Queen	Chatham, N.B.	23	James Richard	Alberton	*5	54 82
94992	Sarah P. Ayer	Charlottetown . .	64	Jno. Champion	do	13	166 40
92610	S. A. Parkhurst	do	44	Thos. B. Woodman	do	*2	68 64
83096	St. Patrick	do	16	Jno. White	Fortune Cove . . .	*3	36 40
96926	Sea Foam	do	15	Wm G. Ramsay	Princetown	4	39 00

QUEEN'S COUNTY.

92466	G. H. Gardner	Charlottetown . .	17	Isaac Marshall	N. Rustico	*3	38 68
96936	Katie and Ella	do	20	G. H. Toombs	Charlottetown . .	5	52 00

Marine and Fisheries—Fisheries Branch.

DETAILED STATEMENT of Fishing Bounties paid to Vessels, &c.—*Concluded.*

PROVINCE OF QUEBEC.

GASPÉ COUNTY.

Official Number.	Name of Vessel.	Port of Registry.	Tonnage.	Name of Owner or Managing Owner.	Residence.	No. of Crew paid.	Amount of Bounty paid.
73495	Canadienne	Halifax, N.S.	53	J. N. Arseneau.....	Grindstone	11	\$ cts. 137 80
96766	Golden Rule.....	Pt. Hawkesbury, N.S.	42	J. P. Savage	Amherst, M.I. ...	9	109 20
94675	Success	Halifax, N.S.	16	R. J. Leslie	do	3	41 60

SAGUENAY COUNTY.

74270	Amarilda.....	Quebec.....	24	Pierre Bernier	Bic	2	62 40
85756	Aristile	do	19	Cleophas Vézina.....	St. Michel.....	4	49 40
100857	Alix	do	13	Alfred Tremblay.....	Montnagny	2	33 80
42436	Amelia	Gaspé.....	50	Paul Cormier.....	Pt. Esquimaux.....	8	130 00
100463	B. C.	Quebec	15	François Métivier.....	Montnagny	2	39 00
83370	C. M. G. P.	do	46	J. B. Petipas	Pt. Esquimaux.....	* 8	112 96
61966	D. Cronan.....	Halifax, N.S.	40	Nazaire Cormier.....	do	6	104 00
59909	Elizabeth.....	Quebec	27	Joseph Caron.....	Sandy Bay.....	4	70 20
80754	Eugenie.....	do	48	André Vigneau.....	Pt. Esquimaux.....	6	124 80
92586	Golden Bow.....	Gaspé.....	61	Matthew Allison.....	Thunder River.....	4	158 60
75679	Gleaner.....	Quebec	41	Luc Cormier.....	Pt. Esquimaux.....	* 8	100 68
85750	H B.	do	57	Edouard Boudreau.....	do	4	148 20
66259	Katie E. Stuart ..	Halifax, N.S.	54	James Buckle	Bonne Espérance ..	* 6	122 86
103355	La Clerina	Quebec	20	Narcisse Levesque	Green Island.....	* 2	26 00
103136	Marie Claude.....	do	21	Ulric Couillard.....	Sandy Bay.....	* 2	45 50
100464	Marie Oliva	do	12	Horace Demeule.....	Isle aux Coudres ..	3	31 20
100469	Marie Victoire ..	do	20	A. Pedneau	do	4	52 00
80734	Marie Louisa.....	do	29	Désiré Morin.....	L'Islet.....	6	75 40
89584	Marie Louise	do	23	Pierre Ouellette.....	Quebec.....	4	59 80
69380	Marie Anne	Gaspé.....	36	Chas. Landry	Pt. Esquimaux.....	7	93 60
69382	Marie du Sacré Cœur	do	46	Paul Landry	do	6	119 60
42434	Marguerite	Quebec	27	Guillaume Duguay.....	Cailles Rouges.....	* 1	52 65
55863	Marie Adelmina ..	do	13	Cyrille Levesque, sr.	Green Island.....	2	33 80
77866	Pioneer	do	39	Wm. Lebrun.....	Pt. Esquimaux.....	6	101 40
75445	Phœnix.....	Gaspé.....	28	Louis Vigneau	do	4	72 80
103358	Romeo	Quebec	22	Louis Pineau	Bic	2	57 20
74385	Safe	Yarmouth, N.S.	35	Cyrille Giasson	Seven Islands.....	3	91 00
100362	St. Louis	Quebec	23	A. Bergeron	Isle aux Coudres ..	5	59 80
103133	Snowshoe	do	20	Ferlinand Buteau.....	Berthier.....	4	52 00
103359	Steadfast	do	40	Joseph Gagné	Murray Bay	5	104 00
80753	Stella Maris	do	51	Ls. Cummings	Pt. Esquimaux.....	* 8	119 34
69591	Ste. Marie	do	37	Alex. Shearer	do	* 4	86 58
73026	Ste. Anne	do	20	A. & L. Michaud	Green Island.....	* 2	26 00

APPENDIX No. 3.

NOVA SCOTIA.

District No. 1.—Comprising the four counties of the Island of Cape Breton.
Inspector A. C. Bertram, North Sydney, C.B.

District No. 2.—Comprising the counties of Cumberland, Colchester, Pictou, Antigonish, Guysborough, Halifax and Hants.
Inspector Robert Hockin, Pictou.

District No. 3.—Comprising the counties of King's, Annapolis, Digby, Yarmouth, Shelburne, Queen's and Lunenburg.
Inspector L. S. Ford, Milton.

DISTRICT No. 1.

ANNUAL REPORT ON THE FISHERIES OF CAPE BRETON ISLAND COM- PRISING THE COUNTIES OF CAPE BRETON, INVERNESS, RICH- MOND AND VICTORIA.

NORTH SYDNEY, C.B., 2nd January, 1896.

To the Honourable
The Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit my report on the fisheries of Cape Breton Island, for the year 1895, together with synopsis of the reports of the local fishery officers, the statistical returns and the usual comparative tables.

In a preliminary report I predicted that the statistics would show a marked decrease in the fishery yield for this year. The statistics, I regret to say, bear me out in that surmise.

In view, therefore, of the large falling off in this industry as compared with 1894, I have endeavoured by the comparative schedule below to show the average loss sustained by our fishermen. It will be observed that the loss is greater per man in Cape Breton and Inverness counties; due in the former to the large falling off in mackerel and codfish, and in the latter to a decreased yield among a larger number of men.

COUNTIES.	MEN.		Increase.	Decrease.	YIELD PER MAN.		Decrease.
	1894.	1895.			1894.	1895.	
Cape Breton	1,554	1,502	.....	52	148·61	127·79	20·82
Inverness	2,214	2,256	42	.....	146·90	140·00	12·28
Richmond	2,434	2,457	23	.....	177·67	154·33	23·34
Victoria	1,449	1,463	14	.....	130·25	123·57	6·68

Marine and Fisheries—Fisheries Branch.

The number of men engaged in the fisheries was slightly greater than in 1894, but by reference to the following comparative table of the number of boats and men employed in the fisheries, it will be observed that they vary but slightly from year to year.

COUNTIES.	TONNAGE OF VESSELS		MANNED BY.		BOATS ENGAGED		MANNED BY.	
	1894.	1895.	1894.	1895.	1894.	1895.	1894.	1895.
Cape Breton	182	174	55	56	818	800	1,498	1,446
Inverness.....	422	509	95	127	808	832	2,119	2,129
Richmond.....	2,185	2,297	504	543	1,305	1,379	1,930	1,914
Victoria.....	56	50	16	17	845	905	1,433	1,446

Observing the success of the fisheries, in other localities, where prosecuted by schooners with the encouragement given by the Government in the way of bounty, there is a growing desire, not confined to fishermen, but to people engaged in other pursuits, to invest capital in suitable crafts for the prosecution of deep sea-fishing. A company has been formed for this purpose at North Sydney, and already the purchase of a suitable fishing schooner has been made in western Nova Scotia. It is expected that other vessels will be purchased by the same company and that in a few years a fleet of suitable fishing schooners will be engaged in the fisheries from the port of North Sydney. From what I can learn, several vessels will also be purchased by business men in other parts of Cape Breton for the purpose of deep-sea fishing. It only requires a start in this direction in each district with a reasonable amount of encouragement the first year to cause capitalists to invest money in it. We all know there is abundance of fish in the sea, there is always a market for well-cured fish, and all that is required is enterprise and capital to create a profitable industry and improve the condition of the people by giving them employment, as well as favourable chances of yielding good returns to those who invest their money therein. Our fishermen are beginning to realize that fishing in small boats a mile or two from the shore bring them poor returns and that sooner or later those boats will have to be abandoned for a class of vessels which will enable them to reach the prolific banks in deep water and therefrom prosecute their calling.

MACKEREL.

This branch of the fisheries shows a decrease of 3,271 barrels from the previous year. In my last annual report, I pointed out the injury done to the mackerel fishery by United States purse-seining vessels, which pursue these fish north while on their way to the spawning grounds. In that report, I stated that thousands of barrels of "spawn mackerel" had been captured by those vessels during the latter part of May and June of that year. The mother fish, when they made their appearance in Cape Breton waters, were unusually full of spawn, and in this condition were captured by purse-seiners. The shore fishermen and the crews of seining vessels stated they had never before known mackerel "so full and ripe for spawning" as was the case that season. Now, the natural inference from the destruction of the female fish before spawning in 1894 is the cause of the failure of this fishery this year, both in the waters of the United States and Canada.

The natural season for spawning is during the month of June. The first spawning grounds reached are Aspy Bay and Bay St. Lawrence. The first appearance of mackerel fry is during the latter part of July, when the waters of those bays become literally alive with young mackerel. They grow so rapidly that in the latter part of August they are about six inches in length, and are called "tinkers." In October they are almost full size when they start on their southern course to remain during the cold weather. It seems evident that if these fish were not molested until after the spawning season they would be found in as great abundance as before the destructive purse-seine was brought into requisition for their capture.

HERRING.

This fishery has been one of the staple branches of Cape Breton fisheries for this year, the returns exhibiting an increase of 10,679 barrels of pickled fish. With two or three minor exceptions, the herring fishery turned out remunerative to a degree that went far to compensate the local fishermen for the loss in other branches.

Considering the value of our fat midsummer herring as an article of profitable foreign commerce and as a staple of food for home consumption, this fishery this year will prove a great blessing not only to fishermen, but also to the farmers residing adjacent the sea coast, and who engage in this branch of the fishery at a season when farming operations do not require close attention. It may be remarked that the Cape Breton summer herring is unequalled in size and excellence of quality by herring caught on any other coast of North America. During the three years previous to 1895 these fish were found to be remarkably scarce in Cape Breton waters. In a former report, I pointed out that I could not attribute their scarcity to any other cause than to the fact that when the fish were reaching the inshore waters severe east and north-east storms began and continued for some days, causing the fish to return to deep water. I would now call attention to the fact that each season that the midsummer herring fishery proved a failure, severe storms prevailed during the latter part of July about the time these fish were due on the coast. This season, however, no storms occurred and the result was that herring were abundant, so that, climatic causes may have more to do with the failure of some branches of the fisheries than is generally believed.

COD.

This fishery is one of the leading branches of the industry, and, I regret to say, the statistics this year show a decrease of no less than 25,432 quintals. Scarcity of these fish on the inshore grounds is the main cause of this decline. It is true, blustery or stormy weather sometimes interferes with the prosecution of this fishery, but the season just closed has been no exception to the rule in this respect; so that some other cause must be assigned for the great decrease in the catch of codfish this year. Scarcity of bait is also a great drawback to this fishery, but, taking the season throughout, the fishermen were fairly well provided with bait. The fishermen say that the cod is kept on the outside banks by vessel fishermen throwing fish offal overboard, and which is ravenously consumed by the codfish. There would appear to be some grounds for this opinion, as late in autumn during stormy weather, codfish are found more plentiful inshore after vessels have abandoned the outer banks. This fishing is by no means becoming exhausted, as this very season larger catches have been made on the banks adjacent to Newfoundland than in recent years. The fish have also been found on the outside banks or codfish grounds of Cape Breton, beyond the reach of boat fishermen, in great abundance. I would emphasize my report of last year by stating that the only remedy, therefore, for our fishermen is to prosecute the industry in schooners instead of boats. The fishermen of Lunenburg, Liverpool, La Have, and other western districts of this province, have largely discarded the fishing boat for a medium sized schooner, so that they are enabled to hunt out the best fishing grounds and profitably prosecute the industry.

Most of these vessels fish off this coast, and, according to the boat fishermen, keep the cod outside by the offal they throw overboard. Cod are, no doubt, as plentiful to-day in the sea as they ever were, and the quantity caught by man does not amount to 5 per cent of the total number of fish. The greatest enemies of the cod are marine animals. It is the natural food of the seal. Often, when seals are killed and opened, it is no exceptional case to find half a dozen cod contained in one seal, and as many as fourteen have been found in the stomach of a large seal. Thus it will be seen that the seal is the natural enemy of the cod, and seals, we are told, were as numerous years ago as they are to-day. Let our local fishermen club together and build suitable crafts to prosecute the cod fishery, and they will have no reason to think that the sea is becoming depleted of these fish.

Marine and Fisheries—Fisheries Branch.

HALIBUT.

There is also a decrease in the total catch of halibut, although some districts show an improvement in this fishery compared with the preceding year. Halibut fishing is not engaged into any great extent by boat fishermen, for the reason that the local market for fresh halibut is limited, and salt halibut is a poor article of food and therefore not of much commercial value. Large numbers, however, are captured off this coast by United States vessels fitted out for the purpose, and which are supplied with ice for preserving the fish until they reach their own markets. The quantity of halibut thus taken off the coast of this island does not of course appear in the returns.

SALMON.

The statistics show a decline in pickled, fresh and preserved salmon. I find that the decrease is general throughout the whole of the island districts. I am unable to assign a cause for the scarcity of these fish in mid-summer during the gill-net fishing season. In the months of October and November, however, salmon ascended the various rivers in as large numbers as when the returns showed greater catches. Their scarcity during the fishing season this year may be ascribed to the fact that last July the water was unusually low in the rivers, owing to prevailing drought and that those fish remained in deep waters until the autumn freshets.

LOBSTERS.

No branch of the fishery brings the fishermen returns so early in the season as does the lobster fishery. On some parts of the coast operations begin as early as the first of May, while on the other sections drift ice prevents the placing of traps in the water before the last of May and first of June. Fishermen are paid cash for their labour at the numerous canneries, and this ready money is very acceptable to them after a winter's idleness. The statistics show a surplus over last year of 274,676 pounds of preserved lobsters. The grounds were found as well supplied with the crustacean tribe as in previous years. Had it not been for the extension of the season granted by the department, there would have been a considerable decrease in the product of the 45 canneries in operation in this district. A number of canneries, however, were closed down even before the prescribed date of closing (15th July). These canneries began operations early in the season, being located in districts which enable the packers to commence earlier than those north of St. Peter's Island. I find that packers who have considerable capital invested in buildings, wharfs, &c., for the prosecution of this industry, show a greater disposition to preserve the grounds than those having but little capital in the business. Some of the former class have adopted floating incubators as suggested in the circular of officer C. A. Stayner issued by the department. These incubators are six or eight feet in length and are made of inch and inch and a half spruce board or deal. There is a space of two or three inches between the boards. On the bottom spruce boughs are laid on which the spawn is placed; the boughs, of course, being submerged a few inches below the surface of the water. The action of the wind and waves keeps the incubators in motion. Shortly after the spawn is placed on the boughs the eggs undergo a transformation and soon the young lobsters are hatched out and disappear through the boughs into the water. Too much encouragement cannot be given by the department and its officers to those of the packers who, in this way, are endeavouring to preserve this valuable crustacean.

THE MINOR BRANCHES.

While there has been an increase in the catch of trout and smelts, the statistics give a decrease in nearly all the other minor branches of the fisheries. This may be the result of indifference on the part of our people to prosecute these fisheries as much as to any other cause.

Alewives—which show a diminution of 2,500 barrels, are not considered valuable as a food fish, but are mainly used for bait. In the early part of the season when they make their appearance in the rivers they are used fresh to a limited extent by fishermen and farmers for home consumption, but only a small quantity is pickled or cured for this purpose.

The *oyster* fishery is capable of greater development if such grounds as Malagawatch, River Dennis and Whycocomagh Bay were cleaned up and new beds cultivated.

I would recommend an examination of our oyster grounds by the expert, Mr. Kemp, at an early a date as possible. The grounds above named appear well adapted for the propagation of the oyster.

The close seasons have been better observed than in former years and whenever persons were discovered violating the regulations prompt measures were taken to have the offenders punished.

SYNOPSIS OF FISHERY OVERSEERS' REPORTS FOR THE ISLAND OF CAPE BRETON, 1895.

CAPE BRETON COUNTY.

Overseer Francis Quinan, of Sydney, reports a considerable decrease in the total catch of fish for the past season. With the exception of mackerel, herring and lobsters, there was a falling off in all the other branches. The falling off is most marked in the cod fishery which shows one-third of a decrease from the previous year. Halibut, mackerel and salmon were also found scarce during the season in his district. Those of the fishermen who engaged in the lobster, herring and mackerel fishery did fairly well, herring particularly were more abundant than in previous years, but prices ruled low. In mid-summer a large whale came ashore at Wadden's Cove, from which a quantity of oil was procured. The close seasons were well observed throughout the year in his district. The season's catch of fish was disposed of in the Halifax and Boston markets excepting what was used for home consumption.

Overseer Alexander McDonald, of East Bay, reports a falling off in the cod, mackerel and halibut branches of the fisheries, and an increase in lobsters and herring. The cod fishery has become such an unprofitable occupation to the local fishermen of this district of late years that fishermen are now abandoning it, and engaging in lobster fishing and other pursuits. There was a poor catch of mackerel, due to the scarcity of these fish, for reasons unknown to local fishermen. The herring fishery, however, was slightly better during the past season than in the two previous seasons. The salmon fishery is not prosecuted generally, and those taken were disposed of to local consumers. There were two lobster factories operated in his district during the season against four last year, yet the returns show an increase over the previous yield which proves that packers had a profitable season. Owing to the water being low in the rivers during mid-summer, trout and salmon were scarce in his district. In the autumn season during freshets these fish made their appearance in large numbers, too late, however for anglers. The regulations in all branches were well observed during the year.

Overseer Wm. Burke, of Mira, reports a falling off in all branches excepting lobsters and herring, of which there is a large increase. At Baulieu and Main-à-Dieu he reports the largest decrease in codfish and haddock, while at the other fishing stations the decrease is not so great. The catch of alewives in Mira Bay was a total failure. The salmon fishery in Mira River and Mira Bay was also poor. He cannot assign a cause for the scarcity of fish in his district. The regulations were well observed, only one case of illegal fishing came to his notice which was duly reported and action taken thereon by the inspector.

Overseer Richard Hickey, of North Sydney, in submitting his report for the year's operations of the fisheries in his district, regrets to say that there was a marked decrease in the most important branch of the industry, viz., the cod fishery.

Marine and Fisheries—Fisheries Branch.

As cod fishing is more largely prosecuted than any other branch in his division, it will be readily seen that the failure of this fishery is universally felt by nearly all fishermen, and on this account, the season has on the whole been a very unprofitable one. The decrease in the catch of cod as compared with the season of 1894 amounts to 4,415 cwt. He is unable to attribute any special cause to the great falling off in this fishery. About the same number of men were engaged as in the previous year. So marked was the scarcity of these fish during the first months of the season that the fishermen became almost disheartened, and some abandoned it entirely and turned their attention to other branches of the industry. Later in the season, however, the fishery showed signs of improvement, and had it not been for unfavourable weather during the fall months, when the fishermen were prevented from prosecuting their calling as they would have wished, the shortage would not have been so large. It invariably happens that when deep-sea fish are found plentiful in the early part of the season they become scarce in the autumn and fall months, and *vice versa*. This was particularly noticed the preceding year when cod were found abundant in the early season, but disappeared from the costal waters on the approach of autumn. The most favourable time for the successful prosecution of the cod fishery is during the early months of the season, and when the fish do not put in an appearance until after that period, as was the case the past season, the prospects for a good catch are never favourable.

He has also to report a decrease in the catch of lobsters as compared with the season of 1894. There is only one cannery located in his district, and the returns for this factory show a decrease in the season's pack of 5,864 cans. The decrease in the first place may be attributed to scarcity of bait during the first part of the season, and, secondly, to frequent storms which destroyed a large number of the fishermen's traps, and greatly interfered with the successful prosecution of the fishery. The decrease cannot be attributed to scarcity of lobsters, as fishermen state they were very plentiful all through the season, and of a larger run than those taken for some years previous. The two branches above named are the only ones showing noticeable decreases in the fishing industry for the past season. The increases on the other hand are also confined to herring and halibut. He reports an appreciable increase in the herring fishery over that of the last and several preceding years. The improvement in this fishery is a pleasing feature of the operations for the past year. At one time this was one of the leading branches prosecuted in this district, but of late years the fishermen have not given it much attention, owing chiefly to the fact that the catch of these fish had fallen off year after year, and eventually it did not repay the expense and time devoted to it. It is to be hoped that the improvement noticed may continue, and this important branch will again assume a foremost place in the fishing industry of Cape Breton. The increase in the halibut fishery is also encouraging to local fishermen. These fish are sold fresh, and always find a ready and remunerative market in the mining and business centres of the district, the supply being entirely used for home consumption. The mackerel fishery did not show any improvement over that of the preceding year. The continued scarcity of these fish, once so plentiful in the costal waters of Cape Breton, has caused the local fishermen to almost wholly abandon the prosecution of this fishery. Many are of the opinion that until the United States and Canadian fishing vessels renounce the use of the seine and go back to the old method of "hooking," no improvement need be looked for in the mackerel fishery. The minor branches of the fisheries in his district during the past year give about an average yield. About 75 per cent of all fish procured has been sold in Canadian markets, the balance being used for home consumption. The several close seasons were well observed, and no violations of the fishery laws occurred in his district during the past year.

INVERNESS COUNTY.

Overseer D. F. McLean, of Port Hood, says: By comparison of the returns for the season of 1895 with that of 1894, it will be observed that a decrease in the catch of herring, mackerel, codfish, hake, haddock, smelts, halibut, bass, alewives, eels and squid has occurred, and an increase in salmon and trout. He reports also an increase

in the catch of lobsters at the three canneries in operation in his district, but, there being four canneries in operation during 1894, the aggregate catch was larger in that year. He is unable to attribute anything of a particular character to the decrease in the branches of the fishery above specified. The most reasonable conclusion, he states, is that the prevailing winds of the season had the most to do with it, consequently herring and mackerel did not come on this coast in such large quantities during the spawning seasons. Codfish and haddock were scarce during the spring and summer, while hake and haddock appeared abundant along the shores during the autumn and fall months, and large catches would undoubtedly have been made were it not that dog-fish, as during the past three years, appeared on the coast and destroyed a comparatively large number of trawls; the same holds true with respect to mackerel nets during fall fishing. He has had several interviews with fishermen concerning dog-fish and their movements. They appear on this coast about the 1st of September, and move off the fishing grounds about the 1st of November. They were not so numerous this year as either in 1893 or 1894. He estimates the quantity of fish used for home consumption at 12 to 15 per cent of the whole catch. The remainder is marketed in Europe, the United States, the West Indies, and in several towns and cities throughout Canada. As near as he can estimate, about 40 per cent in the latter and the balance exported to the countries named. The close seasons have been well observed in his district. No violation of the fishery laws came under his notice.

Overseer James Coady, of Margaree Forks, reports that his statistics show a decrease in the catch of salmon, codfish and alewives, as compared with the season of 1894. This decrease he attributes solely to the scarcity of fish on the coast during the first part of the season. Mackerel, however, show an increase of 230 barrels, besides 17,940 pounds shipped fresh to foreign markets. Herring also show an increase of 549 barrels. These fish were not found so plentiful on the coast for the past twelve years, although south and east of his district they were quite scarce. Lobster fishing also shows an increase, as compared with the season of 1894, notwithstanding the scarcity of bait the first part of the season, and also the fact that there was one factory less in operation during the whole season. All other kinds of fish were much the same as last year in his district. The season being dry and the water low also caused an increase in the catch of salmon, angling being poor throughout the summer. As usual in the months of September and October, when the waters became high in the rivers, salmon ascended in large numbers and were well protected by the officers. Several attempts at poaching were made, the first part of the season, but the offenders, who escaped during the darkness of the night, lost their nets, thirteen in all, which were confiscated. Three weirs and three nets found in the river in Upper Margaree, set in violation of the law, were also confiscated. One offender, being reported and summoned to the Fishery Court, was convicted and fined. About 40 per cent of the total catch of fish was shipped to the United States, 45 per cent marketed in Canada, and the balance used for home consumption.

Overseer David Ross, of North East Margaree, reports a small decrease in the catch of codfish, caused mainly by the scarcity of bait. Herring statistics show an increase of 390 barrels. These fish appeared more plentiful and remained longer on the coast than in previous years. He reports a marked increase in the mackerel fishery over the previous season, there being an increase of 837 barrels. He attributes the improvement in this branch of the fishery to there being fewer purse-seining vessels on the coast than in late years. The lobster pack also shows an improvement over the previous year of 1,700 one pound cans. Lobsters were found more plentiful than in previous years. The weather during the canning season was favourable. Only one case of illegal fishing was discovered. The offender was reported to the inspector, summoned, convicted before Fishery Court and fined. About 80 per cent of the season's product was marketed at Halifax, Brazil and United States.

Overseer Lewis McKeen, of Mabou, reports a decrease in cod, mackerel, herring and alewives; the two latter branches being a complete failure. He is of the opinion that lobster traps have something to do with the falling off in the catches of the above fish during the past five years. The scarcity of bait also greatly contributed to the decrease

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in line fish, such as cod, hake and haddock. Squid, the most valuable bait of all, did not strike in until late in November, when cod became abundant, but blustery weather prevented vigorous prosecution at that season. The cod fishery, is not as vigorously prosecuted in his district as in former years, owing to the fact that fishermen, who formerly engaged exclusively in it, now pursue the lobster fishery. There is a decrease in the lobster pack, as there were two factories less operated than in the previous year. Lobsters were found plentiful, large and firm throughout the season. The returns show a decline in the salmon fishery, caused by prevailing east winds during the fishing season. The mackerel fishery continues to decline year after year in his district, so that this season it was almost a failure. Purse-seining in former years is the cause given by the fishermen for scarcity of mackerel. Other branches of the fishery exhibit no material change. About 85 per cent of the catch was exported, mainly to Halifax and Boston; the balance used for home consumption. The regulations were fairly well observed. Nets were seized in Mabou Harbour for a violation of the regulations and after the matter was reported to the inspector they were confiscated. He reports an accumulation of debris at the mouth of Indian Brook, Whycomagh, which requires to be removed.

Overseer Peter McEachern, of Glendale, reports an increase in codfish, herring and oysters, due to the more vigorous prosecution of the fisheries. The regulations were well observed. The waters in the rivers being low during the fishing season caused a poor catch of salmon and trout.

Overseer Joseph Deveau, of Cheticamp, reports a decrease in the cod fishery of 2,912 quintals, due to scarcity of these fish, and in mackerel a decrease of 258 barrels. There is an increase of 1,680 one pound cans of lobsters over the previous years owing to an increase of traps. The catch of herring, used mainly for bait and home consumption, was the same as last year. There was also an average catch of salmon in his district. There were twenty-one small schooners engaged during the summer in fishing in his district. The number of men employed was 93. Their catch for the season he estimates in value at \$6,135. There were 199 boats engaged, employing 668 men and boys. One case of illegal lobster fishing came to his notice. The offender was summoned by the inspector, convicted and fined. No fish-ways and no injury from saw-dust in his district.

RICHMOND COUNTY.

Overseer D. Cameron, of St. Peters, reports a decrease in all kinds of fish, herring alone excepted. The latter shows an increase over the previous year of 100 barrels. The mackerel fishery for the season of 1895, like 1894, is almost a total failure in his district. He is unable to give an explanation for the scarcity of fish, which is the cause of the decrease in the various branches. He reports that the close season was well observed in his district. There are no saw-mills or fish-ways in his district.

Overseer Alfred Lenoir, of Arichat, reports that on the whole the season's work was less profitable to fishermen than the previous one. The spring mackerel fishery was a total failure, while the fall catch was below former years. These fish for some reason unknown, kept in deep water; a few small scattered schools making their appearance inshore. He is of the opinion that the mackerel schools were broken up by United States seiners and the fish thus disturbed passed in deep water. The cod fishery was an average one, some good catches being made late in the season. Haddock, however, were unusually scarce this season, the reason for which he is unable to assign. The lobster fishery early in the season was good, but in the latter part of June lobsters began to get scarce, and most of the factories closed before the close season had arrived. Mr. Duff, who built an incubator and had it supplied with spawn during the season, was so much encouraged with his success in stocking the grounds that he proposes to have one at each of his canneries. The close season regulations were well observed by the people generally.

Overseer John Murchison, of Grand River, reports that while the fisheries in his district were prosecuted by a larger number of men than in the previous year, yet there

has been no increase in the catch. He reports a decrease in cod, mackerel, haddock, alewives and pollack, and a large increase in herring and lobsters as per the following:

Increase: Herring, 2,668 brls; lobsters, 99,426 lbs. Decrease: Mackerel, 941 brls; cod, 348 cwt; haddock, 799 cwt; pollack, 81 cwt. The returns show that haddock and pollack are yearly falling off. The cause of this is unknown to the fishermen, unless it is that the inshore banks do not furnish as good breeding grounds as formerly. The decrease in the cod-fishery is owing to scarcity of bait during mid-summer months, and the falling off in mackerel he attributes to purse-seiners breaking up the schools outside. About 80 per cent of the total product is marketed at Halifax: the balance is used for home consumption.

VICTORIA COUNTY.

Overseer Chas. L. Campbell, of New Campbellton, reports an increase in the catch of salmon two brls., herring 449 brls., lobsters 3,258 lbs., codfish 270 cwt., haddock 470 cwt., trout 2,600 lbs., smelts 36,500 lbs., alewives 44 brls., clams 10 brls., eels 27 brls., squid 550 brls., tom-cod 3,500 lbs., and a decrease in mackerel 245 brls., hake 65 cwt., pollack 70 cwt., halibut 2,290 lbs., oysters 40 brls. The season has not proved very remunerative to the fishermen, though numbers of them largely increased their fishing gear. The run of summer mackerel did not strike in as plentiful as last season. At Bird Island the fall run was fairly good, but there were not as many fishermen engaged on this fishery as on former years. The dog-fish were again very numerous around the shore driving off other fish and destroying fishermen's gear. The run of herring was of a better quality, being of a larger size than for the past two years. There were no fish-traps in operation in his district this season. The one at Ingonish being destroyed in the fall of 1894; and not paying expenses, another was not procured. The summer being very dry and the waters low, trout and salmon did not ascend the rivers in any quantity until the fall rains. The product of this district, as usual was disposed of at North Sydney, Halifax and Montreal. About one-fifth of the catch is used for home consumption. The close season was well observed. Three cases of violation of the Fisheries Act came under his notice during the year and were reported to the inspector with the result that the offenders were convicted and fined. If bait had not been scarce the catch of lobsters in his district would have been very much larger. Dog-fish were tried as bait, but found unsuitable. Lobsters were larger this year than last. The guardians attended to their duties and gave satisfaction, especially Guardian Gillis at Clyburn's Brook, he having seized eighteen nets found in the rivers, but was unable to capture or identify the owners and poachers. These nets were sent to the inspector. There are no saw mills on any of the streams frequented by trout, nor are there any fish-ways and none are required.

Overseer Wm. Hellen, of Cape North, reports a marked decrease in all branches excepting herring, lobsters and eels, over the previous season. The decrease in cod is 4,892 cwt., caused by the scarcity of these fish in the inshore waters, and the fact that the boat fishermen do not reach the outside banks where the fish are found more plentiful until autumn when they come inshore. The decrease in the catch of mackerel is 518 brls., haddock 569 cwt., hake 74 cwt., halibut 300 lbs., trout 2,000 lbs., and oil 3,700 galls. The falling off in the returns of the foregoing branches he attributes to their scarcity. The decrease in the catch of lobsters he ascribes to purse-seining which breaks up and frightens the schools while on their way to North Bay. Dog fish made their appearance on the coast again towards autumn and caused the usual damage to fishing gear. The increase of 64,662 lbs. of lobsters is owing to a large number of canneries. The excess of 455 brls. of herring is due to the mid-summer run being better than the previous one. Salmon were scarce owing to causes unknown. The product of the fisheries was marketed at Halifax, North Sydney and the United States; about ten per cent being used for home consumption. The regulations were well observed there being no violations noticed by the guardians or himself, no damage was done to streams by saw mills.

Marine and Fisheries—Fisheries Branch.

Overseer Daniel McCharles of Middle River, whose district is inland, reports that only two or three people prosecute the fisheries for a livelihood. The majority of those who fish engage in farming also. Herring and cod were found more plentiful in the lakes than last year. He reports an increase in herring of 197 brls. and an increase in the catch of cod of 1,637 cwt., but a decrease of 50 brls. in alewives. The salmon catch was equal to the previous year. The other branches show a slight increase. About 60 per cent of the product is exported to Halifax and Montreal, and 40 per cent is used for home consumption. The regulations were well observed. There is no injury to streams from saw-dust.

I have the honour to be, sir,
Your obedient servant,

A. C. BERTRAM,
Inspector of Fisheries for District No. 1, Island of Cape Breton.

DISTRICT No. 2.

ANNUAL REPORT ON THE FISHERIES OF DISTRICT NO 2, OF NOVA SCOTIA, COMPRISING THE COUNTIES OF CUMBERLAND, COLCHESTER, PICTOU, ANTIGONISH, GUYSBOROUGH, HALIFAX AND HANTS, FOR 1895, BY INSPECTOR ROBT. HOCKIN.

PICTOU, NOVA SCOTIA, 2nd January, 1896.

The Honourable
The Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit my annual report of the Fisheries in District No. 2, province of Nova Scotia: together with tabulated returns showing the quantities and values of each kind of fish caught as well as comparative tables showing the increase and decrease of the fisheries in each county and of each kind of fish.

The estimated value of the total catch for the past season is \$1,429,782 as compared with the estimated value of the catch, for the previous year (\$1,510,907) exhibits a decrease of a little more than 5½ per cent, but it still slightly exceeds the catch of 1893.

The prominent features of the year's fishing have been the large quantity of herring frequenting the coast waters the fish being large and fat; and the almost failure of the mackerel fishery especially in the autumn months.

In anadromous fish the increases and decreases are as follows:

Salmon a decrease of about.....	7 per cent.
Alewives a decrease do	24 do
Shad an increase do	22 do
Smelts an increase do	4 do

Of the deep-sea fish:

Cod a decrease of about.....	14 per cent.
Pollack do do	27 do
Hake do do	5 do
Haddock an increase of about.....	19 do

SALMON.

The several counties forming this division are so situated as to have coast waters on the Straits of Northumberland, the Bay of Fundy and the Atlantic Ocean,—thus giving a variety of conditions, and it is interesting to note the fluctuation of this fishery in

each. On the Straits of Northumberland, while last year the returns showed a decrease of fourteen per cent from that of the previous year, this season exhibits a further diminution of twenty-five per cent from that of 1894. The estimated value of the catch in 1893 was \$19,430; in 1895 it is \$12,192; showing a decrease in the estimated value of the catch from 1893, of \$7,238, the counties affected thereby are the counties of Antigonish, Pictou and a part of Colchester and Cumberland. The fish are mostly taken in nets set along the coast, for salmon do not group in the comparatively small streams flowing into the straits, until the autumn close season and then for the purpose of spawning. So that the causes affecting the increase or decrease of this fishery are somewhat difficult to determine. Whether or not the fish taken in the coastal waters during the months of June, July and August, are the product of the rivers of these counties, is apparently an unanswerable question. It may be that the fish, which have first seen life in these rivers, come upon the coast and feed near the outlet of the stream; the temperature and other conditions not being such as will induce them to ascend, that they do not do so until the spawning impulse seizes them in the autumn months when the rivers are usually full.

SHAD.

This is peculiarly a Bay of Fundy fishery, only a few barrels are taken in the other waters. They are caught mostly in drift-nets and weirs. The catch, in excess of that of last year was nineteen per cent, and compared with other years is as follows:

	Barrels.
1889	535
1890	750
1891	1,178
1892	1,811
1893	746
1894	981
1895	1,185

In the years 1878-79-80, the returns from the same locality gave an average catch of 6,918 barrels.

To restore this fish to something like its former proportions, would mean about \$50,000 per annum to the fishermen over this limited area. There appears to be a reasonable probability that the 120 barrels of gravid fish annually caught in the Shubenacadie River, affords indication where remedial legislation would be followed by most valuable results.

ALEWIVES.

No satisfactory reason can be given for the decrease of 24 per cent from the catch of last year. This scarcity extended over the whole coast of Nova Scotia and that part of New Brunswick on the Bay of Fundy.

HERRING.

The yield of these fish is nine per cent over the average catch of the previous five years, and seventy per cent over that of last year. Unfortunately, fishermen did not get the full advantage of this increase, for the market price dropped so low that the fishery was not prosecuted with the vigour which it would have been under more favourable circumstances. So many and variable are circumstances affecting fish life in the ocean that it seems useless to offer any theory for this increase, I wish merely to suggest one reason which may have some bearing upon the question. The spawn of most of the sea fish floats near the surface until the fry is developed, but that of the herring sinks to the bottom, attaches itself to rocks, weeds, etc., and is there fed upon by crustaceans. It may be that with the excessive lobster fishing of the past ten years, more of the herring spawn reaches the fry stage.

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MACKEREL.

The catch for the past year has been 5,967 barrels salted and the equivalent of 2,876 barrels fresh.

A recapitulation of the yearly catch since 1889, is as follows :

	Salted.	Fresh.
1889	19,751 barrels	190 barrels
1890	23,139 do	160 do
1891	27,124 do	300 do
1892	14,332 do	10 do
1893	10,851 do	3,750 do
1894	10,175 do	3,347 do
1895	5,967 do	2,876 do

The tendency of late years is to market these fish fresh. This fishery has two well defined periods in the season,—first in the spring months when the fish strike the coast moving northward, apparently from a higher to lower temperature for spawning purposes and again in the fall of the year when they are going southward. So far as my observation goes, I have conjectured that when the rivers in the autumn are full carrying down to the coast waters the young of anadromous fish as well as the elements which go to sustain the lower forms of fish life, which in turn may be fed upon by mackerel, then the fall mackerel fishery is an average one, but when the rivers are unusually low in the autumn there is nothing to keep these fish upon the coast, and consequently fewer are caught. The returns from Guysborough County show 3,596 barrels of salted and equal to 2,859 of fresh for this year. Last year from the same locality the returns were 4,981 barrels of salted and the equivalent to 3,080 barrels of fresh. That the decline is not greater is owing to the fact that the fishing vessels from this county did well in the spring months at the Magdalen Islands. The returns from Halifax County, where most of the fish are usually taken, close to the shore, give 1,854 barrels of salted and equal to 17 barrels of fresh, compared with 4,798 barrels of salted and 550 barrels of fresh for 1894.

LOBSTERS.

This year we have returns for the first time under the Amended Fisheries Act, which requires a true return under heavy penalty. Aggregating these returns we find that there were canned this year 3,280,898 lbs., and from other sources it is learned that 268 tons were sold fresh, compared with 3,824,512 cans and 147 tons sold fresh last year. On assuming that five pounds fresh lobsters will give one pound preserved, had the excess of fresh lobsters been canned, it would have given 3,340,900 cans for this year. From the returns of last year, the new system has shown that some deductions must be made, for it was discovered that some overseers were erroneously adding the pack of other divisions to theirs, because the owners resided therein, although the factory was in other divisions. Taking every thing into consideration I would judge that it would be a fair comparison to estimate last year's catch at 3,744,512 cans. This gives a decrease of nine per cent from the catch of last year. The coast fisheries of the Atlantic, being about the same as last year. The lobster fishery in the coast waters and the anadromous fish, salmon, shad, and gaspereaux are the particular part of the public preserve that are mostly affected by legislation. That the season limit for lobster has been well observed during this year is testified to by all of the overseers. Fishermen, who a few years ago, were bitterly opposed to the regulations, now conclude that they are in the best interests of the fishery and assist the officers in enforcing them. In several localities I have heard of successful experiments with floating incubators. Such experiments in my opinion deserve every encouragement, for, if successful, they would prove of incalculable benefit to this fishery. With regard to the river fisheries, the system of guardians paid only for the time spent on patrol duty gives more satisfactory results than the system of wardens appointed by Order in Council. As no one individual has

sufficient interest in the preservation of the public fishery, it appears to be the only practicable way of maintaining their efficiency. Great results cannot be looked for from the present limited amount voted for the purpose: in this division it does not amount to more than \$1.70 per annum per mile of river that actually requires to be patrolled. If the seed time is not looked after there will be no harvest: Money judiciously spent in preserving fish in the spawning season should be returned many fold.

SYNOPSIS OF OVERSEERS' REPORTS.

ANTIGONISH COUNTY.

Overseer John McDonald, of Antigonish County, attributes the falling off of the salmon fishery to the quantity of foul and putrid lobster bait used by fishermen rendering the water offensive and driving the fish away. The lobster fishery in his division is holding its own both in size and number. While there is a decrease in cod there is an increase in hake; the latter fishery can generally be relied upon. Should the catch be less one season than another it is because of the scarcity of bait. Fewer oysters were taken than last year, as not so many persons fish for them now under the license system as formerly. No violations of the fishery law were reported to him, except that Warden Dexter, on April 20th seized three nets illegally set. On several occasions he has visited lobster factories while in operation and always found the regulations observed. He has visited the several mill dams in the county, none of them are provided with efficient fish-ways.

PICTOU COUNTY.

Overseer Allan McPhee, of Avondale, says there has been a marked decrease in the catch of salmon. The special guardians have been attentive to their duty and poaching has been attended with too much risk to be indulged in. The head-waters of Barneys River have been cut off from fish by an additional dam across the East branch at McGregor's mills. About 60,000 young salmon from the Bedford hatchery were placed in Barneys River and a like number in French River during the past year. He also reports a considerable falling off in the catch of lobsters and other fish for which he is unable to account.

Overseer John D. McQueen, of Little Harbour, says that the general catch of fish is not up to the average, while that of salmon is only about half of the average. The decrease is attributable somewhat to the unusually dry weather during the fishing season. Owing largely to the activity of the special guardians, the regulations have been well observed. Two cases of net fishing out of season came to his notice and the parties were promptly fined. The only fish-way in his district is in good condition.

Overseer A. O. Pritchard reports that guardians employed did their duty faithfully. Several nets were seized and confiscated. The nature of his duties are mostly of a protective character. Salmon do not enter the rivers at a time when they can be legally caught.

GUYSBOROUGH COUNTY.

Overseer Wm. Cameron, of Guysboro, reports an increase in the catch of salmon in his division of 18 per cent over last year. Herring have not been so plentiful for thirty years; prices, however, were low. Mackerel spring fishery was a failure, and during summer and fall they were very scarce, however the fishing vessels that went to Magdalen Islands in the spring did fairly well. He reports an increase of nine per cent in the pack of lobsters. More men are fishing and they set in deeper water. He does not think that the fishery is being depleted, because with all the increased efforts they could not catch so many if they were scarce. There is an important movement among packers to market the largest lobsters alive. While the returns show a falling off in cod of seven

Marine and Fisheries—Fisheries Branch.

per cent, there is an increase in haddock of 40 per cent attributable to a more vigorous prosecution of the winter fishing off Canso. Fishermen did not know until a few years ago that haddock were to be found there. Now there are increasing numbers of men from year to year engaging in this fishery. Some coming from other parts in boats and vessels. The smallest boats used are 21 feet keel. The fishery continuing until about February 15th, but only during fine weather. Owing to the low prices prevailing for herring and cod, the past year has not been a prosperous one for the fishermen. At Auld's Cove the fishermen have subscribed \$110 for a breakwater which is much needed for in stormy weather, boats must run to Port Mulgrave, four miles off for safety.

Overseer Allan McQuarrie, of Sherbrooke, says the coast fisheries in his division have been good, showing a considerable increase. Fish were more plentiful. Weather favourable. There was a considerable decrease in the yield of salmon, trout and smelts owing to dry weather during the fishing season, water was low in the rivers and salmon kept in the salt water. The principal river in his division, the St. Marys, with its lakes, still waters and tributaries, has hitherto been a famous salmon river, but now, with a lobster factory at its mouth, numerous lobster traps, often containing foul and putrid bait, the daily hauling of traps and the large lumbering business with steam tug at the head of the tide, may so disquiet the waters as to intimidate the fish. The close seasons were well observed, and no serious infractions came to his notice. The guardians were most attentive and saw that the regulations were being observed. Fish-ways are in about the same condition as last year, a new one at Fisher's dam being an indispensable necessity, as well as many others throughout the district. He urges the construction of fish-ways in every dam that obstructs the passage of fish, for this above all other things is most vital to the adequate protection of the fisheries. The lobster regulations are now being cheerfully obeyed, the only violation which came to his notice was in regard to small lobsters, fines were imposed on view. He recommends the clearing of debris from a large brook at Smithfield. He further suggests that the setting of nets for gaspereaux in fresh water, be limited to the 1st or 10th of July, for after that date the fish have ascended and the nets are liable to catch trout. Nets for shad should not be allowed in the St. Mary's River after July 1st, for they are then liable to catch small salmon.

HALIFAX COUNTY.

Overseer Robt. Gaston, of Pope's Harbour, reports a decrease in the coast fisheries, except lobsters, in which there is a slight increase, a greater number having engaged in this fishery. Some 28 tons of live lobsters were shipped from his division to the United States. This is the first year that any live lobsters have been shipped from here. One case of illegal packing was reported, and he seized the boat engaged. There are four fish-ways in his division, all but one in good repair.

Overseer George Rowlings, of Musquodoboit Harbour, says: Haddock and cod were fairly plentiful, but the catch of cod is much less than last year; these fish were not so plentiful as last year, and besides there were not so many vessels fishing as in 1894, the number in 1895 being ten less than the preceding year. Herring were very plentiful, they are mostly caught along the shore, in nets, attended by boats. More than 4,000 barrels were taken in his division, over the catch of last year. However, the price fell so low that only what was required for bait was taken. Salmon were fairly plentiful compared with the past few years. Lobsters were fairly plentiful until about 15th June, after which they became scarce and the extra ten days were not needed on that part of the coast. As a rule, proprietors want to close any time after 20th June. Lobster poaching in the fall of the year has killed itself. Fish-ways are in about the same condition as last year. Mr. John Anderson, who owned a dam on the Petpeswick River, but which has not been in use for some years, took out about 10 feet from the centre of the river, giving fish free access to head-waters. He again urges the construction of a fish-way in the dam on Lawrencetown River. The regulations were well observed and the prosecution of parties in 1894 has had a good effect.

Overseer J. H. Bartlett, of West Halifax, reports the catch of mackerel much below that of last year or even below that of the past five or six years. These fish seem to keep away off from shore which renders their capture by means of drag-seines impossible. Fishermen too complain that steamers passing pay no regard whatever to their nets but ruthlessly destroy them. The price for mackerel is better than it has been for a number of years. The herring fishery was much in excess of the past few years, but on account of the very low price fishermen did not catch so many as they otherwise would have done, afterwards prices became fairly remunerative.

The salmon catch was below the average. Close seasons were strictly observed. All branches of the fishery seem to have been carried on with the same vigour as usual, but scarcity of fish, coupled with myriads of dog-fish and squid, render the catch less than usual. Herring is the only fish consumed at home, all the others are marketed. Several disastrous gales did very serious damage to nets wharfs and piers. Fish-ways in the district seem to be doing effective work.

HANTS COUNTY.

Overseer J. R. Mosher, of Hants County, says shad are the fish mostly taken in his division, they were formerly very plentiful, but owing to the greed of fishermen they became almost extinct however they are now somewhat on the increase. The law should protect the spring or spawning shad; many of the fish visit the waters of Nova Scotia and are caught in May and June while trying to get up the rivers. There should be a close season from October 1st to June 25th, for Nova Scotia and during fishing season a close season from 6 a.m., Saturday, to 6 p.m., Monday. Each boat should be limited to 200 fathoms of net.

COLCHESTER COUNTY.

Overseer R. J. Pollock, of Stewiacke, says there was a good run of salmon, and more men engaged in the fishing. It is supposed that the increase is due to the young fry introduced to the river from the hatchery. Not so many shad caught as formerly, less fishing, while lumbering interest greatly interfered with the fishermen. Close seasons have been violated in some instances, and fines were inflicted and apparatus confiscated. He complains that fishermen who set nets for bass after October 1st can catch salmon, however, the legal mesh for bass is six inches extension measure and the run of salmon in the Stewiacke is small, so that there ought not to be any danger that they would be caught.

Overseer J. W. Davidson, of Colchester, remarks that the catch of shad is small as compared with previous yields of the olden time, and says that fishermen have only one opinion as to the cause, which is want of protection during the spawning season. He advocates a close season from August 15th to June 15th. He is of opinion that the guardians have been faithful in watching the rivers.

CUMBERLAND COUNTY.

Overseer Fowler, of Cumberland, notices a large increase in the catch of herring in the Bay of Fundy, also of line fish and of salmon, owing to the employment of a number of small vessels and better outfits.

I have the honour to be, sir,
Your obedient servant,

ROBERT HOCKIN,
Inspector of Fisheries.

Marine and Fisheries—Fisheries Branch.

DISTRICT No. 3.

ANNUAL REPORT ON THE FISHERIES OF DISTRICT No. 3, OF NOVA SCOTIA, COMPRISING THE COUNTIES OF YARMOUTH, SHELBURNE, QUEEN'S, LUNENBURG, KING'S, ANNAPOLIS, AND DIGBY, FOR THE YEAR 1895, BY INSPECTOR L. S. FORD.

MILTON, 2nd January, 1896.

The Honourable
The Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit my annual report on the fisheries of No. 3 district, the statistical return of the several counties, and a synopsis of reports of the local fishery overseers.

As anticipated by my preliminary report, there has been a slight falling off in the catch of a few kinds of fish, owing to their scarcity; mackerel more especially, which shows a shortage from even last year.

The Grand Bank fishermen, as a rule, make a good showing, but boat fishing generally has not been a success. Scarcity of bait when needed most, scarcity of fish in some instances, and the extra attention given to the lobster fishery, are given as the principal factors to which shortage is ascribed.

HERRING

Yielded an average catch, and would have been an exceptional one, had the prices for the salted fish not run so low. In most of our harbours, especially on the Atlantic coast, they schooled in large numbers. Refrigerators and better facilities for shipping the frozen herring to the United States, would make a material difference in the prosecution of this fishery.

MACKEREL.

Returns show a fair catch in a few counties, but in some a complete failure. I would again remind the department of the importance of this most valuable fishery, and of the necessity of an intelligent investigation as to the cause of its failure of late years.

LOBSTERS.

Largely owing to persistent, if not perfect protection, this fishery is still to the front in importance, and contributes largely to the income of our fishermen. The shipments of live lobsters to the United States are increasing yearly, and there seems an unlimited market for them at remunerative prices. Constant care on the part of the officers has to be maintained to prevent the shipping of short and berried fish which either through carelessness or intent, find their way into the crates and the necessary inspection causes bitter complaints from the shippers, although the fish are handled as carefully as possible by the officers. Guardians at every fishing station to inspect the crates while they are being filled, thus preventing the re-handling at Yarmouth, would no doubt be the best plan, but with the present small staff of officers, such a scheme is not possible. The canneries in most of the counties buy only the fish between 9 inches and 10½ inches in length, and the close competition makes a profitable margin difficult to realize; and yet there is little diminution of the canning business, and active preparations are being made for next season.

SALMON.

The salmon fishery gave a fair average, with better prospects in the future for all our inland fisheries, although much has been done the past years to provide efficient passes for such fish, much remains undone both as to the passage and restocking of our rivers and lakes.

Alewives and other river fish yielded fairly, but still fall short of the needed supply for bait in the spring.

About five per cent only of the fish caught in this district is consumed at home, the balance is exported.

The saw-dust regulations have been fairly observed.

SYNOPSIS OF OVERSEERS' REPORTS.

SHELburne COUNTY.

Overseer E. S. Goudy, of Barrington, states that while the cod-fishing has been carried on as vigorously as in past years, the catch has only been about two thirds. There has been a large increase in the herring fishery. Mackerel were seen in large schools but too far from the shore to be caught in the traps. The law, as far as the canneries are concerned, was well observed. There has been an increased shipment of live lobsters, and extensive preparations are being made for next season.

Overseer W. J. McGill, Shelburne, reports that cod show a small increase, as four new vessels engaged in the business. Bank fishing may be considered good, but inshore line fishing was a comparative failure, owing to scarcity of fish and bait. Mackerel show a small increase in the fall catch over last year's, herring plenty outside the harbour, but owing to the low price few comparatively were caught. Lobsters fairly good; an increase of live shipments at good prices is shown. This business needs careful watching, if it is to remain permanent, though the law has been fairly observed in this district. Salmon and alewives gave an average catch. The money expended in clearing our brooks and rivers shows beneficial results in the increase of our river fisheries.

YARMOUTH COUNTY.

Overseer J. A. Hatfield, Yarmouth, reports, a slight falling off in the cod fisheries. Mackerel show an increase over last year, herring less; not due to scarcity of fish but to their low price. The yield of lobsters exceeds last year's, both alive and canned. Alewives a light catch, but increased price. Salmon also less than average, other fish yielded fairly.

QUEEN'S COUNTY.

Overseer J. N. Freeman, Liverpool, reports that while hook and line boat fishing, cod, haddock, pollack and bait have been below the average, owing to scarcity of fish and bait, fishing vessels fared better. Herring an average catch, mackerel a comparative failure. These fish did not seem to enter our harbour. Salmon a large falling off; alewives a fair yield. Lobster, fair for fishermen and packers.

LUNENBURG COUNTY.

Overseer W. M. Solomon, West LaHave, reports that the Grand Bankers have been more successful than last year. The whole catch of cod, haddock and pollack, exceeds that of 1894, by over 7½ per cent, including the shore catch which has been very small. Mackerel have been a complete failure. Herring below the average. Lobster exceed the take of last year, and the law has been generally observed. Salmon, an increased catch. Alewives, below the average. The LaHave and Petite Rivers have had plenty

Marine and Fisheries—Fisheries Branch.

attention this year. The latter is now clear of all obstructions from the sea to its source. There are 31 fish-ways in his district, some of which require repairing, and they will doubtless be put in order for next season.

Overseer D. Evans, Chester, reports a large decrease in the catch of mackerel from even last year's decreased catch. Herring show an increased catch. Cod and other line fish are an average catch. Lobsters fair. Fishing for lobsters with hand pots (so called), is an abuse calculated to destroy that fishery if allowed continuance unchecked. The Mush-a-Mush and Martins rivers have had all obstructions removed, and fish have now a free passage from the sea to the lakes for spawning purposes. The fishermen in his district have petitioned the Government against winter fishing, asking for a close season from July 1st to April 1st, instead of January as at present.

ANNAPOLIS COUNTY.

W. M. Bailey, Annapolis County, reports that the catch of salmon was below the average in the river, but better on the bay shore. Herring show a small increase. Mackerel, a total failure. Lobsters showed a falling off the first part of the season, which was partly made up at the last. Pollack, a failure, other fish, an average catch. The salmon and trout streams cannot stand much longer, the vast strain upon them by sportsmen unless they are helped by a judicious system of restocking.

KING'S COUNTY.

R. F. Reid, Wolfville, reports a decrease of the catch of fish in the gaspereaux. Larger numbers got up during the early high water, before the nets were in, is proven by the large numbers of young fish returning to the sea this autumn.

Overseer James S. Miller reports the catch of salmon in many stations of his district as very good. Shad fishing good, both as regards catch and quality. Cod not up to the average. Haddock double of last year's catch. Herring fairly good, though the fishermen still maintain that the lobster traps keep the herring off shore.

DIGBY COUNTY.

Overseer T. C. Shreve, Digby, reports that the catch of all kinds of fish shows a decrease from 1894. Reasons assigned, scarcity of bait and the large run of dog-fish. These fish are very voracious and drive the marketable fish from the fishing grounds. If it were possible to offer a small bounty or in some way make it profitable to kill those fish, the catch of marketable fish would be increased all along our coast. Mr. Shreve thinks that something should be done to stop shipping clams to the United States. The clam beds at Cheticamp and Meteghan are being rapidly exhausted in this way, and it is upon these beds our fishermen depend for a large portion of their bait.

I would again call the attention of your department to the necessity of amending many of the regulations governing the river fisheries. Some of them, owing to circumstances are impracticable, and the officers find themselves handicapped often, where modern regulations would make matters easier all round.

All of which is respectfully submitted,

L. S. FORD,

Inspector of Fisheries, District No. 3.

Marine and Fisheries—Fisheries Branch.

Number.	DISTRICTS.	KINDS OF FISH.												FISH PRODUCTS.			TOTAL VALUE.	Number.			
		Lobsters, preserved in cans, lbs.	Cod, dried, cwt.	Hake, dried, cwt.	Haddock, cwt.	Pollack, cwt.	Trout, lbs.	Halibut, lbs.	Smelts, lbs.	Alewaves, brls.	Oysters, brls.	Clams, brls.	Eels, brls.	Shad, brls.	Squid, brls.	Coarse and mixed fish brls.			Fish Oils, galls.	Seal Skins, No.	Fish used as Bait, brls.	Fish Guano, tons.
<i>Cape Breton County.</i>																					
1	From False Bay Beach to Long Beach.	46298	975	5	161	1000	28800	1900	18	22	50						743	250	27	19,083 42	1
2	From Long Beach to Glace Bay and Bridgeport.		373	4	40	800	4000	2500	15		20						190	95	6	5,707 50	2
3	From Lingan to South Bar and Sydney River.	26500	267	5	23	600	12500	2500	25		25						335	66	17	9,003 50	3
4	Sydney to North-west Arm and Sydney Forks.		14			1200		3500	60		30						7	4		2,639 80	4
5	From Grand Narrows Bridge to Christmas Island.		1200		300	1000		550	125		17						400	250		9,242 50	5
6	Boisdale to George's River.		325		50	125		350	30		15						100	50		2,367 50	6
7	Little Bras d'Or and Boularderie.	43056	2300	20	200	100	8000	600	45		16	200					600	350		23,512 84	7
8	Sydney Min-s, Big and Little Ponds.		320	10	60		600	600	25		10	50					50	50		3,610 00	8
9	North Sydney to Ball's Creek.	30240	400		30	10	2000	500	4		12	25					100	60		4,455 00	9
10	Louisburg and Kennington Cove.		840		454	10	1050	200	4		40	40					520	130		16,749 10	10
11	Big Lorraine and Little Lorraine.		1390		530	16	1800	400	10		50	50					830	165		20,823 50	11
12	Bauline.		140		70	3	400	100	3		10	10					60	42		2,396 50	12
13	Mira-a-Dieu.	73140	490		110	6	600	200	6		40	40					240	126		19,203 60	13
14	Mira Bay and River.		390		140	6	450	400	90		12	10					190	90		8,845 50	14
15	Scatarie Island.		1050		250	25	2000		80		7	10					800	40		8,012 00	15
16	Gabarus, Grand Mira and Big Lake.		1140		80	110			14		75	7					570	600		31,287 96	16
17	North side East Bay and Fork's Lake.		84			50			12		3						140	100		1,470 55	17
18	Bensacite, Piper's Cove and Grand Narrows.		322						4		3						20	10		2,556 50	18
19	South side East Bay		30								3									886 50	19
Totals.		164198	12050	44	2498	66	4535	62150	563	15	22	286	11	425	3	5922	1100	2518	50	191,953 77	

RETURN showing the Number and Value of Vessels and Boats engaged in the Fisheries, Fishing Material, &c.—Nova Scotia—Con.

Number.	DISTRICTS.				FISHING VESSELS AND BOATS.				FISHING MATERIAL.				KINDS OF FISH.									
	Vessels.		Boats.		Number.	Value.	Men.	Number.	Value.	Fathoms.	Value.	Number.	Value.	Salmon, salted, bris.	Salmon, fresh, in ice, lbs.	Salmon, preserved in cans, lbs.	Herring, salted, bris.	Herring, fresh or frozen, lbs.	Mackerel, salted, bris.	Mackerel, fresh, or preserved (in cans) lbs.	Lobsters, preserved (in cans), lbs.	
	Number.	Value.	Number.	Value.																		Men.
	<i>Inverness County.</i>																					
1	Port Hood			81	1600	172	10000	3700						300			160	8000	60		68138	
2	Little Mabou			31	310	46	1200	400									80	3000	10		32856	
3	Seaside			15	200	30	2500	800						500			180	5000	15		37078	
4	Judique and Little Judique			55	640	114	6000	1900						3600			600	38000	50			
5	Long Point			27	370	44	2000	600						3000			360	6000	65			
6	Creignish			16	150	32	2000	700						3000			400	4000	25			
7	Low Point			24	240	42	2500	800									400	6000	15			
8	Port Hastings	1	78	1600	6	20	300	60.0	1800	660							960	2000	40			
9	Port Hawkebury	2	116	3000	15	300	30	60.0	1800	660	3	525	600				420	1000	440			
10	West Bay to Malagawatch	1	60	1400	13	90	1420	265	7320	2680							3040					
11	Orangedale Boom and River Dennis				50	950	150	3650	1300								240					
12	Seal Cove, Estmere and River Inhabitants				27	400	81	2350	1025								230					
13	Mabou Harbour, Coal Mines and Ben Vitrach				16	350	33	590	270					300			7		4			14496
14	Port Bain and Broad Cove				13	260	28	650	300								5		5			
15	Scotsville and East Lake Amslie				11	100	18	660	180													
16	Whycocomagh				7	100	14	250	120													
17	West side Margaree Har., Margaree R. and Forks				15	325	30	1690	546													
18	Margaree Island				18	460	38	1200	275													
19	Broad Cove Marsh to Whale Cove.				23	516	46	1790	438													
20	Grand Etang				21	1300	60	1800	1000													
21	Friar's Head				16	950	48	1100	900													
22	DeLaney's Cove and Doucett's Cove				8	310	24	1000	950													
23	East side Margaree Harbour				24	1200	72	2400	1000													
24	Eastern Harbour and Cheticamp	21	255	6135	93	128	2500	465	3855	2683				3200			849					16900
25	Cape Rouge and Pleasant Bay				71	1870	203	1600	975					4000	1000		60					34400
	Totals	25	509	12135	127	832	17381	2129	65905	25942	3	525	600	9	44000	1000	3864	73040	4731	18500	268592	

Marine and Fisheries—Fisheries Branch.

RETURN showing the Number and Value of Vessels and Boats engaged in the Fisheries, Fishing Material, &c.—Nova Scotia—Can.

Number	DISTRICTS.	KINDS OF FISH.										FISH PRODUCTS.				TOTAL VALUE.						
		Cod, dried, cwt.	Cod tongues and sounds, brls.	Hake, dried, cwt.	Hake sounds, lbs.	Haddock, cwt.	Trout, lbs.	Hallbut, lbs.	Smelts, lbs.	Basas, lbs.	Alewives, brls.	Oysters, brls.	Clams, brls.	Refs, brls.	Squid, brls.		Tom Cod or Frost Fish.	Coarse and mixed fish, brls.	Fish Oil, galls.	Fish used as bait, brls.	Fish used as manure, brls.	Fish Guano.
<i>Inverness County.</i>																						
1	Port Hood.	1600	1000	400	400	200	600	200	200	10	160							1400	260	25		24,391 82
2	Little Mabou	300	50	40	100	100	400			20	10							50	40	15		2,418 50
3	Seaside	100	200	60	200	200	800			10	20							40	70	10		7,578 84
4	Judique and Little Judique	200	80	30	2400	800	800			10	50							30	50	10		11,681 92
5	Long Point	1600	200	30	1200	300	300			20	5							50	50			4,468 00
6	Craigshish	120	50	30	50	50	20			20								40	40			4,093 00
7	Low Point.	160	30	50	300	4000	4000			30	10							50	70			3,069 00
8	Port Hastings.	140	50	50	700	800	1600			50	10							800	100			6,727 00
9	Port Hawkesbury	200	15	50	3600	9500	1600			300	75	117	120	10500	950			50	95	150	65	10,301 50
10	West Bay to Malagawatch	790	7	3800	9000	400	35	240	45	400	35	240	45	50	8			8	8			26,757 50
11	Orangedale Boom and River Dennis.	250	5	1300	1300	3800	9000			350	33	50	33	1500	90			9	38	21		7,650 20
12	Seal Cove, Estmere and River Inhabitants	130	5	8	400	100	4500	350	14	4	7	14	14	14	7			67	80			4,977 60
13	Mabou Har., Coal Mines and Ben Virrach.	110	8	5	28	400	4000			158	85							60	40			5,241 24
14	Port Bain and Broad Cove.	90	5	15	28000	700	2000			15	10							45	12			899 50
15	Scottsville and East Lake Ainslie.	90								15	10											4,342 00
16	Whycocomagh									276	10	12	6									922 50
17	West side Margaree Har., Margaree River and Forks.	935	21	62	1500	540	300			276	10	12	6					421	65			20,005 94
18	Margaree Island	120	12	23	300	300	300											75	120			7,890 72
19	Broad Cove Marsh to Whale Cove.	231	6	45	250	250	49											143	49			3,977 20
20	Grand Etang	1400	50	10	60	200	100											180	250			27,199 10
21	Friar's Head	900	20	60	100	100	87											90	87			10,564 50
22	Delaney's Cove and Doucett's Cove.	440	17	56	50	25	100											140	55			6,771 50
23	East side Margaree Harbour.	1400	470	580	1700	1700	41293			4	1293	100						300	100			14,630 00
24	Eastern Harbour and Cheticamp	9845	29	190	1850	1850	135											4193	1893			75,376 70
25	Cape Rouge and Pleasant Bay	1000	27	1968	540	2443	4496	6465	38200	550	633	1050	137	635	2257	12000	2066	8561	4839	238	86	*315,846 78
	Totals	20211	27	1968	540	2443	4496	6465	38200	550	633	1050	137	635	2257	12000	2066	8561	4839	238	86	

* Add 28,600 lbs. Dogfish, \$286, in this county.

RETURN showing the Number and Value of Vessels and Boats engaged in the Fisheries, Fishing Materials, &c.—Nova Scotia—Con.

Number.	FISHING VESSELS AND BOATS.										FISHING MATERIAL.						KINDS OF FISH.																
	Vessels.			Boats.			Gill-Nets.				Salmon, fresh in ice, lbs.	Herring, salted, brs.	Mackerel, salted, brs.	Lobsters, preserved in cans, lbs.	Cod, dried, cwt.	Cod Tongues and Sounds, brs.	Haddock, cwt.	Number.															
	Number.	Tonnage.	Value.	Men.	Number.	Value.	Men.	Fathoms.	Value.																								
<i>Richmond County.</i>																																	
1	157	2855	28	180	2160	222	28520	14260	150	3332	568108656	1712	3	910	1																		
2	111	1725	13	183	2196	221	27540	13770	4008	44	59376	1067	6	906	2																		
3	805	16140	254	234	2804	148	8860	4436	489	150	33600	183	7	71	3																		
4	95	1000	21	15	250	22	3000	800	346	578	28896	5796	7	247	4																		
5	18	8000	144	20	140	23	2800	900	75	75	22560	5000	9	300	5																		
6	184	2900	22	100	1100	150	28200	6900	210	115	6700	175	6	55	6																		
7	804	2900	58	82	820	100	6750	2260	2100	60	1260	500	8	3020	8																		
8				90	900	180	4000	1750	700	300	500	500	9		10																		
9				55	1240	128	7400	1285	340	240	121056	900	10	2011	11																		
10				78	1358	162	15900	2776	1500	615	520	83888	350	30	12																		
11	11	180	3	228	4008	360	45000	7655	2200	2856	1253	77610	2690	1020	13																		
12				51	870	104	6400	1120	895	94	456	113	14		14																		
Totals																	71	2297	35700	543	1379	18770	1914	198490	64302	10	3850	16316	3622	535642	27489	16	6682

Marine and Fisheries—Fisheries Branch.

RETURN showing the Number and Value of Vessels and Boats engaged in the Fisheries, Fishing Material, &c.—Nova Scotia—Con.

DISTRICTS.	Number.	KINDS OF FISH.								FISH PRODUCTS.		TOTAL VALUE.	Number.
		Pollack, cwt.	Habit, lbs.	Smelts, lbs.	Alewives, brls.	Clams, brls.	Refs, brls.	Squid, brls.	Flounders, lbs.	Coarse and Mixed Fish, lbs.	Fish Oils, galls.			Fish used as Bait, brls.
<i>Richmond County.</i>													
1 Arichat and Petit de Grat	111	3464	13	29	17	87	35325	30	1176			52,801 39	1
2 Cape Augnet, Madame Island and West Arichat	905	1420	24	63	18	68	30825	70	1327			43,309 69	2
3 Rocky Bay and Cape Le Rond	10	890	4	12	3	34	15275	15	155			11,315 25	3
4 D'Escousse and Lower D'Escousse	7	14475	12	356	26	18	17600	15	2127			46,592 74	4
5 St. Peter's			3		15				275	23		3,794 00	5
6 River, Bourgeois									2900	80		27,853 40	6
7 Grandigue and Fort St. Louis			25	8000	130				90	25		3,708 50	7
8 River Inhabitants and Basin			400	15300	20				310	50		54,354 00	8
9 Port Malcolm and Gut of Canso			430			120			410	58		12,111 00	9
10 West Bay			10		20				160	20		4,094 00	10
11 Fourchu to St. Esprit			900		20				390	230		26,712 84	11
12 L'Archeveque to Point Michaud	6		10		34				116	150		24,438 22	12
13 L'Ardoise, Lower L'Ardoise and Rockdale	22	500	168		34				945	260		50,259 40	13
14 Grande Grève, St. Peter's East and Indian Reserve	18		15		50				182	60		8,588 80	14
Totals	1079	21649	1114	26000	387	327	94025	130	9573	956		379,193 23	

Marine and Fisheries—Fisheries Branch.

RETURN showing the Number and Value of Vessels and Boats engaged in the Fisheries, Fishing Material, &c.—Nova Scotia—Con.

Numbers.	DISTRICTS.	KINDS OF FISH.												FISH PRODUCTS.			TOTAL VALUE.	Numbers.			
		Cod, dried, cwt.	Cod, tongues and sounds, brls.	Hake, dried, cwt.	Haddock, cwt.	Trout, lbs.	Halibut, lbs.	Smelts, lbs.	Alewives, brls.	Oysters, brls.	Clams, brls.	Rels, brls.	Squid, brls.	Tom Cod or Frost Fish, lbs.	Coarse and Mixed Fish, brls.	Fish Oils, galls.			Seal Skins, No.	Fish used as Bait, brls.	
<i>Victoria County.</i>																					
1	Meat Cove, Wreck Cove and Burton's Beach	344			21	500									16	260		265	8,819 40	1	
2	Bay St. Lawrence Pond and North Harbour	746			80	1000									36	550	12	410	13,907 70	2	
3	Middle Head and White Point	720		20	50	100									32	568		138	6,796 20	3	
4	New Haven and Neil's Harbour	4149		11	175	800									90	2600		600	23,081 70	4	
5	Green Cove and North Bay, Ingomish	1797		8	220	200									65	1100		300	16,056 40	5	
6	New Campbellton, Big Bras d'Or & Bird Island	250		10	30	110									50	220		35	6,819 38	6	
7	Englishtown, St. Ann's Bay and Black Head	100		100	10											150		100	4,440 00	7	
8	Barasois, Eel Cove, North River & Indian Brook	220			110	1300										49000		50	8,060 00	8	
9	Bretton Cove, Little River and Black Rock	400			70	30										10		200	50	50	50
10	French River, Wreck Cove and Path End	625			170	2100										15		680	85	8,169 50	10
11	South Bay, Ingomish and Middle Head	2300		50	800	1400										2000		2000	38,025 50	11	
12	Kemp Head, Bourderie and Baddeck	2066				1375										3612		202	37	12,309 90	12
13	North and south sides Little Narrows	279				260										3578		8	4,430 30	13	
14	Washabuck and Iona	2495														1645		311	16,648 65	14	
	Totals	16535	1	199	1736	5375	6400	51335	157	880	22	229	2630	1100	965	9182	212	3131	*180,782 33		

* To be added in this county, 213,700 lbs. dog-fish, \$2,137.

RECAPITULATION

Of the Yield and Value of the Fisheries for the Island of Cape Breton for the Year 1895.

Kinds of Fish.	Quantity.	Rate.		Value.	
		\$	cts.	\$	cts.
Salmon, pickled.....	Brls. 215	16	00	3,440	00
Salmon, fresh.....	Lbs. 63,775	0	20	12,755	00
do preserved.....	Cans. 1,296	0	15	194	40
do smoked.....	Lbs. 200	0	20	40	00
Herring, pickled.....	Brls. 37,349	4	50	168,070	50
do fresh or frozen.....	Lbs. 118,340	0	01½	1,479	25
do smoked.....	" 9,000	0	02	180	00
Mackerel, pickled.....	Brls. 11,348	14	00	158,872	00
do preserved.....	Cans. 19,900	0	12	2,388	00
Lobsters, preserved.....	" 1,330,474	0	14	186,266	36
do fresh.....	Tons. 3	75	00	225	00
Cod, dried.....	Cwt. 76,285	4	50	343,282	50
do tongues and sounds.....	Brls. 44	10	00	440	00
Hake, dried.....	Cwt. 2,211	2	50	5,527	50
do sounds.....	Lbs. 540	0	50	270	00
Haddock, dried.....	Cwt. 13,369	3	50	46,791	50
Pollack, dried.....	" 1,145	2	50	2,862	50
Trout.....	Lbs. 54,890	0	10	5,487	00
Halibut, fresh.....	" 96,664	0	10	9,666	40
Smelts.....	" 129,035	0	05	6,451	75
Bass.....	" 550	0	10	55	00
Alewives.....	Brls. 2,467	4	00	9,868	00
Oysters.....	" 1,945	4	00	7,780	00
Clams.....	" 661	6	00	3,966	00
Eels.....	" 1,557	10	00	15,570	00
Shad.....	" 11	10	00	110	00
Squid.....	" 5,649	4	00	22,596	00
Flounders.....	Lbs. 99,025	0	05	4,951	25
Tom-cods.....	" 13,100	0	05	655	00
Coarse and mixed fish.....	Brls. 3,164	3	00	9,492	00
Fish oil.....	Galls. 33,238	0	40	13,295	20
do used as bait.....	Brls. 11,444	1	50	17,166	00
do used as manure.....	" 238	0	50	119	00
do guano.....	Tons. 136	25	00	3,400	00
Seal skins.....	No. 1,312	1	25	1,640	00
Dog-fish.....	Lbs. 242,300	0	01	2,423	00
Total for 1895.....				1,067,776	11
Total for 1894.....				1,177,453	55
Decrease.....				109,677	44

Marine and Fisheries—Fisheries Branch.

TABLE showing the Number and Value of Vessels and Boats, Nets, Seines, &c., engaged in the Fisheries of the **Island of Cape Breton** and the Approximate of the Value of other material not included in the Statistical Returns for the Year 1895.

Material.	Value.
	\$ cts.
111 vessels, 3,030 tons.....	52,085 00
3,916 boats.....	70,917 00
393,984 fathoms of nets.....	136,799 00
45 canning establishments.....	40,000 00
90,000 lobster traps.....	67,500 00
Hand lines, trawls, &c.....	17,246 00
Fishing-piers, fish-houses and other sundries.....	85,200 00
Steamers, smacks, canoes, &c.....	7,850 00
31 smelt-nets.....	1,060 00
2 trap-nets.....	920 00
6 seines (845 fathoms).....	1,180 00
Total.....	480,757 00

NOVA SCOTIA—

RETURN showing the Number, Tonnage and Value of Vessels and Boats, and the the Number of Men employed in the Province of

Numbers.	DISTRICTS.	BOATS.			FISHING MATERIALS.						Herring.		
		Number.	Value.	Men.	Gill-Nets.		Smelt-Nets.		Weirs.		Salmon, fresh in ice, lbs.	Salted, brls.	Smoked, lbs.
					Fathoms.	Value.	Number.	Value.	Number.	Value.			
	<i>Antigonish County.</i>		\$			\$	\$						
1	Harbour Bouché.....	29	506	31	13100	626						308	
2	Linwood, Cape Jack & Little Tracadie	27	397	29	13800	1040					700	256	
3	Big Tracadie and Bayfield.....	24	304	29	8150	1004					1950	358	
4	Monk's Head, South and North Side of Antigonish Harbour.....	30	456	35	16790	2517					10450	295	
5	Lakeville, Ballantyne's Cove and South Side Cape George.....	26	579	38	12400	1050					2300	317	
6	North Side, Cape George and George- ville.....	24	460	43	10700	890					900	209	
7	Malignant Cove, Doctor's Brook, Arisaig, Knoidart and Moidart...	35	606	45	11700	1562					9100	338	
	Totals.....	195	3308	250	86640	8689					25400	2081	
	Value..... \$										5080	9365	
	<i>Colchester County.</i>												
1	Sterling.....	13	190	16	500	150	12	240					
2	Stewiacke.....	55	322	94	823	475					8600		
3	Five Islands.....	7	185	14						4	700	800	12
4	Economy.....	9	250	18	3000	600				8	1560	16150	
5	Little Bass River to Highland Village	16	500	30	4850	975				6	1150	20180	7433
6	Great Village to Queen's Village....	22	590	44	5605	1300					34760		
	Totals.....	122	2037	216	14778	3500	12	240	18	3410	80490	12	7433
	Value..... \$										16098	54	148

Marine and Fisheries—Fisheries Branch.

District No. 2.

Quantity and Value of all Fishing Materials, the Kinds and Quantities of Fish, and Nova Scotia (District No. 2) for the Year 1895.

	Mackerel, salted, brls.	Lobsters, preserved in cans, lbs.	Cod, dried, cwt.	Hake.		Haddock, cwt.	Trout, lbs.	Snelbs, lbs.	Bass, lbs.	Alewives, brls.	Oysters, brls.	Eels, brls.	Shad, brls.	Coarse and mixed fish.	Fish oils, galls.	Fish used as bait, brls.	Fish used as manure, brls.	TOTAL VALUE.	Numbers.
				Dried, cwt.	Sounds, lbs.														
57	61178	133	14	11	3	200	2000	.....	9	.....	8	.....	100	77	85	300	.....	\$	1
50	.....	57	6	.....	.....	300	2000	.....	27	.....	75	.....	.....	25	51	.....	.....	3,339	2
117	.....	11	.....	.....	.....	300	4000	.....	7	100	40	.....	.....	.....	91	.....	.....	4,882	3
35	33600	74	139	199	11	1000	6000	.....	33	.....	80	.....	.....	104	149	160	.....	11,107	4
114	40226	237	471	419	70	.....	1500	.....	48	.....	.....	.....	.....	319	150	200	.....	12,534	5
43	.....	154	670	472	17	.....	.....	.....	23	.....	.....	.....	.....	414	163	.....	.....	4,888	6
39	38593	33	448	532	17	.....	.....	.....	14	.....	.....	.....	.....	258	130	200	.....	11,339	7
455	173597	699	1748	1633	118	1800	15500	.....	161	100	203	.....	100	1197	819	860	.....	.....	.....
6370	24304	3146	4370	817	413	180	775	.....	644	400	2030	.....	150	479	1229	430	.....	60,182	.....
.....	4800	.....	.....	.....	.....	200	10405	.....	51	.....	5	.....	.....	.....	25	20	.....	1,514	1
.....	.....	142	.....	.....	.....	8500	.....	800	150	.....	.....	.....	.....	.....	.....	.....	.....	3,630	2
.....	.....	24	.....	.....	.....	150	.....	.....	.....	.....	.....	.....	.....	50	18	.....	.....	970	3
.....	.....	.....	.....	.....	.....	300	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,021	4
.....	.....	.....	.....	.....	.....	250	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,876	5
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8,787	6
.....	4800	166	.....	.....	.....	9400	10405	800	201	.....	5	659	.....	50	43	20	.....	.....	.....
.....	672	747	.....	.....	.....	940	500	80	804	.....	50	6590	.....	20	65	10	.....	26,798	.....

RETURN showing the Number, Tonnage and Value of Vessels and Boats engaged

Numbers.	DISTRICTS.	FISHING VESSELS AND BOATS.						FISHING MATERIALS.						Salmon, fresh, in ice, lbs.	Herring, salted, brls.		
		Vessels.			Boats.			Gill Nets.		Smelt Nets.		Weirs.					
		Number.	Tonnage.	Value.	Men.	Number.	Value.	Men.	Fathoms.	Value.	Number.	Value.	Number.			Value.	
	<i>Cumberland County.</i>			€			€			€			€				
1	Pugwash, Port Philip and Gulf Shore					126	2624	130	990	336	39	780					
2	Wallace					25	200	45	700	290	15	450					
3	River Philip	1	50	500	4	10	220	12	900	450					3500		
4	La Planche and Nappan					1	10	1	170	65					300		
5	Minudie to Apple River	1	30	500	4	8	167	13	260	90					2300	70	
6	Advocate					5	120	8	200	85					2000	35	
7	Spencer's Island and Port Greville	2	18	210	6	10	225	23	480	225					1000	250	
8	Parrsborough					2	45	3	60	30				2	60	5000	20
	Totals	4	93	1210	14	187	3611	235	3760	1571	54	1230	2	60	14100	375	
	Value	€													2820	1687	

Marine and Fisheries—Fisheries Branch.

in the Fisheries, Fishing Material, &c.—Nova Scotia—Continued.

	Herring, fresh or frozen, lbs.	Herring, smoked, lbs.	Mackerel, fresh or preserved (in cans), lbs.	Lobsters, preserved (in cans), lbs.	Cod, dried, cwt.	Hake, dried, cwt.	Haddock, cwt.	Pollack, cwt.	Trout, lbs.	Halibut, lbs.	Smelts, lbs.	Alewives, brls.	Oysters, brls.	Eels, brls.	Shad, brls.	Fish oils, galls.	Fish used as bait, brls.	Fish used as manure, brls.	VALUE.	Numbers.
.....	1500	.....	250	429631	.....	.....	.....	.....	700	.....	75600	50	51	.....	.....	.....	825	2500	66,850	1
.....	.....	.....	.....	.....	.....	.....	.....	.....	2000	.....	17000	180	425	6	.....	.....	.....	.....	3,495	2
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	225	.....	.....	11	.....	.....	.....	1,910	3
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1500	105	.....	.....	10	.....	.....	.....	655	4
.....	200	.....	.....	.....	60	10	.....	.....	.....	.....	1800	10	.....	.....	250	.....	.....	.....	3,774	5
.....	100	.....	.....	.....	45	.....	20	.....	.....	3000	.....	.....	.....	.....	.....	.....	.....	.....	1,247	6
.....	900	.....	.....	.....	293	5	160	20	.....	9000	.....	.....	.....	.....	.....	25	.....	.....	4,242	7
.....	500	.....	.....	.....	15	.....	10	.....	.....	3000	.....	.....	.....	.....	2	.....	.....	.....	1,522	8
.....	1500	1700	250	429631	413	15	225	46	2700	15000	95900	570	476	6	281	25	855	2500	.....	.....
.....	15	34	30	60148	1859	37	788	115	270	1500	4795	2280	1904	60	2810	10	1283	1250	83,695	.....

Marine and Fisheries—Fisheries Branch.

RETURN showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, Fishing Material, &c.—
Nova Scotia—Continued.

DISTRICTS.	KINDS OF FISH.												FISH PRODUCTS.			VALUE.	Numbers.									
	Lobsters.	Cod.		Hake.		Haddock, cwt.	Pollack, cwt.	Trout, lbs.	Halibut, lbs.	Smelts, lbs.	Basas, lbs.	Alewives, brls.	Clams, brls.	Beals, brls.	Shad, brls.			Squid, brls.	Tom-cod or Frostg, lbs.	Coarse and mixed, brls.	Fish Oils, galls.	Fish used as bait, brls.	Fish used as manure, brls.	\$	1	2
<i>Guyborough County.</i>																										
1	30400		490			40	1400	1200	600		9	15	40		60	750		250	510	150	10,405	1				
2	54720		800			100	150	3000	500		10	10	35		50	160		400	460	250	15,666	2				
3	72844		1200		10	12	2500	2000	900		180	160	40		90	1600		600	660	350	25,563	3				
4	36000		490			40	2800	1040	1500	150	150	30	40	2	20	500		250	300	180	14,500	4				
5	156		156		7	20	500	1400	700		10	50	10	2	15	400		80	260	300	4,583	5				
6	33760		240		3	15	600	1200	1400		80	20	20		15	350		120	700	175	12,670	6				
7			280		5	25	3000	800	300		30	15	10		20	500		140	310	...	5,658	7				
8	85870		360		10	40	...	4000	500		10	25	30		50	700		180	270	400	20,599	8				
9	23100		410		15	30	...	2500	600		...	30	20		40	900		250	400	110	13,004	9				
10	50400		310		10	50	...	2100	900		25	60	30		70	1000		160	310	250	23,028	10				
11	49111		8881		247	2551	616	8750	3810	600	743	164	314		1800	1100	35	7796	4316	2121	212,490	11				
12	234664	25	4700	30	700	5000	450	1000	17000		100	...	78		...	...	15	3990	3900	1900	139,692	12			
13	66764		1754		218	1488	89	1900	...	2400	...	48	5		3134	...	7	2531	3600	716	92,624	13				
14	4752		1655		266	1236	47	2137	...	6000	...	352	...	50	800	...	7	1682	1300	700	121,017	14				
Totals.....	1246885	25	21726	30	1496	10705	1202	24737	117650	20110	750	1744	584	732	6104	8560	64	18429	16896	7302
Value	174555	1000	97767	300	3740	37468	3005	2474	11705	1005	75	6976	4088	7320	40	24656	428	96	7371	25344	3651	711,499				

Marine and Fisheries—Fisheries Branch.

27 Tangier.....	1	39	1700	4	40	840	38	7905	540	1	500				27
28 Pope's Harbour and Gerrard Island.....					42	925	40	3854	565						28
29 Spry Island, Taylor's Head and Mushaboon.....	5	151	2800	31	99	1995	68	4980	1000	1	200				29
30 Sheet Harbour and Sober Island.....	1	12	200	2	67	1088	64	4280	897			2	125	100	30
31 Baver Harbour and Salmon River.....					39	743	30	2650	47						31
32 Quoddy and Harrigan Cove.....	1	10	150	2	16	250	10	200	40						32
33 Moser River and Smith's Cove.....					10	160	18	80	16						33
34 Mitchell's Bay and Ecum Secum.....					33	418	30	2100	220						34
Totals.....	70	1882	50710	451	2913	44804	3039	286201	37375	5	1500	421	42600		70600

RETURN showing the Number, Tonnage and Value of Vessels and Boats,

Numbers.	DISTRICTS.	SALMON.		HERRING.		MACKEREL.		LOBSTERS.		COD.	
		Fresh in ice.	Smoked.	Salted.	Fresh or frozen.	Salted.	Fresh or preserved, in cans.	Preserved, in cans.	Alive or fresh.	Dried.	Tongues and sounds.
<i>Halifax County.</i>											
1	North Shore.....	2000	100	100	.....	100	.....	.....	14	80	.....
2	East St. Margaret's.....	1800	.....	30	.....	10	.....	.....	3	50	.....
3	Indian Harbour.....	5000	.....	7000	6000	120	500	.....	10	1100	.....
4	Peggy's Cove.....	1600	.....	350	2500	50	100	.....	1	180	.....
5	Dover.....	1500	.....	2500	10000	200	1000	.....	15	450	.....
6	Prospect.....	3000	.....	1500	10000	250	1000	8600	30	1000	.....
7	Terrence Bay.....	100	.....	1000	5000	200	.....	10992	42	1000	.....
8	Pennant.....	60	.....	350	2000	50	.....	8000	15	1600	.....
9	Sambro.....	300	.....	250	600	40	.....	67200	12	600	.....
10	Ketch Harbour.....	300	.....	100	450	80	200	.....	8	150	.....
11	Portuguese Cove.....	180	.....	80	300	50	.....	.....	31	40	.....
12	Herring Cove.....	500	.....	60	210	25	.....	.....	1	650	.....
13	Ferguson's Cove.....	80	.....	90	1800	25	.....	.....	1	15	.....
14	Bedford.....	500	.....	.....	.....	8	.....	.....	.....	.....	.....
15	Halifax.....	.....	.....	10	.....	5	500	.....	.....	500	.....
16	Eastern Passage and Devil's Island.....	674	.....	444	.....	19	.....	.....	3	967	1
17	Lawrencetown and Cow Bay.....	578	.....	238	.....	10	.....	.....	3	78	.....
18	Seaforth and Three Fathom Harbour.....	180	.....	274	.....	13	.....	.....	3	670	1
19	West Chezetcook.....	.....	.....	651	.....	2	.....	.....	4	3386	2
20	East Chezetcook.....	.....	.....	738	.....	2	.....	.....	3	792	1
21	Petpiawick Harbour.....	.....	.....	771	.....	2	.....	24692	.....	355	.....
22	Musquodoboit Harbour.....	1660	55	617	.....	14	.....	.....	5	444	.....
23	Jeddore.....	500	60	1584	.....	28	.....	.....	10	2541	2
24	Clam Harbour Owl's Head.....	341	90	2697	.....	92	.....	35088	22	415	1
25	Ship Harbour.....	312	.....	1427	.....	35	.....	.....	12	320	1
26	Pleasant Harbour.....	.....	.....	233	.....	5	.....	46900	10	285	.....
27	Tangier.....	410	.....	1030	.....	22	.....	.....	.....	225	1
28	Pope's Harbour and Gerrard's Island.....	.....	.....	693	.....	30	.....	36000	3	268	.....
29	Spry Bay, Taylor's Head and Mushaboon.....	60	.....	1080	.....	320	.....	102528	12	693	.....
30	Sheet Harbour and Sober Island.....	480	700	1090	.....	2	.....	130416	4	194	.....
31	Beaver Harbour and Salmon River.....	.....	.....	152	.....	8	.....	128067	6	230	.....
32	Quoddy and Harrigan Cove.....	200	.....	17	.....	.....	.....	96206	3	140	.....
33	Moser River and Smith's Cove.....	.....	.....	5	.....	.....	.....	.....	.....	50	.....
34	Mitchell's Bay and Ecum Secum.....	190	.....	90	.....	7	.....	117648	.....	124	.....
Totals.....		22405	1005	27251	38860	1864	3300	811737	243	19592	10
Value.....		\$ 4481	201	122630	389	26096	396	113643	9720	88164	100

Marine and Fisheries—Fisheries Branch.

engaged in the Fisheries, Fishing Material, &c.—Nova Scotia—Continued.

HAKE.		KINDS OF FISH.											FISH PRODUCTS.				VALUE.	Numbers.
Dried.	Sounded.	Haddock.	Pollack.	Trout.	Halibut.	Smelts.	Alewives.	Oysters.	Clams.	Eels.	Squid.	Coarse and mixed fish.	Fish Oils.	Fish used as Bait.	Fish used as Manure.	Seal Skins.			$	Numbers.
Cwt.	Lbs.	Cwt	Cwt	Lbs	Lbs.	Lbs.	Brls	Brls	Brls	Brls	Brls	Brls	Galls.	Brls	Brls	No.	\$	Numbers.
25	25	40	40	650			15			3	5	15	40	2			3,222	1
25	25	20	30	300		250	5			4	4	1	3	5			1,255	2
900	1400	150	150	200	500	100	35		12	6	12	30	500	130			44,347	3
110	150	60	80	80	200		15			1	2	25	100	20			4,456	4
600	500	150	100	800	1200	150	35		3	3	8	12	450	75			20,461	5
109	150	90	120			100	40			12	3	10	75	200	50	40	19,437	6
450	600	60	250		800	250	50			30	3	20	120	400	60	50	18,416	7
150	250	100	80	600	1000	180	65			20	2	10	75	300	90	40	13,293	8
350	275	140	250	250	200	200	14			2	2	4	25	800	40	350	17,221	9
100	110	80	210		150		16					5	12	100	30		3,966	10
		12	10									5	28	3			1,509	11
200	310				140000							3	380	165			18,746	12
50	80	12	40		2000							4	65	21			1,448	13
				200							3						262	14
180	120	150	5										1000	45			3,939	15
12	40	339	99		9116		19		15	5		12	495	65			9,823	16
		9	32	420	130	4000	38		14	6		10	35	7			2,514	17
		27	6	160	387	13000	28		19	5		15	298	44			5,914	18
		218	28		988	5500	8		238	7		8	1826	280			23,071	19
		46	39	350	760	1200	30		42	9		15	315	38			8,172	20
		64	280	375	1140	300	125		33	5		13	128	24	120		10,600	21
		47	58	1230	2460	5000	10		28	14		15	200	26			6,983	22
2		98	57	220	2410	1600	15		38	18		35	1313	200			22,007	23
88	174	32	24	1000	1150		7		19	7		30	248	25	180		22,069	24
		40	23	350	1990	700	160		11	6		8	174	16			10,233	25
		100	400	56	18	1550	3		9	4		6	138	10	240		10,528	26
		13	18	500	1780	1000	11		12	4		11	116	8			6,660	27
		21		30	5	2000			2	1	3		224	10	180		10,521	28
		385	775	70		1275			3	11	4		803	60	500		29,834	29
				13		700		10		2	7	3	113	10	650	17	25,096	30
				11	3					3	1		130	5	700	12	20,563	31
				15						5			100	4	450		14,709	32
				3		100							30	2			282	33
				22	2	1780							100	3	600		18,174	34
3848	5384	2217	2057	7685	175766	33530	754	4	568	147	88	582	11169	1573	4100	29		
9620	2692	7760	5143	769	17577	1676	3016	16	3976	1470	352	873	4468	2360	2050	29	429,671	

RETURN showing the Number, Tonnage and Value of Boats engaged

Numbers.	DISTRICTS.	Boats.			FISHING MATERIALS.								
		Number.	Value.	Men.	Gill-Nets.		Smelt-Nets.		Weirs.		Salmon, fresh in ice, lbs.	Herring, salted, brls.	Herring, fresh or frozen, lbs.
					Fathoms.	Value.	Number.	Value.	Number.	Value.			
	<i>Hants County,</i>		\$			\$		\$					
1	Maitland to Shubenacadie	43	234	43	2480	345					11600		
2	Shubenacadie to Grand Lake.	66	290	64	1270	310					3500		
3	Noel to Walton	9	260	11	2600	720			3	100	8000		
4	West Hants	18	630	18	3325	925			9	290	3200	10	
	Totals..	136	1414	136	9675	2300			12	390	26350	10	
	Value		\$								5270	45	
	<i>Pictou County.</i>												
1	West Pictou.....	126	2650	138	2500	750	6	150					
2	Pictou Island	64	1352	107	880	240						70	
3	Central Division	20	400	20	400	120							
4	Southern Division.....	23	410	33	2900	1890	3	60			9300	51000	
5	Merigonish Island.....	12	175	18	870	430					7412		
6	North Beach	4	60	4	825	410					4200		
7	Ponds.....	18	270	19	1060	520	1	30			6300	8000	
8	Lismore.....	4	60	4	510	290					5050	8700	
	Totals.....	271	5377	343	9940	4650	10	240			32262	70	
	Value		\$								6452	315	

Marine and Fisheries—Fisheries Branch.

in the Fisheries, Fishing Materials, &c.—Nova Scotia—Continued.

KINDS OF FISH.														FISH PRODUCTS.		VALUE.	Numbers.	
Herring, smoked, lbs.	Mackerel, salted, brls.	Lobsters, preserved in cans, lbs.	Cod, dried, cwt.	Hake, dried, cwt.	Haddock, cwt.	Trout, lbs.	Smelts, lbs.	Bass, lbs.	Alewives, brls.	Oysters, brls.	Eels, brls.	Shad, brls.	Tom cod or frost fish, lbs.	Coarse and mixed fish, brls.	Fish used as bait, brls.			Fish used as manure, brls.	$	Numbers.
1000			46	5	8	9500	4700	800	522								4,408	1
			68					600	86								1,504	2
									15								2,816	3
									197								4,974	4
1000			114	5	8	9500	4700	1400	820									
20			513	13	26	950	235	140	3280			2640	480	90			13,702	
	10	309760	25			500	11000			15	7				700	1500	46,149	1
	5	229000	6												400	1100	33,622	2
	20	21792	75			6000	15000	200	200		100						3,170	3
	2	19144		100		300	6700								16	110	6,482	4
						300									95	100	4,633	5
	2	34752	10	18		500									100	160	870	6
	13		72	180		100	3960				37				50		6,603	7
																	2,706	8
	52	614448	188	298		7700	36660	200	200	15	144				1361	2970		
	728	86022	846	745		770	1833	20	800	60	1440				2042	1485	104,235	

RECAPITULATION

Of the Yield and Value of the Fisheries in District No. 2, Nova Scotia, with Comparative Statement of the Increase or Decrease for the years 1894 and 1895.

Articles.	Quantity in 1895.	Rate.	Totals.	Increase.	Decrease.
			\$	Quantity.	Quantity.
		\$ cts.	\$		
Salmon, salted	Brls. 9	16 00	144		1
do fresh.....	Lbs. 235,161	20 00	47,032		16,473
do canned.....	" 2,000	15 00	300	2,000	
do smoked.....	" 2,035	20 00	407		140
Herring, salted.....	Brls. 66,482	4 50	299,169	27,020	
do fresh.....	Lbs. 777,660	0 01	7,777	348,710	
do smoked.....	" 10,133	0 02	203	9,767	
Mackerel, salted.....	Brls. 5,967	14 00	83,538	4,202	
do canned.....	Lbs. 575,350	0 12	69,043	93,950	
Lobsters, canned.....	" 3,280,898	0 14	459,325		543,614
do fresh.....	Tons. 268	40 00	10,720	121	
Cod, dried.....	Cwt. 42,898	4 50	193,041		7,273
do tongues and sounds.....	Brls. 40	10 00	400	29	
Hake, dried.....	Cwt. 7,410	2 50	18,525		386
do sounds.....	Lbs. 7,507	0 50	3,754		1,506
Haddock.....	Cwt. 13,273	3 50	46,456	2,496	
Pollack.....	" 3,305	2 50	8,263		1,263
Trout.....	Lbs. 63,522	0 10	6,353	132	
Halibut.....	" 307,816	0 10	30,782		17,901
Smelts.....	" 216,805	0 05	10,840	9,445	
Bass.....	" 3,150	0 10	315	20	
Alewives.....	Brls. 4,450	4 00	17,800		1,280
Oysters.....	" 595	4 00	2,380		205
Clams.....	" 1,152	7 60	8,064		148
Eels.....	" 1,237	10 00	12,370	48	
Shad.....	" 1,208	10 00	12,080	227	
Squid.....	" 6,252	4 00	25,008		548
Tom cod.....	Lbs. 18,160	0 05	908	7,110	
Coarse fish.....	Brls. 806	1 50	1,209		4,512
Fish oils.....	Galls. 30,870	0 40	12,348		38,437
Seal skins.....	No. 29	1 00	29		1
Fish used as bait.....	Brls. 21,547	1 50	32,323	1,547	
do products used as manure.....	" 17,752	0 50	8,876	325	
Total.....			1,429,782		

Marine and Fisheries—Fisheries Branch.

COMPARATIVE STATEMENT of the Value of Fisheries in each County of District No. 2,
Nova Scotia, for the Years 1894 and 1895.

County.	Value in 1894.	Value in 1895.	Increase.	Decrease.
	\$	\$	\$	\$
Antigonish	69,454	60,182		9,272
Colchester	26,506	26,798	292	
Cumberland	92,792	83,695		9,097
Guyaborough	653,837	711,499	57,662	
Halifax	485,333	429,671		55,662
Hants	16,692	13,702		2,990
Pictou	166,296	104,235		62,055
Total	1,510,904	1,429,782	57,954	139,076
	1,420,782			57,954
Decrease	81,122			81,122

TABLE showing the Value of Vessels, Boats, Nets, &c., engaged in the Fisheries of District No. 2, Nova Scotia, with an Approximate Value of other Fishing Material for the Year 1895; also showing the Number of Hands employed therein.

Articles.	Values.
	\$
99 vessels, 2,529 tons.....	64,365
6,245 boats.....	120,991
717,458 fathoms of gill-nets.....	65,987
78 trap-nets.....	13,780
505 seines, 48,035 fathoms.....	73,805
94 smelt bag-nets.....	2,020
34 weirs.....	3,873
1,931 trawls, &c.....	7,652
	352,473
222,647 lobster traps.....	\$112,370
101 canneries.....	108,800
	221,170
41 steamers and smacks.....	\$15,630
33 freezers and ice houses.....	15,405
1,572 smoke and fish houses.....	44,825
955 piers and wharfs.....	23,706
	99,566
Total.....	673,209
Number of hands engaged on vessels.....	587
do do boats.....	6,860
do do packing, cleaning, curing fish....	900
do employed in lobster canneries.....	1,773
	10,120

Marine and Fisheries—Fisheries Branch.

RETURN showing the Lobster Plant and other: Fixtures employed in the Fishing Industry in District No. 2, for the year 1895.

COUNTRIES.	LOBSTER PLANT.				OTHER FIXTURES USED IN FISHING.								No.	Value.							
	Traps.		Canneries.		No. of hands employed.		Freezers and Ice houses.		Smoke and Fish houses.		Piers and Wharfs.				Steamers and Smacks.						
	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.			No.	Value.					
Antigonish	19,275	\$ 12,261	4	\$ 4,900	94		41		807		1		100		7		300		280		140
Colchester	600	360	1	100	5																
Cumberland	23,960	14,376	21	15,050	268		4		65												
GuySBorough	80,400	45,270	24	37,200	613		560		16,857		229		7,332		31		13,540		3,088		1,696
Halifax	59,777	17,803	28	21,800	377		967		27,096		725		16,274		3		1,700		4,000		2,000
Pictou	38,635	22,300	23	29,750	416														200		100
Totals	222,647	112,370	101	108,800	1,773		1,572		44,825		955		23,706		41		15,630		7,568		3,936

NOVA SCOTIA, DISTRICT NO. 3.

RETURN showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, Quantity and Value of Fishing Material, Kinds and Quantities of Fish, as well as the Number of Men employed in the Fishing Industry, in District No. 3 of Nova Scotia, for the Year 1895.

Number.	FISHING VESSELS AND BOATS.						FISHING MATERIAL.				KINDS OF FISH.					
	Vessels.			Boats.			Gill-Nets.		Weirs.		Salmon, fresh in ice, lbs.	Herring, salted, lbs.	Herring, smoked, lbs.	Lobsters, alive or fresh, tons.	Cod, dried, cwt.	
	Number.	Tonnage.	Value.	Men.	Number.	Value.	Pathoms.	Value.	Number.	Value.						
<i>Annapolis County.</i>																
1	27	810	8	12	240	21	1200	600	1	300	3000	900	5	590	1	
2	1	650	10	19	380	35	2900	1000	2	700	4200	600	5	320	2	
3	22	650	10	21	340	42	3200	1600	750	600	670	600	7	600	3	
4	21	480	24	480	40	2000	1000	1000	1	50	500	500	10	750	5	
5	62	1860	14	34	680	60	3200	1600	1	50	480	480	10	380	6	
6	350	10500	84	28	560	40	2800	1400	4	600	250	60,200,000	14	400	7	
7	26	780	10	25	500	40	3500	1700	10	200	600	25,300,000	7	2000	8	
8	2	780	10	25	500	40	3500	1700	4	600	5000	60,200,000	2	400	9	
9	10	3000	20	1000	500	10	200	300	10	200	5000	25,300,000	2	400	10	
10	10	3000	20	1000	500	10	200	300	8	400	5000	25,300,000	2	400	11	
11	13	4000	1	50	1000	1	50	1000	1	50	1000	400	1	400	12	
12	13	4000	1	50	1000	1	50	1000	1	50	1000	400	1	400	13	
13	14	4000	1	50	1000	1	50	1000	1	50	1000	400	1	400	14	
14	14	4000	1	50	1000	1	50	1000	1	50	1000	400	1	400	15	
15	14	4000	1	50	1000	1	50	1000	1	50	1000	400	1	400	15	
Totals	14	487	14610	126	220	4400	377	24000	11950	27	2300	13600	4505	520000	67	10040
Values											2720	20272	10400	5025	45100	

Marine and Fisheries—Fisheries Branch.

RETURN showing the Number and Value of Vessels and Boats engaged in the Fisheries, &c.—Nova Scotia—Continued.

Number.	DISTRICTS.	KINDS OF FISH.													FISH PRODUCTS.			Total Value.						
		Cod, tongues & sounds, brls.	Hake, dried, cwt.	Hake, sounds, lbs.	Haddock, cwt.	Pollack, cwt.	Trout, lbs.	Halibut, lbs.	Smelts, lbs.	Bas, lbs.	Alwives, brls.	Clams, brls.	Eels, brls.	Shad, brls.	Flounders, lbs.	Tom cod or frost fish, lbs.	Coarse and mixed fish, brls.		Fish oils, galls.	Fish used as bait, brls.	Fish used as manure, brls.	Fish guano, tons.		
<i>Annapolis County.</i>																								
1	Margaretville	4	125	75	154	100	2000											150	300		10	9,649 00	1	
2	Port George	3	200	100	200	50	2000											200	320	60	10	7,630 00	2	
3	Port Lorne	6	520	25	750	100	3000											250	425	70	20	11,382 50	3	
4	Hampton	4	250	125	550	100	3200											300	380	75	10	9,955 00	4	
5	Plummy and Young's Cove	4	1000	500	700	100	3000											300	410	80	10	13,020 00	5	
6	Parker's Cove	3	280	140	1000	100	2000											200	350	30	30	10,240 00	6	
7	Hillboro' and Delap C. ve.	2	800	400	1200	500	10000											400	400	25	30	14,182 50	7	
8	Victoria Beach and Granville	10	3500	1500	7000	2660	50200											1000	1300		40	69,490 00	8	
9	Thorne's Cove to Ferry		500	250	210	288	2000											250	100	30	30	16,665 00	9	
10	Clementsport to Bear River	2	600	300	920	122	1000	2000	2000	100	520	17	100	2000	2000	500		250	364	100	20	18,033 50	10	
11	Annapolis East to County Line						500																342 00	12
12	Lequille River						700																170 00	13
13	Round Hill River						10000																1,000 00	14
14	Inland Lakes and Streams																						4,215 50	15
15	Annapolis Fish Dryer		886		443																			
Totals		38	8661	3640	13077	4120	12200	77400	2000	4220	105	730	17	100	2000	2000	500	3050	4349	440	180			
Values		\$ 380	21652	1820	45769	10300	1220	7740	100	422	420	5110	170	1000	100	1000	1220		6523	220	1440		\$190,305 00	

RETURN showing the Number and Value of Vessels and Boats engaged in the Fisheries, &c.—Nova Scotia.—Continued.

Number.	FISHING VESSELS AND BOATS.						FISHING MATERIAL.						KINDS OF FISH.								
	Vessels.			Boats.			Gill-Nets.		Trap-Nets.		Weirs.		Seines.		Salmon, fresh, in ice.		Herring.				
	Number.	Tonnage.	Value.	Men.	Number.	Value.	Men.	Value.	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.	Salted, lbs.	Fresh or frozen, lbs.	Smoked, lbs.	Number.	
<i>Digby County.</i>																					
1	6	270	7500	65	5	150	10	180	120	2	150	4	750	1800	150	500	1800	1	1800	1	
2					8	240	17	240	99							45	900	750		2	
3					3	210	14	470	200	1	1000	5	850	2500							3
4					10	30	21	550	200	5	600						250	1400	600	4	
5					7	21	13	260	100	2	90							800	500	5	
6					8	19.0	70	2000	844								100			6	
7					16	480	31	960	405			2	300	250						7	
8	1	24	1100	10	9	270	18	875	220	1	1500	2	300	280						8	
9					33	99	75	1940	836			2	360	250			1600			9	
10					7	200	14	300	110											10	
11					12	360	24	320	115											11	
12					4	120	8	240	98											12	
13					8	240	16	500	200			4	400							13	
14	1	41	1100	10	5	150	11	220	83	2	3200	1	500					20000	500	14	
15					24	60	48	390	140	1	1500	1	100							15	
16					1	360	21	420	150											16	
17	2	25	600	10	25	750	50	4000	1600			2	200							17	
18					8	240	16	320	125											18	
19					15	870	36	870	360											19	
20	1	10	200	3	5	150	10	130	100	13	750							100	20000	20	
21	24	480	19000	175	41	3450	78	18000	7200			10	600	2500						21	
22	12	303	7200	92	51	4000	118	6425	3500			3	280	810						22	
23	7	185	3500	60	36	2100	75	7060	3590											23	
Totals.	54	1347	42200	425	387	17590	795	46810	20390	4	6200	31	3790	9300	3750	375	4700	2150			
Values.															750	1087	476	443			

Marine and Fisheries—Fisheries Branch.

RETURN showing the Number and Value of Vessels and Boats engaged in the Fisheries, &c.—Nova Scotia.—Continued

Number.	DISTRICTS.	KINDS OF FISH.										FISH PRODUCTS.			TOTAL VALUE.	Number.								
		Lobsters.		Cod.				Hake.				Halibut, lbs.					Chams, brls.	Shad, brls.	Flounders, lbs.	Tom-cod or frost fish, lbs.	Coarse and mixed fish, brls.	Fish oils, galls.	Fish used as bait, brls.	Fish used as manure, brls.
		Preserved, in cans, lbs.	Alive or fresh.	Dried, cwt.	Tongues and Sounds, brls.	Dried, cwt.	Sounds, lbs.	Haddock, cwt.	Pollack, cwt.	Halibut, lbs.	Clams, brls.	Shad, brls.	Flounders, lbs.	Tom-cod or frost fish, lbs.											Coarse and mixed fish, brls.
<i>Digby County.</i>																								
1	Digby	12000	15	3000	8	8000	1000	8000	200	20000	70	800	2500	40	3000	1000	200	200	72,036 00	1				
2	Bayview		1	60	2	240	150	65	41	1000	10	400	1000	12	200	40	25	2,406 50	2					
3	Broad Cove		1	30	2 ¹ / ₂	240	150	110	17	500		400	1000	18	300	48	30	1,618 50	3					
4	Rosway		4	100	3	400	180	130	15	300				18	600	90	35	2,705 75	4					
5	Waterford			20	2	120	100	38	9	200				4	75	15	8	763 00	5					
6	Centerville			200	4	1800	250	70	38	700				18	1800	300	60	7,411 00	6					
7	Sandy Cove			65	2 ¹ / ₂	900	100	48	30	900				4	150	27	8	1,360 50	7					
8	Mink Cove			90	4	700	200	120	9	850				9	600	70	40	3,279 75	8					
9	Little River			230	4	1500	400	400	33	1000				17	1400	150	25	7,03 00	9					
10	White Cove			80	1	400	150	35	9	500				9	400	35	20	2,230 50	10					
11	Long Beach and Whale Cove			278	8	900	250	175	23	800				4	400	120	10	4,785 00	11					
12	East Ferry			125	3	520	300	75	24	1000				4	250	60	4	2,768 50	12					
13	St. Mary's Bay			315	1	90	100	20	150	30				10	175	30	4	2,817 50	13					
14	Weymouth			45	2	325	200	140	10	300				6		5		2,912 50	14					
15	White's Cove			112	3	65	100	75	38	900				10		25		1,837 50	15					
16	Church Point			330	4	95	120	125	25	900				4		9		1,201 00	16					
17	Meteghan			21000	3				315	1000				22		65		6,454 00	17					
18	Cheticamp			315	2				115	800				4		28		1,122 50	18					
19	St. Mary's			40	1	15			50	700				6		58		2,136 50	19					
20	Smith's Cove			3	10000	14	5000	8000	12	800				100		100		3500	125	7,373 00	20			
21	Westport			2	7000	10	4700	500	3500	4000				45	2000	2000	400	400	110,155 00	21				
22	Freeport			3000	1	3000	8	2000	1800	19000				18	10000	1800	500	1800	103,886 00	22				
23	Tiverton			36000	28	25600	92	27310	6550	27800				21633	97950	480	25	1200	48,730 00	23				
Totals		5040	2100	115290	920	68275	3275	97300	54157	9795	3360	260	175	578	16940	14692	870	396,354 50						

RETURN showing the Number, Tonnage and Value of Vessels and Boats, and

Number.	DISTRICTS.	FISHING VESSELS AND BOATS.								FISHING MATERIAL.							
		Vessels.			Boats.			Gill Nets	Trap-Nets		Weirs.		Seines.				
		Number.	Tonnage.	Value.	Men.	Number.	Value.	Men.	Fathoms.	Value.	Number.	Value.	Number.	Value.	Number.	Fathoms.	Value.
	<i>King's County.</i>		%		%		%		%		%		%		%		%
1	Aylesford..																
2	Avonport..				16	260	16	2000	750								
3	Boat Island ..											1	750	400			
4	Gasparaux ..									35	200						
5	Long Island ..													2	1000	500	
6	Starr's Flats ..											3	4000	2000			
7	Kingsport ..											1	600	300			
8	Medford ..											1	200	100			
9	Blomidon ..											2	500	1	300	150	
10	Baxter's Harbour ..				13	260	26	400	200			3	900	1	300	150	
11	Hall's Harbour ..	2	31	700	6	20	400	40	2000	1000		11	3300	1	300	150	
12	Hunting Point ..											1	300				
13	Chipman's Brook ..							90	45			1	300	1	300	150	
14	Black Rock ..	2	25	800	5			150	75			1	300				
15	Harbourville ..	1	15	400	3			90	45			4	1200				
16	Morden ..				3	60	6	90	45			2	600				
17	Scott's Bay ..				7	140	14	840	420					3	9000	4000	
	Totals	5	71	1900	14	59	1120	102	5660	2580	35	200	25	7400	15	16750	7900
	Values	\$															

Marine and Fisheries—Fisheries Branch.

the Quantity, and Value of all Fishing Material, &c.,—Nova Scotia—Continued.

KINDS OF FISH.											FISH PRODUCTS.			TOTAL VALUE.	Number.	
Salmon, fresh, in ice, lbs.	Herring, salted, brls.	Herring, smoked, lbs.	Lobsters, alive or fresh, tons.	Cod, dried, cwt.	Haddock, cwt.	Pollack, cwt.	Trout, lbs.	Bass, lbs.	Alewives, brls.	Shad, brls.	Fish oils, galls.	Fish used as bait brls.	Fish used as manure, brls.			\$	cts.
1350							800		1300						350 00	1
100								100	10	90					5,200 00	2
2000							1500								970 00	3
150								150	900						4,150 00	4
										65					695 00	5
										189					1,890 00	6
										100					1,247 50	7
	30			25						20		20	50		947 50	8
	50			40	50	45				10		10	60		1,967 50	9
	150	30000		70	45	30									6,997 50	10
8500	390		2	325	400	90					200	100	150		13,865 00	11
22000	700	120000		350	360	100					200	300	600		1,080 00	12
1000	90			20	30	10					300	40	50		2,586 00	13
4000	150	4000		100	70	30					40	100	90		6,717 50	14
2000	550	100000	1	190	90	75					150	150	250		5,012 50	15
4000	100	150000		60	20	40					400	75	100		1,092 50	16
1000	50			50	25	30					375	60	80		11,637 50	17
2000	1000	160000	3	90	80					235	100	75	250			
48100	3260	564000	6	1320	1170	450	2300	250	2210	709	1765	930	1680			
9600	14670	11280	450	5940	4095	1125	230	25	8840	7090	906	1395	840	66,306 00		

RETURN showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, &c.—Nova Scotia.—Continued.

KINDS OF FISH.

FISHING MATERIAL.

FISHING VESSELS AND BOATS.

Number.	Vessels.			Boats.			Gill-Nets.			Trap-Nets.		Seines.		Salmon, fresh in ice, lbs.	Salmon smoked, lbs.	Herring, salted, lbs.	Herring, fresh or frozen, lbs.	Herring, smoked, lbs.	Mackerel, salted, lbs.	Mackerel, fresh or preserved in cans, lbs.	Number.	
	Number.	Tonnage.	Value.	Men.	Number.	Value.	Men.	Fathoms.	Value.	Number.	Value.	Fathoms.	Value.									
<i> Lunenburg County.</i>																						
1	2	10	400	6	150	3500	150	28000	4500	20	10000	10000	5500	8000	700	3000	1500	2600	25	48095	1	
2	24	1650	57500	320	200	3600	90	17000	2450	8	1200	5000	1550	4000	4000	1000	20000	40	40	2		
3	1	39	750	10	85	1500	120	35000	2700	15	6400	13000	7000	510	510	800	4000	150	150	3		
4					80	1400	85	28000	1800	8	5900	11000	1500	250	250	250	235	75	75	4		
5					28	750	32	22000	1250	8	1200	7000	3500	800	800	150	235	25	25	5		
6					65	1650	60	28000	1700	20	12000	6500	600	600	600	750	245	75	75	6		
7					26	725	35	14000	1200	2	800	7000	3500	250	250	400	225	40	40	7		
8					50	1050	54	28000	1650	1	400	7000	3500	525	525	450	450	100	100	8		
9					100	2500	100	70000	4500	9	3520	12000	5500	500	500	5000	5000	20	20	9		
10					50	2500	52	50000	2500	2	800	10	5000	3000	400	2500	1100	1100	20	20	10	
11					190	6025	210	140000	11500	2	800	35	27000	10500	575	1100	425	150	150	11		
12					28	425	32	15500	820			8	5025	900					25	25	12	
13	70	5600	382000	1120	194	8730	175	30000	18000	39	12050	600	935	120	3900	24000	1500	280	280	14		
14	70	4830	345000	965	245	9800	130	35600	17800	28	11200	5	550	940	3500	1050	4133	1300	125	1500	14	
15	7	480	28000	98	184	5520	149	25000	14500	5	2000	4	35.0	750	4000	875	1050	1050	60	1000	15	
Totals	174	12499	813650	2320	1675	49775	1524	566100	86870	146	56870	205	122525	58075	23580	2625	35408	71255	11700	1240	5000	181730
Values														4716	525	159336	712	234	17360	600	25442	

Marine and Fisheries—Fisheries Branch.

RETURN showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, &c.—Nova Scotia—Continued.

Number.	Districts.	KINDS OF FISH.										FISH PRODUCTS.					TOTAL VALUE.						
		LoBSTERS, alive or fresh, tons.	Cod, dried, cwt.	Cod, tongues & sounds, brls.	Hake, dried, cwt.	Haddock, cwt.	Pollack, cwt.	Trout, lbs.	Halibut, lbs.	Smelts, lbs.	Alewives, brls.	Clams, brls.	Rel's, brls.	Squid, brls.	Flourders, lbs.	Tom cod or frost fish, lbs.		Coarse and mixed fish, brls.	Fish oils, galls.	Seal skins, No.	Fish used as bait, brls.	Fish used as manure, brls.	Fish guano, tons.
<i>Lunenburg County.</i>																							
1	Chester	1556	50	225	1200	1200	5000	140	15	40	75	8000	800	100	400	400	5	140	40	33,114	94	1	
2	Mahone Bay and Martin's River	49350	80	60	300	35000	2500	12	10	20	35	5000	400	50	10000	4	1500	4	1500	241,122	00	2	
3	Fox Point	300	60	325	650	1200	600	3	8	8	35	5000	150	100	675	150	50	40	60	10,014	00	3	
4	Mill Cove	260	80	200	140	350	200	4	6	6	20	1800	30	30	135	40	60	40	60	4,710	50	4	
5	Lodge		70	40				4			8	800	10	10	160	40	15	40	15	2,884	25	5	
6	North-west Cove.	330	2	75	70	360	5	5	4	4	12	1000	15	15	170	35	20	25	15	7,066	95	6	
7	Aspotogan	200	50	40	40	200	4	4	4	4	9	800	10	10	150	10	140	38	8	8,044	25	7	
8	Tandy Beaches.	250		75				4		5	12	1500	225	100	1000	60	55	60	55	39,005	15	9	
9	Blandford	3000	60	400	300	250	4	3	4	15	12	800	25	15	250	30	25	30	25	16,143	50	10	
10	Little Tancook	1050	425	65	800	800	5	5	4	5	5	1050	45	45	400	40	250	40	250	60,327	00	11	
11	Big Tancook	800	3	120	135	200	400	22	5	15	18	1400	200	200	50	6	12	6	12	2,965	00	12	
12	Deep Cove.																						
13	Lunenburg to Cross Island	300	78500	135	886	6700	774	150	180450	275	30	95	6	250	150	30250	350	525	350	474,010	71	13	
14	La Have River, Kitsew's Cove and Dublin	250	104570	35	1122	313	625	26500	4500	35	30	12	25	625	48080	30	400	400	30	539,383	75	14	
15	Petite Riviere to County Line.	180	6388	20	225	15	155	700	1200	40	25	5	18	350	2300	25	225	225	25	56,543	40	15	
Totals		730	246554	285	1791	9032	2862	3420	251060	14675	239	191	140	522	28150	3750	485	94660	9	3254	550	405	
Values		\$ 54750	1109493	2850	447	31612	6655	342	25106	734	1196	1337	1400	2088	1408	187	970	37864	9	4881	275	3240	1,499,800

RETURN showing the Number, Tonnage and Value of Vessels and Boats and the

Number.	DISTRICTS.	FISHING VESSELS AND BOATS.						FISHING MATERIAL.										
		Vessels.			Boats.			Gill-Nets.		Trap Nets.		Seines.		Salmon.				
		Number.	Tonnage.	Value.	Men.	Number.	Value.	Men.	Fathoms.	Value.	Number.	Value.	Number.	Fathoms.	Value.	Salted, brls.	Fresh, in ice, lbs.	Herring, salted, brls.
	<i>Queen's County.</i>		\$		\$				\$		\$			\$				
1	Liverpool, Gull Island and Brooklyn.	8	438	13050	78	78	1593	89	5420	1864	4	1500	6	660	1800	3	1050	1375
2	Western Head, Moose Harbour and Black Point					50	902	58	4704	1663			3	330	900			1046
3	White and Hant's Point and Somerville.					48	783	59	3454	1330								861
4	Port Joli and Port Hebert.					38	899	47	1200	447								819
5	Port Mouton.	3	34	1300	10	130	3128	140	5598	2059			2	220	450			5014
6	Eagle Head and Beach Meadows.					25	511	26	1324	452								323
7	West and East Berlin					4	583	39	2260	798	1	400						649
8	Port Medway.	3	172	8000	31	61	1046	68	2988	1073	2	800						3750
9	Milton					5	50											1600
10	Mill Village					20	240	20	680	272								3 41
11	Greenfield					10	100											1919
	Totals	14	644	22350	119	499	9835	546	27628	9958	7	2700	11	1210	3150	3	11660	10609
	Values	\$														48	2332	47740

Marine and Fisheries—Fisheries Branch.

Quantity and Value of all Fishing Material, &c.—Nova Scotia—Continued

KINDS OF FISH.														FISH PRODUCTS.		TOTAL VALUE.		Number.
Mackerel, salted, brls.	Lobsters, preserved, in cans, lbs.	Lobsters, alive or fresh, Tons.	Cod, dried, cwt.	Hake, dried, cwt.	Haddock, cwt.	Pollack, cwt.	Halibut, lbs.	Smelts, lbs.	Alewives, brls.	Clams, brls.	Eels, brls.	Shad, brls.	Coarse and mixed fish, brls.	Fish oils, galls.	Fish used as bait, brls.	\$	cts.	
94			5492	62	45	23	6510		22				17	2200	268	34,900	50	1
71			382	13	40	20	685		2				30	381	60	7,991	40	2
50	22656		418		73	20	500						12	143	35	10,116	54	3
20	24240		362		37	7	200	400	20	26	20		1	84	25	9,710	20	4
82	46032	200	1126	20	76	27	4800						6	188	83	51,327	18	5
19	38400		110		15	2							6	43	23	7,711	70	6
2	35040		47	1	6	3	200		10					20	5	8,172	10	7
29	8736		3921		52	12			305					187	31	24,405	84	8
									60							560	00	9
									194		4	10				1,584	20	10
									171			2				1,087	80	11
367	175104	200	11858	96	344	114	12895	400	784	26	24	12	72	4446	5 0			
5138	24514	15000	53361	240	1204	285	1289	20	3136	182	240	120	144	1778	795	157,567	46	

RETURN showing the Number, Tonnage and Value of Vessels and Bats, and the Quantity and Value of all Fishing Material, &c.
Nova Scotia—Continued.

Marine and Fisheries—Fisheries Branch.

Number.	DISTRICTS.	KINDS OF FISH.										FISH PRODUCTS.			Tot. L. VALUE.	Number.	
		Lobsters, preserved in cans, lbs.	Lobsters, alive or fresh, tons.	Cod, dried, cwt.	Hake, dried, cwt.	Haddock, cwt.	Pollack, cwt.	Trout, lbs.	Hallbut, lbs.	Smelts, lbs.	Alewites, brls.	Clams, brls.	Reis, brls.	Fish oils, galls.			Fish used as bait, brls.
<i>Shelburne County.</i>																	
1	Harrington		100	2500		1500	250	500	1600	400	650	20	20	1200	1800	33,735 00	1
2	Wood's Harbour	80170	700	800		200			1000					225	4000	87,063 80	2
3	Shag Harbour	17000	90	1000		475	200	200	4500	200	25			180	600	21,164 50	3
4	Bear Point	35000	50	275		175	80		1000					50	600	12,620 00	4
5	Cape Island	60000	800	9750		4200	300		123000			60	60	6000	6500	234,045 00	5
6	Port la Tour and Baccaro		235	3000		700	1800		2300		200			3500	1400	50,705 00	6
7	Upper Port la Tour		70	375		170	280		1500					340	425	12,306 00	7
8	Cape Negro and Blanche		310	475		600	200		1200					180	480	34,700 00	8
9	Cape Negro Island		250	425		275	180		2800					1750	800	38,355 00	9
10	Port Clyde	8000						620								3,732 00	10
11	North-east Harbour	15648	65	795		140	53		800					400		14,160 20	11
12	Black Point and Round Bay		10	461		400	31		2000					490		10,653 00	12
13	Roseway and McNutt's Island		12	525		600	50		1000					675		15,988 00	13
14	Gunning Cove, Churehoyer, and Birchtown			625		387	180		500					350		13,136 00	14
15	Shelburne and Sandy Point	24000	65	8628		259	117		4500			80	175	10	1500	65,940 00	15
16	Jordan		43	2191		350	12		2400			5000		50		18,355 00	16
17	Lockeport		322	19244		1900	784		11000			40	650	5	2200	129,573 00	17
T-tals.		239818	3122	51069	1300	12301	4617	6070	157700	5600	1708	905	114	19040	16955		
Values		33575	234150	229811	3250	43053	11542	607	15770	280	6832	4335	1140	7616	25432	796,182 00	

RETURNS showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, Fishing Material, &c.—
Nova Scotia—Continued.

Number.	DISTRICTS.										KINDS OF FISH.										
	Yarmouth County.					FISHING VESSELS AND BOATS.					FISHING MATERIAL.					KINDS OF FISH.					
	Vessels.		Boats.		Men.	Gill-Nets.		Trap-Nets.		Weirs.		Herring.		Lobsters.		Cod.					
	Number.	Tonnage.	Value.	Men.		Number.	Value.	Fathoms.	Value.	Number.	Value.	Number.	Value.	Salmon, fresh, in ice, lbs.	Salted, brls.	Smoked, lbs.	Mackerel, fresh, lbs.	Preserved, in cans, lbs.	Alive or fresh, tons.	Dried, cwt.	Tongues and brls.	Number.
1	Yarmouth	89	26070	230	53	1000	106	4300	1500	3	10000	100	3000	3772	2500	280630	395950	445	18800	4	1
2	Tusket	372	11800	90	175	1200	175	14000	4000	1	500	1	5000	4392	..	10800	..	140	6600	..	2
3	West Pubnico	972	23300	215	25	1300	50	1200	1600	1	2000	150	..	1350	..	48000	30000	150	11700	..	3
4	East Pubnico	40	1000	12	20	1000	40	600	150	..	..	..	..	600	..	5000	42720	75	1000	..	4
5	Sandford	1	20	500	5	35	700	66	5000	2000	1	3000	4000	2600	..	120000	..	110	475	..	5
6	Port Maitland	1	12	300	6	20	700	45	3000	1000	..	..	..	235	..	..	..	150	4950	..	6
7	Argyle	1	10	250	5	20	300	40	1200	400	..	..	..	400	..	..	..	150	400	..	7
8	Eel Brook	1	13	500	5	25	200	40	1500	600	..	..	..	150	..	..	..	300	200	..	8
9	Arcadia and Little River	..	..	..	40	600	80	1000	400	..	..	2	1000	5000	..	..	..	..	..	..	9
10	Salmon River	2	21	500	9	20	400	40	2000	500	..	..	400	400	..	..	..	..	..	..	10
11	Sluice Point	..	..	..	20	150	20	2000	500	..	..	..	..	400	..	..	..	..	150	..	11
12	Totals	47	2359	63220	577	528	8150	851	39800	13050	6	15000	12400	18899	2500	*464430	468650	1520	44335	4	12
	Values	..	..	..	..	..	..	..	..	..	..	..	2480	85045	50	*46443	65611	114000	198567	40	..

* NOTE—These being mostly fresh are rated 2 cents lower than elsewhere.

RECAPITULATION

Of the Yield of the Fisheries of District No. 3, Nova Scotia, 1895.

Kinds of Products.	Quantities.	Rate.		Value.		Total.	
		\$	cts.	\$	cts.	\$	cts.
Salmon, salted	Brls.	3	16 00	48 00			
do fresh in ice	Lbs.	121,500	0 20	24,300 00			
do smoked	"	2,625	0 20	525 00			24,873 00
Herring, salted	Brls.	102,333	4 50	460,498 50			
do fresh	Lbs.	118,855	0 01	1,188 55			
do smoked	"	1,120,350	0 02	22,407 00			484,094 05
Mackerel, salted	Brls.	1,837	14 00	25,715 00			
do fresh or in cans	Lbs.	803,930		87,181 08			112,899 08
Lobsters, preserved in cans	"	1,101,312	0 14	154,183 68			
do alive or fresh	Tons.	5,673	75 00	425,475 00			579,658 68
Cod, dried	Cwt.	390,776	4 50	1,758,492 00			
do boneless	Lbs.	105,000	0 10	10,500 00			
do tongues and sounds	Brls.	419	10 00	4,190 00			1,773,182 00
Hake, dried	Cwt.	41,203	2 50	103,007 50			
do sounds	Lbs.	10,190	0 50	5,095 00			168,102 50
Haddock, dried	Cwt.	69,446	3 50	243,061 00			
do smoked (finnan haddies)	Lbs.	21,000	0 05	1,050 00			244,111 00
Pollack, dried	Cwt.	39,048	2 50	97,620 00			97,620 00
Trout	Lbs.	33,290	0 10	3,329 00			3,329 00
Halibut	"	661,765	0 10	66,176 50			66,176 50
Smelts	"	127,195	0 05	6,359 75			6,359 75
Bass	"	4,470	0 10	447 00			447 00
Alewives, salted	Brls.	9,386	4 00	37,544 00			
do smoked	Lbs.	35,000	0 02	700 00			38,244 00
Eels	Brls.	775	10 00	7,750 00			7,750 00
Shad	"	877	10 00	8,770 00			8,770 00
Squid	"	667	4 00	2,668 00			2,668 00
Clams	"	2,382	7 00	16,674 00			16,674 00
Flounders	Lbs.	31,350	0 05	1,567 50			1,567 50
Tom-cod or frost fish	"	49,250	0 05	2,462 50			2,462 50
Coarse and mixed fish	Brls.	1,346	2 00	2,692 00			2,692 00
Fish oil	Galls.	172,291	0 40	68,916 40			68,916 40
Seal skins	No.	9	1 00	9 00			9 00
Fish used as bait	Brls.	38,388	1 50	57,582 00			57,582 00
do do manure	"	5,410	0 50	2,705 00			2,705 00
do guano	Tons.	585	8 00	4,680 00			4,680 00
Total for 1895							3,715,572 96
Total for 1894							3,859,033 56
Decrease							143,460 60

Marine and Fisheries—Fisheries Branch.

TABLE showing the Value of Fishing Vessels, Boats, Nets, &c., used in District No. 3,
Nova Scotia, with an Estimate of other Material or Fixtures not included in
 Returns—1895.

Material.	Value.	Total.
	\$ cts.	\$ cts.
385 vessels (tonnage, 20,119).....	1,088,830 00	
4,825 fishing boats.....	132,205 00	
1,031,198 fathoms of gill-nets.....	182,533 00	
265 seines (145,735 fathoms).....	78,985 00	
458 trap-nets.....	97,560 00	
87 weirs.....	14,740 00	
51 smelt-nets.....	280 00	
	23,950 00	1,595,133 00
34 lobster canneries.....	140,900 00	
176,126 lobster traps, &c.....		
	9,220 00	164,850 00
89 freezers and ice-houses.....	78,254 00	
1,245 smoke and fish-houses.....	48,083 00	
374 piers and wharfs.....	40,958 00	
37 sailing and steam smacks.....	49,504 00	
Trawl gear.....		
		226,019 00
Total value.....		1,986,002 00

NUMBER of Men employed in the Fisheries of District No. 3, Nova Scotia.

In vessels and smacks.....	4,549
In fishing boats.....	5,939
Persons in canneries.....	968
Total.....	11,456

RECAPITU

RETURN showing the Number and Value of Vessels and Boats engaged in the Number of Men employed in the Fishing Industry of

Number.	COUNTIES.		FISHING VESSELS AND BOATS.						FISHING					
			Vessels.			Boats.			Gill-Nets.		Trap-Nets.		Weirs.	
			Number.	Tonnage.	Value.	Men.	Number.	Value.	Men.	Fathoms.	Value.	Number.	Value.	Number.	Value.
			\$		\$			\$		\$		\$		
1	Cape Breton....	12	174	3,650	56	800	19,606	1,448	69,685	27,948	2	920	.....
2	Inverness	25	509	12,135	127	832	17,381	2,129	65,905	25,942	.....	.....	.....
3	Richmond	71	2,297	35,700	543	1,379	18,770	1,914	198,490	64,302	.....	.....	.....
4	Victoria	3	50	600	17	905	15,160	1,446	59,904	18,607	.....	.....	.....
5	Antigonish .....	.....	.....	.....	.....	195	3,308	250	86,640	8,689	.....	.....	.....
6	Colchester .....	.....	.....	.....	.....	122	2,037	216	14,778	3,500	.....	.....	18	3,410
7	Cumberland	4	98	1,210	14	187	3,611	235	3,760	1,571	.....	.....	2	60
8	Guysborough....	25	549	12,445	122	2,421	60,440	2,641	304,464	7,902	73	12,280	2	13
9	Halifax	70	1,882	50,710	451	2,913	44,804	3,039	288,201	37,375	5	1,500	.....	.....
10	Hants .....	.....	.....	.....	.....	136	1,414	136	9,675	2,300	.....	.....	12	390
11	Pictou .....	.....	.....	.....	.....	271	5,377	343	9,940	4,650	.....	.....	.....	.....
12	Annapolis	14	487	14,610	126	220	4,400	377	24,000	11,950	.....	.....	27	2,300
13	Digby	54	1,347	42,200	425	387	17,590	795	46,810	20,390	4	6,200	31	3,790
14	King's	5	71	1,900	14	59	1,120	102	5,660	2,580	35	200	25	7,400
15	Lunenburg	174	12,499	813,650	2,520	1,675	49,775	1,524	566,100	86,870	146	55,870	.....	.....
16	Queen's	14	644	22,350	119	499	9,835	546	27,628	9,958	7	2,700	.....	.....
17	Shelburne	77	2,712	130,900	768	1,457	41,335	1,744	321,200	37,735	260	17,090	.....	.....
18	Yarmouth	47	2,359	63,220	577	528	8,150	851	39,800	13,050	6	14,500	4	1,250
	Totals.....	595	25,678	1,205,280	5,879	14,986	334,113	19,736	2,142,640	385,319	538	112,260	121	18,613

Marine and Fisheries—Fisheries Branch.

LATION.

Fisheries, Fishing Materials, and the Kinds and Quantities of Fish, as well as the the whole Province of **Nova Scotia**, for the Year 1895.

MATERIAL.			KINDS OF FISH.										Number.
Number.	Seines.		Salmon, salted, brls.	Salmon, fresh in ice, lbs.	Salmon, preserved in cans, lbs.	Salmon, smoked, lbs.	Herring, salted, brls.	Herring, fresh or frozen, lbs.	Herring, smoked, lbs.	Mackerel, salted, brls.	Mackerel, fresh or preserved in cans, lbs.	Lobsters, preserved in cans, lbs.	
	Fathoms.	Value.											
2	200	500	9	12,525		200	6,796	45,340	9,000	1,450	1,400	364,198	1
3	525	600	9	44,000	1,000		9,864	73,000		4,731	18,500	268,592	2
1	120	80	10	3,850			16,916			3,622		535,642	3
			187	3,400	296		3,773			1,545		162,042	4
		%		25,400			2,081			455		173,597	5
				80,490			12			7,433		4,800	6
				14,100			375	1,500		1,700	250	429,631	7
84	5,435	3,205	9	34,154	2,000	1,030	36,683	669,600		3,596	571,800	1,246,685	8
421	42,600	70,600		22,405		1,005	27,251	38,860		1,864	3,300	811,737	9
				26,350			10			1,000		614,448	10
				32,262			70	67,700		52		614,448	11
				13,600			4,505		520,000			36,000	12
33	3,650	9,360		3,750			375	47,600		22,150		36,000	13
15	16,750	7,900		48,100			3,260		564,000			175,104	14
205	122,525	58,075		23,580		2,625	35,408	71,255	11,700	1,240	5,000	181,730	15
11	1,210	3,150	3	11,660			10,609			367		175,104	16
1	1,600	500		8,410			29,277			230	334,500	239,818	17
				12,400			18,889		2,500		464,430	468,660	16
776	194,615	153,970	227	420,436	3,296	4,860	206,164	1,014,855	1,139,483	19,152	1,399,180	5,712,684	

RECAPITU

RETURN showing the Number and Value of Vessels and Boats engaged in the
Number of Men employed in the Fishing Industry of the

Number.	COUNTIES.	KINDS OF FISH.										
		Lobsters, alive or fresh, tons.	Cod, dried, cwt.	Cod, tongues and sounds, bris.	Hake, dried, cwt.	Hake, sounds, lbs.	Haddock, cwt.	Pollack, cwt.	Trout, lbs.	Halibut, lbs.	Smelts, lbs.	Bass, lbs.
1	Cape Breton		12,050		44		2,498	66	4,355	62,150	13,500	
2	Inverness		20,211	27	1,968	540	2,443		44,960	6,465	38,200	550
3	Richmond		27,489	16			6,602	1,079		21,649	26,000	
4	Victoria	3	16,535	1	199		1,736		5,375	6,400	51,335	
5	Antigonish		699		1,748	1,633	118		1,800		15,500	
6	Colchester		166						9,400		10,405	800
7	Cumberland		413		15		225	46	2,700	15,000	95,900	
8	Gusborough	25	21,726	30	1,496	490	10,705	1,202	24,737	117,050	20,110	750
9	Halifax	243	19,592	10	3,848	5,384	2,217	2,057	7,685	175,766	33,530	
10	Hants		114		5			8	9,500		4,700	1,400
11	Pictou		188		298				7,700		36,660	200
12	Annapolis	67	10,040	38	8,661	3,640	13,077	4,120	12,200	77,400	2,000	4,220
13	Digby	28	25,600	92	27,310	6,550	27,800	21,663		97,950		
14	King's	6	1,320				1,170	450	2,300			250
15	Lunenburg	730	246,554	285	1,791		9,032	2,662	3,420	251,060	14,675	
16	Queen's	200	11,858		96		344	114		12,895	400	
17	Shelburne	3,122	51,069		1,300		12,301	4,617	6,070	157,700	5,600	
18	Yarmouth	1,520	44,335	4	2,045		5,722	5,422	9,300	64,760	104,520	
	Totals	5,941	509,959	503	50,824	18,237	96,088	43,498	151,682	1,066,245	473,035	8,170

Marine and Fisheries—Fisheries Branch.

LATION.

Fisheries, Fishing Materials, and the Kinds and Quantities of Fish, as well as the whole Province of **Nova Scotia**, for the Year 1895—*Concluded*.

KINDS OF FISH.											FISH PRODUCTS.					TOTAL VALUE.		Number.
Alewives, brls.	Oysters, brls.	Clams, brls.	Eels, brls.	Shad, brls.	Squid, brls.	Flounders, lbs.	Tom-cod or frost fish, lbs.	Coarse and mixed fish, brls.	Fish oils, galls.	Seal-skins, No.	Fish used as bait, brls.	Fish used as manure, brls.	Fish guano, tons.	\$	cts.			
563	15	22	286	11	425			3	5,922	1,100	2,518		50	191,953	77	1		
633	1,050	157	655		2,267		12,000	2,066	8,361		4,839	238	86	315,846	78	2		
1,114		460	387		327	99,025		130	9,573		956			379,193	23	3		
157	880	22	229		2,630		1,100	965	9,182	212	3,131			180,782	33	4		
161	100		203					100	1,197		819	860		60,182	00	5		
201			5	659					50		43	20		26,798	00	6		
570	476		6	281					25		855	2,500		83,650	00	7		
1,744		584	732	4	6,164		3,560	64	18,429		16,896	7,302		711,499	00	8		
754	4	568	147		88			582	11,169	29	1,573	4,100		429,671	00	9		
820				264			9,600	60						13,702	00	10		
200	15		144								1,361	2,970		104,235	00	11		
105		730	17	100		2,000	2,000	500	3,050		4,349	440	180	190,305	00	12		
		480		26		1,200	3,500	289	42,350		9,795	1,740		396,354	50	13		
2,210				709					1,765		930	1,680		66,306	00	14		
299		191	140		522	28,150	3,750	485	94,660	9	3,254	550	405	1,499,800	00	15		
784		26	24	12				72	4,446		530			157,567	46	16		
1,708		905	114						19,040		16,955			796,182	00	17		
4,280		50	480	30	145		40,000		6,980		2,575	1,000		*609,058	00	18		
16,303	2,540	4,195	3,569	2,096	12,568	130,375	80,510	5,316	236,399	1,350	71,379	23,400	721	6,213,131	07			

* Add to value of No. 18:—

35,000 lbs. smoked alewives.....	\$ 700 00
21,000 " finnan haddies.....	1,050 00
105,000 " boneless cod.....	10,500 00

\$12,250 00

RECAPITULATION

Of the Yield and Value of the Fisheries of the whole Province of Nova Scotia for the year 1895.

Kinds of Fish.		Prices.		Quantity.	Value.		Total Value.
		\$	cts.		\$	cts.		$	cts.
Salmon, salted.....	Brls.	16	00	227	3,632	00	
do fresh.....	Lbs.	0	20	420,436	84,087	00	
do preserved, in cans.....	"	0	15	3,296	494	40	
do smoked.....	"	0	20	4,860	972	00	89,185 40
Herring, salted.....	Brls.	4	50	206,164	927,738	00	
do fresh.....	Lbs.	0	01	1,014,855	10,444	80	
do smoked.....	"	0	02	1,139,483	22,790	00	960,972 80
Mackerel, salted.....	Brls.	14	00	19,152	268,128	00	
do fresh.....	Lbs.			1,399,180	158,612	08	426,740 08
Loabster, preserved, in cans.....	"	0	14	5,712,684	799,775	04	
do alive or fresh.....	Tons.			5,944	436,420	00	1,236,195 04
Cod, dried.....	Cwt.	4	50	512,292	2,305,315	50	
do tongues and sounds.....	Brls.	10	00	503	5,030	00	2,310,345 50
Hake, dried.....	Cwt.	2	50	50,824	127,060	00	
do sounds.....	Lbs.	0	50	18,237	9,119	00	136,179 00
Haddock, dried.....	Cwt.	3	50	96,088	336,308	00	
do smoked (finnan haddies).....	Lbs.	0	05	21,000	1,050	00	337,358 50
Pollack, dried.....	Cwt.	2	50	43,498			108,745 50
Trout.....	Lbs.	0	10	151,682			15,169 00
Halibut.....	"	0	10	1,066,245			106,624 90
Smelts.....	"	0	05	473,035			23,651 50
Bass.....	"	0	10	8,170			817 00
Alewives.....	Brls.	4	00	16,303	65,212	00	
do smoked.....	Lbs.	0	02	35,000	700	00	65,912 00
Oysters.....	Brls.			2,540			10,160 00
Eels.....	"	10	00	3,569			35,690 00
Shad.....	"	10	00	2,096			20,960 00
Squid.....	"	4	00	12,568			50,272 00
Flounders.....	Lbs.	0	05	130,375			6,518 75
Tom-cods or frost fish.....	"	0	05	80,510			4,025 50
Clams.....	Brls.			4,195			28,704 00
Coarse fish.....	"			5,316			13,393 00
Dog-fish.....	Lbs.			242,300			2,423 00
Fish-oil.....	Galls.	0	40	236,399			94,559 60
Seal-skins.....	No.			1,350			1,678 00
Fish as bait.....	Brls.			71,379			107,071 00
do manure.....	"			23,400			11,700 00
do guano.....	Tons.			721			8,080 00
Total for 1895.....							6,213,131 07
do 1894.....							6,547,387 11
Decrease.....							334,256 04

Marine and Fisheries—Fisheries Branch.

RECAPITULATION

SHOWING the Number and Value of Fishing Vessels, Boats, Nets, &c., in the whole Province of **Nova Scotia** for the year 1895.

Articles.	Value.	Total.
	\$	\$
595 vessels, 25,678 tons.....	1,205,280	
14,986 boats.....	324,113	
2,142,640 fathoms gill-nets.....	385,319	
776 seines (194,615 fathoms).....	153,970	
538 trap-nets.....	112,260	
121 weirs.....	18,613	
130 smelt-nets.....	3,360	
Trawls and hand-lines.....	74,402	
		2,277,317
180 lobster canneries.....	172,750	
488,773 do traps.....	320,770	
		493,520
122 freezers and ice-houses.....	24,625	
2,817 smoke houses and fish houses.....	123,079	
88 steamers, smacks and dories.....	64,438	
Fishing piers, wharfs, &c.....	156,989	
		369,131
Total value.....		3,139,968

APPENDIX No. 4.

NEW BRUNSWICK.

District No. 1, comprising the county of Charlotte.—*Inspector J. H. Pratt, St. Andrew's.*

District No 2, comprising the counties of Restigouche, Gloucester, Northumberland, Kent, Westmoreland and Albert.—*Inspector R. A. Chapman, Moncton.*

District No. 3, comprising the counties of St. John, King's, Queen's, Sunbury, York, Carleton and Victoria.—*Inspector H. S. Miles, Oromocto.*

DISTRICT No. 1.

REPORT ON THE FISHERIES OF DISTRICT No. 1, NEW BRUNSWICK,
COMPRISING THE COUNTY OF CHARLOTTE, FOR THE YEAR 1895,
BY INSPECTOR JOHN H. PRATT.

ST. ANDREWS, N.B., 2nd January, 1896.

To the Honourable
The Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit herewith my seventh annual report on the fisheries of District No. 1, New Brunswick, comprising the mainland and islands of the county of Charlotte, and also the fisheries of the Chiputneticook Lakes, extending from Ste. Croix, northward, along the international boundary between the state of Maine and New Brunswick, as well as tabulated statements showing the quantities and values of each kind of fish caught, with a synopsis of fishery officers' reports and the amount of capital employed in the various fisheries.

I regret to have to report a slight decrease in the catch this season and a corresponding falling off in the value, owing for the most part, to a less vigorous prosecution of the fisheries on account of the low prices paid throughout the year by the dealers.

The figures for the past two years are as follows:—

Total value of fisheries for 1894	.....	\$1,118,477.29
do do 1895	.....	968,203.50
Decrease during 1895	.....	\$150,273.79

It is probably needless for me to allude to the fact that many vessels from other ports of New Brunswick and Nova Scotia come to this district and catch their cargoes of which no returns are made here, but I presume, they report at their home ports.

Over two months of this past year were spent by me in the "Curlew" cruising on the coasts of Nova Scotia and Cape Breton, assisting in the protection of our fisheries against any attempts of violations of the treaty of 1818 by the large number of United States fishing schooners hovering off our shores. Several attempted violations were reported and promptly dealt with by Commander Spain, R.N.

Marine and Fisheries—Fisheries Branch.

SALMON.

I am pleased to report that salmon is on the increase in the Ste. Croix River, quite a number have been seen on the Magaguadavic River, and there is no doubt that with proper encouragement they will visit this river as freely as the Ste. Croix and other rivers. The vigilance of Overseer Todd, of St. Stephens, and his guardians in watching the Ste. Croix and its numerous fishways, on both sides, have been productive of good results. The increase of salmon is perceptible to the most ordinary observer, and the gain of the poachers on the river, formerly lucrative, is now almost nil. The efficient staff of special guardians engaged on the river this year, is strongly recommended for next season.

LOBSTERS.

A decrease is noticed in the catch of lobsters, due not only to a less number of fishermen, but to a scarcity of lobsters frequenting the grounds. Those crustaceans are reported decreasing in St. Andrew's Bay, due to over fishing therein, and the local officers strongly recommend a prohibition in that bay for a couple of years. I have already reported on the advisability of a regulation being adopted for this district, if not for the whole Bay of Fundy, namely, raising the length limit of lobsters to 10½ inches, instead of nine inches as at present. In this matter I am supported by the several fishery officers, and nearly every lobster fisherman in this district, and in fact by nearly every one in the Bay of Fundy. The fishermen receive only about one cent for all lobsters under 10½ inches, which do not recompense them for their labour, as it is materially ruining the fisheries for the future. Our people are fully awakened to the importance of this fishery, and will welcome any regulation which will be of benefit.

HERRING.

Herring still continue very plentiful in the Bay of Fundy, although we are continually informed that they are "destroyed" and will so be "used up." The day of their total disappearance, however, seems to be as distant as ever. This year herring both large and small, were found all over the district in large schools, and the market soon showed signs of being glutted. Prices remained extremely low, in consequence of the supply being so much in excess of the demand. Pickled herring brought very small prices, and smoked herring remained constantly at a low figure. There was a good demand for bloaters, which paid fairly good profits. The sardine market did not recover from the dulness experienced in 1894, and in consequence low prices were paid for sardine herring during the season. The employees of the numerous United States sardine canneries went on strike for several weeks in the midst of the fishing season, thus materially reducing the receipts of our many weir owners.

COD.

I regret to state that a large decrease is noticed in the catch of this fish, in a large measure due to a number of vessels not fishing for them as in former years. The presence of the voracious dog-fish in the Bay of Fundy, has also very much interfered with the catch of cod.

POLLACK AND HADDOCK.

A slight decrease will be noticed in the catch of the above fish, due largely, to a less vigorous prosecution of this fishery than in former years. Prices have ruled too low during the season, to warrant persons leaving other fisheries that were of a more remunerative nature, to engage in pollock and haddock fishing.

HAKE.

A large decrease is noted in the catch of hake, and I cannot account in any way for their non-appearance in large schools, except that possibly some particular kind of feed was not to be found in our waters, or possibly the numerous schools of dog-fish in the Bay of Fundy may account for their absence. Much of the decrease can be attributed to the fact, that fishing for hake was considerably neglected during the season owing to the low price offered by buyers for them.

SARDINE AND LOBSTER CANNING.

The canning of lobsters and sardine herring is attracting considerable attention from our energetic fishermen, and this season's returns show a larger output of canned goods. The several factories are having quite a large demand for their goods and are highly spoken of by the dealers and consumers. Another lobster factory will be in operation in Campobello during the coming year, and my next annual report will show a greatly increased output of all kinds of canned goods. Besides sardine and lobster, canned haddock and scallops are also placed on the market, and but for the prohibitory duties imposed by the United States tariff, the canneries would be able to export largely to the Western States.

FISH-WAYS.

With reference to the fish-ways in this district, with the exception of the one at Hinton's stream, and one at Upper Falls, they are all in good order. Heretofore they were of no value to the fisheries on the Magaguadavic River, as the "notch" at the Lower Falls was not adapted to the passage of fish. However, this obstruction has been overcome by the building of the new dam and fish-way. This fish-way, the invention of F. W. Holt, Esq., C.E., of St. George, N.B., contains some novel features, and is admirably adapted for a place of this kind. My thanks are due to this gentleman, who kindly assisted me by preparing plans and specifications for the work, and who also superintended its construction.

CAMPOBELLO FISH FAIR.

The commendable efforts put forth by the officers of the Campobello Fish Fair Society, to encourage our fishermen by an annual exhibition of the products of their labours, deserves the recognition and assistance of all their friends. Every year this society puts forth their best energies to elevate the standard of boats, fish, etc., and the results have been most gratifying to all concerned. During October last, their annual fair was held at Welshpool, and was largely attended. A splendid programme was carried out by an efficient committee, consisting of boat racing and other sports, concluding with a grand ball during the evening. The fisheries exhibits, in the opinion of experts, could not possibly be excelled anywhere, and great praise was given the numerous exhibitors for their pains-taking work. Suitable prizes were also awarded to the successful exhibitors. These annual gatherings of our fishermen and dealers, interchanging their ideas and discussing the innumerable details relating to our fisheries, will engender a better feeling among them all, and even at this early date many good results of the annual fish fair are appearing.

SYNOPSIS OF FISHERY OFFICERS' REPORTS.

Overseer Campbell, St. Andrews, reports that the fishing season in his district has not been a very profitable one, which he attributes to the low prices obtained, rather than to any scarcity of fish. The principal fishery in his district is weir fishing for small herring for sardine purposes. They have been very plentiful, perhaps never more

Marine and Fisheries—Fisheries Branch.

so, but the prices have been so low that many weirs were scarcely fished at all. The establishing of Robertson & Gardner's fish curing house at St. Andrews has been a great benefit to the line fishermen, giving them a ready market for their fish. This firm has used nearly 600,000 pounds of fresh cod, haddock, pollack and herring during the past season, and are actively engaged in putting up finnan haddies, bloaters and dried fish for the West Indian market. The lobster catch has been about the same as last season, but more traps and men were employed. In the part of the district under his immediate care, the catch is decreasing annually, and will soon be unworthy of any attention from the fishermen. There has been no large herring caught in this district the past few years, although I believe they were plentiful in the inner bay during the winter. Less trouble has been experienced with the fishermen this season than for some years past, which is partly due to the presence of the "Curlew," and partly because herring were so plentiful and cheap, that it did not pay to run the risk of seining or torching for them. Quite a number of fishermen commenced to fish lobsters this fall, but owing to the energetic actions of these officers the practice was stopped. The fishing in Chamcook lakes has been poor, and the catch of land-locked salmon and trout small. In the St. George district, however, there has been the usual good fishing. He again calls attention to the great use and help a small steam launch would be in connection with the "Curlew," and how much it would assist the local officers during the frequent trips the "Curlew" has to make outside the Bay of Fundy. It is almost impossible to prevent illegal fishing in row boats, the district being so large and the tides and currents so strong. The only way is to drive to the nearest point and try to secure help, which is often difficult and sometimes impossible. The new fishway at the Lower Falls, St. George, promises to be a success, and I feel certain that salmon can now get up, and it will be interesting to watch the result next season. Some of the fish-ways at Second Falls and Bonny River need repairs during the coming season.

Special Guardian Frawley, St. George, states that the catch of fish in his district consists entirely of trout, which was considerably larger than last year. The fishways at the lower falls are in good working order, he has repaired them this year. The fishway at Linton's stream is in the same condition as last year, and will require some repairs. The fish-way at Upper Falls having been carried out by the freshet last spring, it is doubtful whether fish can ascend it or not.

Special Guardian Cross, Beaver Harbour, states that there has been a good catch of cod and a slight increase in pollack and halibut during the past season. The catch of hake, haddock and sardines fell off somewhat from the catch of last season. Sardine herring were just as plentiful as last season, but the prices ruled so low during the latter part of the season, that very little fishing was carried on for them. The catch of lobsters has increased considerably, as more men were employed in this fishery. There was more fish guano made this year, owing to the prices for herring being so low, and fish so plentiful. On account of the depressed condition of the sardine market, the packers did not can any more fish than usual. On the whole, fishermen did not do so well this year as in 1894.

Special Guardian Dick, of Latête, states that the yield is about the same as last year's with the exception of the catch of lobsters, which somewhat fell off owing to the scarcity of this crustacean. A number of men in this district commenced lobster fishing before the expiration of the close season, but he promptly destroyed all their traps, which, he believes, will have a lasting effect.

Overseer Todd, of St. Stephen, states that the catch of all kinds of fish in his district was better than previous years. Salmon have been abundant and are visibly increasing. This he largely attributes to efficient protection, for, since special guardians have been placed where needed, very little illegal fishing has been done. There are five fish-ways in the Ste. Croix River, and two in Dennis Stream, all have been kept open and in good condition this season. Nearly all the fish returned by him were used for home consumption, and the balance were exported to the United States. He strongly recommends

that guardians be employed next season the same as this season, thus giving the district efficient protection.

Special Guardian Haney, West Isles, states that he has been very careful in obtaining information contained in his report, and expresses his regret that there is a shrinkage in the returns. The fishermen have not done nearly so well as they did last season. This is attributed not only to the price of sardine-herring being low, but also to the fact of the Eastport and Lubec sardine canneries being idle about a fortnight during the very best of our fishing, and when they opened again the squid and silver hake had driven the herring into St. Andrew's Bay, Beach Bay and Letang River. Besides, the sardine factories closed some weeks earlier than they usually do, which also helped to decrease the returns. Very little trouble has been experienced by him through illegal fishing this season, the prices being too low to warrant them in running the risk of apprehension. Some illegal lobster fishing has been attempted, but the prompt action of the several officers in destroying the traps has had a good effect. Taking it as a whole, very little friction has been experienced between the officers and the fishermen.

Overseer Brown, Campobello, reports an increased quantity of salt herring put up, but on account of the low price the fishermen did not meet with much encouragement in the herring fishery, although herring of all sizes were very plentiful during the season, it was quite a common occurrence for the weirs to be full and no demand for them. Smoked herring brought such a small price that they barely paid for the expense incurred in putting them up. Line fish have decreased somewhat, as fishermen were not trawling for hake, as vigorously as in former seasons, as these fish were very scarce this year. He had some trouble with fishermen commencing lobster fishing previous to the open season, but their traps were promptly destroyed when met with. He recommends that lobster fishing commence 1st December and close 31st May, also that herring for bait only may be fished by torchlight during the month of December.

Overseer Martin, of Grand Manan, reports a large decrease in line fish especially in the catch of hake, which were not so plentiful as last season. He sees no particular reason for the scarcity, unless it is owing to the absence of some particular kind of food, such as shrimps, upon which hake chiefly subsist. The presence of large schools of dog-fish interfered considerably with trawling. There has been quite an increase in the catch of herring over last year, and fully two-thirds of the smoked herring put up are good bloaters. They bring forty cents a box for the West India markets, and this branch of our fishing industry has proved quite successful. The cost of curing and packing is much less than in the old way, as the bloater boxes are furnished by the purchaser. The lobster catch is also in excess of last year and the fish being more plentiful, which is attributed to the rigid enforcement of the law regarding them. The law against Sunday fishing has been well observed, and he has not the same complaint to make this year, that he previously made of the North Head fishermen. The spawning grounds at South-west Head were closely watched, and he knows of no violation there. He is of opinion that if the practice of leaving nets full of fish in the water during the day time could be prevented, herring would frequent in large numbers their old haunts at North Head in the early winter.

I have the honour to be, sir,

Your obedient servant,

JOHN H. PRATT,
Inspector of Fisheries.

Marine and Fisheries—Fisheries Branch.

DISTRICT No. 2.

REPORT ON THE FISHERIES OF DISTRICT No. 2, COMPRISING THE COUNTIES OF RESTIGOUCHE, GLOUCESTER, NORTHUMBERLAND, KENT, WESTMORELAND AND ALBERT, FOR THE YEAR 1895, BY INSPECTOR R. A. CHAPMAN.

MONCTON, 2nd January, 1896.

To the Honourable
The Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit my report for the year 1895, of the fisheries of District No. 2, in the province of New Brunswick, with extracts from the reports of several of the local fishery officers, also tabulated statements giving the product and values by districts and counties, together with an estimate of the capital employed in the prosecution of the fisheries. These returns show an increase in the aggregate value over last year's catch of \$243,823; the figures are :

For 1894.....	\$2,940,185
“ 1895	3,175,008

As my preliminary report has been so fully verified by the statistics, I will only refer briefly to the several kinds of fish taken.

SALMON,

Though a large catch, is not quite up to last year's, but the local officers and guardians report the streams full of salmon and grilse this fall.

HERRING.

Not only was there an abundance of these fish last spring, but the run in August and September of fine fat herring on the Caraquet and Miscou Banks was, as in 1894, very large, which has again increased the catch materially.

SMELTS.

Nearly a million of pounds over the catch of 1894, and consequently much the largest catch on record. Notwithstanding this continuous drain, they appear to be increasing in our waters, as the river were full of them last spring at spawning time, and the take this fall is larger than ever. The importance of this fishery to a large number of very poor people in the winter season, when there is no other employment, cannot be over estimated.

COD.

Notwithstanding the rough weather of the past fall, more of these fish were caught than in 1894, due to increased preparations for taking them in certain districts.

MACKEREL

Were abundant in a few localities and the quantity shipped in ice is larger than ever before, but in other places they did not strike in, and the aggregate catch is below last year's yield.

LOBSTERS.

Owing to a smaller number of factories being operated this year, the quantity canned is considerably below that of 1894, but prices being high, and the black not recurring on the inside of the cans, makes it a profitable year for both packers and dealers.

OYSTERS.

More were raked than last year, and while in some districts there is danger of over-fishing, at Bay du Vin and other points on the Miramichi River, the beds appear to be extending and increasing yearly.

SYNOPSIS OF FISHERY OVERSEERS' REPORTS.

RESTIGOUCHE COUNTY.

Overseer J. A. Verge reports that while the salmon catch is not up to the large figures of 1894, it is still above the average. The streams were full of parent fish this fall.

Overseer Donald McLean says: Salmon fishing has not been equal to last season, which was an exceptional year, much above the average, the decline was attributed to unfavourable weather during the first of the season. The several close seasons as well as the law regarding saw-dust and mill rubbish have been strictly observed.

GLOUCESTER COUNTY.

Overseer William Sweeney reports spring herring abundant, and other fishing fair, except mackerel, which were very scarce.

Overseer James Hickson reports a big catch of nearly all kinds of fish taken in his district. The laws and regulations generally well observed.

Overseer J. D. Thériault says fishing in his district was generally below that of last year, as only small boats are commonly used, which cannot stand rough weather.

Overseer Jos. L. Haché reports fishing fair. Any falling off is attributed to bad weather rather than scarcity of fish.

Overseer Xavier D. Albert reports increased means of fishing and larger catch than usual although rough weather interfered a good deal during the fall months.

Overseer Adolphe Aché says fishing in his district was not as good as last year, owing to storms, especially in the latter part of the season.

Overseer Wm. Walsh reports the yield of fish, except smelts, less than last year, owing to bad weather, which prevented the small boats used from going out. The quantity of smelts taken is nearly double that of the previous season, many of which were taken by hook and line before the regular fishing through the ice commenced.

NORTHUMBERLAND COUNTY.

Overseer J. G. Williston says salmon fishing was better than last year, smelts were abundant and prices good. Other kinds of fish about the same as last year. Saw-dust and other regulations were well observed.

Overseers Hogan and Boeis report large quantities of salmon and grilse ascending the North-west and South-west Miramichi rivers this fall during spawning season.

Marine and Fisheries—Fisheries Branch.

KENT COUNTY.

Overseer W. F. Hannah reports a fair catch of extra large mackerel, which were shipped in ice to the United States, realizing good prices and a profit to all concerned. Smelt fishing was good, aggregating a large catch at fair prices, which was a great boon to the fishermen.

WESTMORELAND COUNTY.

Overseer Robert Goodwin says fishing fairly good all round and regulations well observed.

Overseer Denis T. Cormier reports shad fishing better than usual, but again urges close time to 20th June, to allow them time to deposit their spawn.

I am, sir, your obedient servant,

R. A. CHAPMAN,
Inspector of Fisheries.

DISTRICT No. 3.

REPORT ON THE FISHERIES OF DISTRICT No. 3 OF NEW BRUNSWICK, COMPRISING THE COUNTIES OF ST. JOHN, KING'S, QUEEN'S, SUNBURY, YORK, CARLETON AND VICTORIA, FOR THE YEAR 1895, BY INSPECTOR H. S. MILES.

Oromocto, 2nd January, 1895.

To the Honourable
The Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit herewith my annual report for the year just ending on the fishery of this division, with synopsis of the reports of the local officers and statistics of the catch and values, &c., &c. As compared with last year, a decrease will be noticed in the catch of salmon, shad and alewives. The total value of all the fisheries this year is \$259,946.25, showing a decrease of \$32,940.15, which is also partly due to the fact that this year Albert County's catch is omitted from my statistics.

The Bay of Fundy is the only place where bait can be procured in the months of April, May and part of June by the Nova Scotia fishermen, who say that if they could not get bait here they would be compelled to quit the business. About 2,500 barrels of fresh alewives were used for this purpose, and were either sold here to the vessels or shipped to Digby, Halifax, Yarmouth and Pubnico. The pickled and smoked fish are largely exported to the West Indies and the United States.

SHAD.

The supply of this fish is diminishing, owing to overfishing. On account of high prices being obtained both in local and foreign markets for shad they are eagerly sought after, and the result is that each year shows a more or less decreased supply with a corresponding increase in the prices obtained. I cannot too strongly recommend that some protection be given this fish, either by a close time or that certain spawning grounds be permanently reserved for them.

SALMON.

The decrease of the catch of the fish was most observable in the St. John harbour and was ascribed to the destruction of nets by vessels passing up and down the bay in the fog.

LOBSTERS

Show an increase over last season's catch, owing largely to a greater number of men fishing for them. The prices received for them were also more remunerative.

HERRING

Were very plentiful, but owing to low prices they were not considered worth catching.

COD, HAKE AND HADDOCK

Yielded about as usual. In the winter the fish are frozen and shipped to all parts of Canada, and when dried and salted, are prepared into boneless fish, and used for home consumption.

SARDINES

Were all used this year for lobster and other bait.

TROUT.

In most of our streams and brooks this fish is plentiful, and while none are exported large quantities are caught and used by sportsmen and others from whom no estimate of the catch can be procured. But so long as trout fishing is prohibited except by angling, no danger of exhaustion exists.

BASS.

The bass fishing on the St. John River and Bellisle Bay will no doubt be vigorously prosecuted this season. The three years' protection which have been given the bass in these waters will no doubt show beneficial results, and the fishermen are jubilant that they are again permitted to fish them.

FISH-WAYS

These are needed in several rivers in my district. During the year one was built at Woodstock, and no doubt will give entire satisfaction. It was built on the old style fish-ladder principle. The two on the Oromocto River were damaged last spring by the ice, one was rendered completely useless, the other was repaired. Those fish-ways on the Oromocto River have always been considered useless, and no fish have ever been known to pass through them. An effort will be made to induce the government to buy out the dams at Hart's and Tracy's mills. No finer spawning grounds for all kinds of fish can be found than the north and south Oromocto lakes and the beneficial results would be uniform throughout the counties of St. John, King's, Queen's, Sunbury and York.

NON-TIDAL WATERS.

It is a matter of fact that salmon will not rise to the fly on the St. John River, and I beg to recommend that net-fishing be allowed above Crock's Point, otherwise poaching with long nets will be carried on. If thirty yards were licensed it would be a source of considerable revenue, would please the inhabitants greatly and less destruction of fish than at present would result

Marine and Fisheries—Fisheries Branch.

SYNOPSIS OF FISHERY OFFICERS' REPORTS.

ST. JOHN COUNTY.

Joseph O'Brien, of St. John County, reports a decrease in the catch of salmon in his district, owing to the exceptionally foggy weather in the bay and harbour. Of this fish about 90 per cent are exported in ice to the United States. Of alewives all those that are salted are exported, and about 20 per cent of the fresh and smoked are used for home consumption and the remainder for bait. Twenty-five per cent of the shad are sent to the States fresh in ice. Of lobsters not less than 80 per cent are shipped alive on ice to the Upper Canadian and United States markets. The entire catch of finnan haddies was sold in Canada. The close seasons were well observed, but for other violations eighteen fines were imposed and one net confiscated. Of the two fish-ways in St. John County, only one (at Knight Bros.' mill on Musquash River) is working satisfactorily, the other (at Mr. Bostwick's mill on Salmon River) needs repairing. This officer recommends an amendment of the law in *re* the inspection of pickled fish.

Guardian Leonard Parker, of Tynmouth Creek, St. John County, reports that salmon frequent the waters under his supervision in great abundance and were this year well protected on the spawning beds. He has seen during the past season 290 salmon within a distance of one mile, the water being quite low and very clear, the fish were easily counted. He spent two days with Guardian Parker in November, and better salmon streams he never saw. Those streams are all in an unbroken wilderness and can only be examined and protected on foot.

KING'S COUNTY.

Overseer W. H. Heine, Norton Station, reports that the district under his charge has been carefully looked after. The catch of alewives was not nearly as large as last year, the low price of fish causing this fishery not to be so vigorously prosecuted as formerly. The catch of shad on the Kennebecasis River was largely in excess of last year, especially on the upper parts of the river where the fish were more plentiful than for years past. Large schools of young fish being frequently seen in the waters from the bridge which crosses the river. In the vicinity of Hampton where large quantities are frequently caught, the catch was very light, owing to the river being filled with logs for the greater part of the fishing season. Pickerel fishing in Darling Lake is increasing and more people are engaging in the fishery, large quantities are being caught and shipped to the States. Salmon are very scarce in this river. There has been very little illegal fishing in this district during the past year, two nets only were seized for illegal fishing for which he could find no owner. Two other parties were found occupying greater parts of the river than one-quarter. About 50 per cent of the alewives caught in this section are used for home consumption, the balance being shipped to St. John and West India markets. The catches of shad are used for home consumption, being shipped to the towns and villages along the I. C. R. The close seasons have been strictly observed. He has patrolled the river in his canoe regularly and found no violations; a continuance of strict protection of this district will make the shad fishery a very valuable industry. One man was paid by a fish merchant at Hampton the sum of \$236 for shad the past season.

Overseer J. W. Nolan, Smith's Creek, reports that no illegal fishing came under his observation, and that a strict enforcement of the law through his section was observed.

Overseer W. L. Belyea, Brown's Flats, reports an average catch, and states that about 50 per cent of the fish caught in his section have been exported. Forty per cent sold in Canada, and the balance used for home consumption. No abuses existed to his knowledge. The several close seasons have been strictly observed. One violation in sturgeon fishing occurred, and he seized the net. A fine of \$10 was paid to the inspector. He is of the opinion that the sturgeon fishing season should begin at least two weeks earlier. The length of net to be 60 fathoms, and that not more

than two licenses be granted to one man, also that the number of said licenses be plainly marked on each net, together with the initials of the owner, to enable the officers to keep a better trace of violations, as when only the initials are used, it is hard to distinguish the lawful net from the illegal one.

Overseer Justus H. Grey, of Springfield, reports that he finds the fishermen very much encouraged with the year's operation in salmon fishing. A larger harvest of this valuable product has been made this year than ever before, and is generally recognized as being due to the fostering care the Department of Fisheries has devoted to this industry. Salmon are exported in ice and net about 35 cents per lb. Pickerel have been very scarce this year, during the whole season, and few were taken. I cannot account for the failure. Shad also have been scarce. Alewives were late coming and only remained a short time. The fishermen were engaged generally in farming, and this particular season required their attention to that industry. The abundance of eels that infest these waters are most destructive to salmon and are a great source of loss and annoyance to the fishermen, who often find only "the skin and bones" of what was once a fine salmon. The fishermen at the present time are delighted with the prospect of bass fishing the coming winter. No abuses of the fishery law existed in the district, but some illegal fishing did come to his knowledge, and a seizure of four nets was made. It would be a good step if the Department of Fisheries enacts an order to have the bass-nets numbered, with the number of license, then we could easily understand if any nets were not licensed.

QUEEN'S COUNTY.

Overseer A. C. Warden, of Johnston, reports a fair catch of all kinds of fish usually caught in his district, excepting salmon and alewives; the latter were plentiful, but owing to the very low prices given in the St. John market, very few were caught, compared with the two previous years. The change of the close season from Friday to Saturday night gave general satisfaction. The close seasons have been well observed, and no violations came under his notice. There are no fish-ways in this district.

Overseer M. Case, of Wickham, reports that the catch of alewives was below that of last year, or the average catch of the last four years. There appeared to be a good stock of fish in the river, but, as the prices were low in the St. John market, our river fishermen did not engage in that fishery. Shad were about on an average with other years. Salmon were a little below the ordinary. Trout and eels were more plentiful than in the past. About 40 per cent of the fish caught in this district were used at home, and the balance sold in St. John and in the United States. Close seasons well observed. No illegal fishing came to his knowledge. No fines nor confiscations of any kind occurred in this district. No fish-ways in this district. Our fishery regulations are good when properly carried out.

SUNBURY COUNTY.

Overseer Geo. W. Hoben, of Swan Creek, reports a decrease in some kinds of fish, particularly alewives, in consequence of the low freshet and its short duration, and also to the low prices of the fish in the markets. The catch of pickerel keeps well up, as they are in demand in the States markets, and with all the efforts made use of to catch them, they do not seem to diminish. The salmon yield was not as usual, owing largely to the quantity taken lower down the river and in the harbour of St. John. The low tides in St. John prevent the fish getting up through the falls. Shad was about the same as last year, and of excellent quality. This fish is used at home. In consequence of the Government extending the close season for shad and alewives till Saturday night, the fishermen seem to feel well satisfied, and to show no disposition for illegal work. The close seasons for all kinds of fish have been well kept. He reports no contravention of the fishery regulations. The fish-way on the upper branch of the Oromocto River in this county appears to be of no use or benefit, and until the present mill-dams are removed, the fish cannot reach the Oromocto Lakes, which would be the finest spawning grounds for all kinds of fish in New Brunswick.

Marine and Fisheries—Fisheries Branch.

YORK COUNTY.

Overseer Robert Orr, Fredericton, reports as follows: As usual he devoted his time in visiting the rivers and lakes under his control, to carry out departmental instructions and the various orders received from time to time. There is no increase in the catch of salmon, shad and gaspereaux, and a great falling off in pickerel. Grilse were plentiful in the South-west Miramichi and were of a large size. There was a scarcity of salmon during the open season, and those in the river did not, as a rule, rise to the fly. The reason for this was the extreme low water and its crystal clearness. He has never observed it lower or clearer, and probably never in the history of man has it been more so. There was a large run of salmon from the 15th September to the 27th November in this river, the spawn of which was all carefully protected by the guardians, three of whom were in the employ of the department, and six others paid by the riparian owners. This joint protection has been a great success, and all work in harmony in securing an efficient protection. He visited the entire length of this river, some 50 miles, every fortnight, and found everything clear and the men on duty. The forks of the river, 50 miles from Boiestown should have two extra men next season to watch the branches. Some illegal work was done there, but with so small a force, it is impossible to keep a faithful watch at all points. All the fish in this district are used for home consumption. Drifting is still carried on on the St. John River, but to a less degree than formerly. In order to stop this, a larger force of guardians will be necessary. The close season was strictly observed through the vigilance of the guardians under him. No seizures were made during the season. He again calls attention to the fact that from 30 to 40 dams for lumber purposes, are still unprovided with fishway. The great complaint throughout his district, particularly in the Miramichi, is that the open season begins too early. It should be changed from 1st March to 1st June, and in doing this, the salmon would be allowed to run up and get into the streams if the open season was extended to 1st September, as formerly.

Altogether, he reports a successful season, so far as protection is concerned.

CARLETON COUNTY.

Alex. G. Lindsay, of Highlands, reports that the fishing waters in his district are comprised within the portion of the Main South-west Miramichi and its north and south branches, together with the tributaries, about 127 miles. These waters are free of obstruction, the mill dam at Foreston on the south branch excepted, and the St. John River, between the York and Victoria county line, with the various rivers emptying into the St. John between the two county lines mentioned. Salmon, trout, shad and alewives frequent the St. John. Shad are unknown on the Miramichi in this county. Salmon do not rise to the fly on the St. John. Net fishing prohibited. It is not so openly practised, but the catch is very considerable. He received reliable information that salmon nets are owned and used in the St. John, in all the parishes bordering the river. Shad are caught as far up as Grand Falls.

VICTORIA COUNTY.

Overseer Thos. D. Ryan, of Grand Falls, reports that the catch of fish has been about an average one. Fish were very plentiful, but owing to the very dry season, and unusually low water in the rivers and streams, the prosecution was much less vigorous. All the fish caught in the district are used for home consumption. Abuses exist more or less in the district, but the fisheries have been well protected during the past season. The close seasons have been well observed, and in some localities protected by special guardians. There is but one way to protect the fisheries and that is by special guardians during the proper season. No fish-ways in this district.

NEW BRUNSWICK—DISTRICT NO. 1.

RETURN showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries; Quantity and Value of Fishing Material; Kinds and Quantities of Fish, and the Total Number of Men employed, &c., in District No. 1, of the Province of New Brunswick, for the Year 1895.

Number.	FISHING VESSELS AND BOATS.						FISHING MATERIAL.						KINDS OF FISH.											
	Vessels.			Boats.			Gill-Nets.		Weirs.		Seine.		Salmon, fresh, in ice, lbs.	Herring, salted, bbls.	Herring, fresh or frozen, lbs.	Herring, smoked, lbs.	Lobsters, preserved in cans, lbs.	Lobsters, alive or fresh, tons.	Cod, dried, cwt.	Finnan Haddies, smoked, lbs.	Hake, dried, cwt.	Hake, sounds, lbs.	Haddock, cwt.	Number.
	Tonnage.	Value.	Men.	Number.	Value.	Men.	Fathoms.	Value.	Number.	Value.	Fathoms.	Value.												
<i>Charlotte County.</i>																								
1	368	8275	66	407	39963	481	11952	3163	50	50400	46	1919	9677	8170	2809000	8050000	467	5430	2300	2300	1100	1		
2	293	6550	89	139	7450	124	2263	628	28	11275	25	1000	1250	1220	125000	125000	18	1739	1610	1452	4363	2		
<i>St. George to St. Stephen.</i>																								
4	87	1600	25	76	1685	84	44	12275	44	12275	42	1260	1100	95	6000	6000	11	70	946	500	400	3		
5	268	5300	16	118	1955	154	810	262	62	30750	73	1868	2825	1000	3000	11500	344	485	2780	2780	920	5		
<i>St. George, river and lakes.</i>																								
7	143	3000	29	280	10568	240	3825	755	70	26130	76	2283	2933	300	50870	7000	197	750	20	20	7			
<i>St. Stephen, river and lakes.</i>																								
8	1159	24725	275	1228	68118	1240	23800	7283	286	136855	286	9350	19825	600	10765	2859870	8191000	1079	9902	7676	7032	12732		
Totals																								

Marine and Fisheries—Fisheries Branch.

Return showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, &c.—New Brunswick—Con.

Number.	DISTRICTS.	KINDS OF FISH.													FISH PRODUCTS.					TOTAL VALUE.	Number.					
		Pollack, cwt.	Trout, lbs.	Hallibut, lbs.	Smelts, lbs.	Alwives, brls.	Scallops, (canned) cans.	Sardines, (canned) cans.	Clams, brls.	Clams, (shelled) lbs.	Shad, brls.	Squid, brls.	Sardines, brls.	Clams, (canned) lbs.	Founders, lbs.	Tom Cod or Frost Fish, lbs.	Pickrel, lbs.	Coarse and Mixed Fish, brls.	Fish Oils, galls.			Seal Skins, No.	Fish used as Bait, brls.	Fish used as Manure, brls.	Fish Guano, tons.	
<i>Charlotte County.</i>																										
1	Grand Manan	4090		8000	4000														23500	660					345,480	001
2	Campo Bello	4213		45000					149	5000									5461	1176					66,963	902
3	St. George to St. Stephen	200	2500				200000	650	3000						2200				900	50	3300	28			85,697	503
4	L'Etang to St. George	1615		20500					30	76240					50				2000	210	1000	75			178,489	004
5	Lepreaux to L'Etang	240					4800	188000	4390	7409	50				4500				5350	6	1190	1075	230		110,786	405
6	St. George, river and lakes		6000																						600	006
7	St. Stephen, river and lakes		5000		4000	135																			1,602	507
8	West Isles	4396		360	4800		200000	61	64	58875					6507	1000			2678	726	100	26			178,614	208
	Totals	14754	13500	73860	12800	135	4800	588000	5101	10409	50	243	181125	10000	13257	1550	3500	41	39889	6	4012	5475	359		968,203	50

RECAPITULATION

Of the Yield and Value of the Fisheries in District No. 1, **New Brunswick**, for the year 1895.

Kinds of Fish.	Quantity.	Price.		Value.	
		\$	cts.	\$	cts.
Salmon, fresh, in ice	Lbs. 600	0	20	120	00
Herring	Brls. 10,765	4	50	48,442	50
do frozen	per 100 2,859,870	0	02	57,197	40
do smoked	Lbs. 8,191,000	0	02	163,820	00
Alewives	Brls. 135	4	00	540	00
Cod	Cwt. 9,902	4	50	44,559	00
Seal-skins	No. 6	3	00	18	00
Pollack	Cwt. 14,754	2	50	36,885	00
Hake	" 7,676	2	50	19,190	00
do sounds	Lbs. 7,032	0	50	3,516	00
Haddock	Cwt. 12,732	3	50	44,562	00
Halibut	Lbs. 73,860	0	10	7,386	00
Finnan haddies, smoked	Lbs. 210,000	0	10	21,000	00
Shad	Brls. 50	10	00	500	00
Scallops, preserved	Cans 4,800	0	15	720	00
Sardines	588,000	0	05	29,400	00
Trout	Lbs. 13,500	0	10	1,350	00
Tom-cod or frost fish	" 1,550	0	05	77	50
Squid	Brls. 243	4	00	972	00
Flounders	Lbs. 13,257	0	05	662	85
Smelts	" 12,800	0	05	640	00
Pickrel	" 3,500	0	05	175	00
Clams, preserved	Cans 10,000	0	05	500	00
Coarse or mixed fish	Brls. 41	2	00	82	00
Sardines	" 181,125	2	00	362,250	00
Clams	" 5,101	1	25	6,376	25
Lobsters	Tons 1,079	75	00	80,925	00
do	Cans 11,500	0	14	1,610	00
Fish-oil	Galls. 39,889	0	40	15,955	60
Clams, shelled	Lbs. 10,409	0	10	1,040	90
Fish guano	Tons 359	25	00	8,975	00
Fish used as bait	Brls. 4,012	1	50	6,018	00
do manure	" 5,475	0	50	2,737	50
Total value of catch for 1895				963,203	50
do do 1894				1,118,477	29
Decrease during 1895				150,273	79

Marine and Fisheries—Fisheries Branch.

NUMBER and Value of Vessels, Boats, Nets, Weirs, &c., employed in the Fisheries of
District No. 1, **New Brunswick**, for the year 1895.

Material.	Value.
	\$ cts.
60 vessels (tonnage, 1,159).....	24,725 00
1,228 boats.....	68,118 00
23,800 fathoms of gill-nets.....	7,283 00
296 seines (fathoms, 9,350).....	19,825 00
50 smelt-nets.....	530 00
286 weirs.....	136,855 00
856 trawls.....	9,365 00
14,643 lobster-traps.....	11,615 00
4 lobster canneries.....	4,200 00
12 fish-presses.....	1,200 00
5 ice-houses.....	1,200 00
510 smoke and fish-houses.....	113,492 00
247 piers and wharfs.....	45,255 00
13 sailing and steam smacks.....	5,550 00
2,500 hand-lines.....	2,500 00
500 dip-nets.....	2,500 00
3 sardine canneries.....	8,500 00
1 fish-curing factory.....	2,500 00
40 weir-scows.....	4,000 00
Total.	469,213 00

Marine and Fisheries—Fisheries Branch.

DISTRICT No. 2.

the Fisheries, Quantity and Value of Fishing Material, Kinds and Quantities of No. 2, Province of **New Brunswick**, for the Year 1895.

KINDS OF FISH.												
Salmon, fresh, in ice, lbs.	Salmon, preserved, in cans, lbs.	Salmon, smoked, lbs.	Herring, salted, brls.	Herring, fresh or frozen, lbs.	Herring, smoked, lbs.	Mackerel, salted, brls.	Mackerel, fresh or preserved, in cans, lbs.	Lobsters, preserved, in cans, lbs.	Lobsters, alive or fresh, tons.	Cod, dried, cwt.	Cod tongues & sounds, brls.	Number.
63500									2			1
132500			2300	30000	10000			30000	5	180		2
196000			2300	30000	10000			30000	7	180		
39200			10350	600	200			4200	525	810		
120000	5000		24000	50000		50	3500	37500	4	1570		1
1028400	3000		31500			60	42300	125000	6	17100		2
37000			2000			290	21700	72000	4	4000		3
			1700			60				4800		4
1000			26000	11000		200	7000	96000	4	30000	30	5
5600			2100	10000		200	11000	68000	3	5620	10	6
			4500			100	15000	208000	2	12150	15	7
8460			10000			50	1000	288000	2	2000		8
36000			2400	20000		50	21000	6000	5	1200	4	9
9280			8000			180		50400	3	2300	5	10
1245740	8000		112200	91000		1240	122500	950900	33	80740		68
249148	1200		504900	1820		17360	14700	133126	2475	363330	680	
80400		5000	4000		10000	10	4000	73550	3	500		1
131550			7000		10000	20	30000	129500	3	200		2
88000			100			120	1000					3
54000												4
36800												5
390750		5000	11100		20000	150	35000	203050	6	700		
78150		1000	49950		400	2100	4200	28427	450	3150		
26000			2000			20	138000	170250	3	200		1
			6000			100		82000	3	300		2
17000			10500			40	32000	156000	4	450	20	3
			5000			250	1000	150000	3	100		4
			3500			50		45000	2	100		5
43000			27000			460	459000	603250	15	1150	20	6
8600			121500			6440	55080	84455	1125	5175	200	
5000			42000	25000	25000	150	10000	732000	60	100		1
2650			2000	40000	30000		5000		10	25		2
12700			100									3
20350			44100	65000	55000	150	15000	732000	70	125		
4070			198450	1300	1100	2100	1800	102480	5250	562		
7000				5000					45	4		1
1400				100					3375	18		
1902840	8000	5000	196700	191000	85000	2000	631500	2519200	176	82899	88	
380568	1200	1000	885150	3820	1700	28000	75780	352688	13200	373045	880	

RETURN showing the Number, Tonnage and Value of Vessels and Boats engaged in and the Total Number of Men employed, &c., in District No. 2,

Number.	DISTRICTS.	KINDS OF FISH.								
		Hake, dried, cwt.	Hake sounds, lbs.	Haddock, cwt.	Trout, lbs.	Halibut, lbs.	Smelts, lbs.	Bass, lbs.	Alewives, brls.	Oysters, brls.
<i>Restigouche County.</i>										
1	Above Dalhousie				10000		585000			
2	Dalhousie to Belledune				4000		32000			
	Totals				14000		617000			
	Values				1400		30850			
<i>Gloucester County.</i>										
1	Petit Rocher	200			2000					
2	Bathurst, &c.				9000		130000	15000		
3	Grand Aise	50	200		400		16000			
4	Upper Caraquet	150	150	163	400	1400	74000	500		1100
5	Caraquet	400	600	400	1400	120000	50000	1600		100
6	Shippegan (Mainland)	500	1700	100		5000	95000	500		20
7	Shippegan Island	480	270	220		13500	20000			
8	Miscou, &c.	200	200			1800	290000	2000		
9	Pokemouche	170	230	50	4500	1500	220000	2500		540
10	Tracadie	130	150	150	4500	9000	160000	1700		450
	Totals	2280	3500	1080	22200	152200	1055000	23800	990	1220
	Values	\$ 5700	1750	3780	2220	15220	52750	2380	3960	4880
<i>Northumberland County.</i>										
1	Neguac, &c.	150	150		2000	1000	564000	20000	100	400
2	Bay du Vin, &c.	100	100		2000	4500	593500	40000	400	11100
3	Chatham, &c.				4000		1000000	20000	400	500
4	North-west Miramichi River				22000			200000	1100	
5	South-west Miramichi River				8000		30000	1500	1200	
	Totals	250	250		38000	5500	2187500	281500	3200	12000
	Values	\$ 625	125		3800	550	109375	28150	12800	48000
<i>Kent County.</i>										
1	Harcourt, &c.				4000			2000		
2	Carleton	200			2500		145000	38400		
3	St. Louis	100	100		6000		400000	25000	1500	200
4	Richibucto, &c.	600	3200	20	1800	12500	1168000	2000	2400	250
5	Buctonche, &c.	500	200		2000		990000	4000	1900	3000
6	Cocagne	100			1500		180000	2000	500	1100
	Totals	1500	3500	20	17800	12500	2793000	73400	6300	4550
	Values	\$ 3750	1750	70	1780	1250	139650	7340	25200	18200
<i>Westmoreland County.</i>										
1	Shediac, Botsford, &c.	100			10000		820000	5000	1500	300
2	Westmoreland and Sackville	50			2000		156000	7500	350	
3	Dorchester								30	
	Totals	150			12000		976000	12500	1880	300
	Values	\$ 375			1200		48800	1250	7520	1200
<i>Albert County.</i>										
1	Albert County				2000					12
	Values				200					48
	Grand totals	4180	7250	1100	106000	170200	7628500	391200	12382	18070
	Values	\$ 10450	3625	3850	10600	17020	381425	39120	49528	72280

Marine and Fisheries—Fisheries Branch.

the Fisheries, Quantity and Value of Fishing Material, Kinds and Quantities of Fish,
Province of **New Brunswick**, for the Year 1895—*Concluded*.

KINDS OF FISH.								FISH PRODUCTS.					TOTAL VALUE.	Number.	
Clams, brls.	Eels, brls.	Shad, brls.	Squid, brls.	Sardines, cans.	Flounders, lbs.	Tom-cod or frost fish, lbs.	Coarse and mixed fish, brls.	Fish oils, galls.	Seal skins, No.	Fish used as bait, brls.	Fish used as manure, brls.	Fish guano, tons.			\$	cts.
	3000					102000							78,200	00	1
	20					8000				400	1500		46,985	00	2
	3020					110000				400	1500				
	30200					5500				600	750		125,185	00	
10	10				5000			350		550	1400		150,220	00	1
900	20					750000		500		6700	27000		522,646	00	2
200			50					400		3000	400		57,969	00	3
400	25		25			6000	100	2000		1500	1700		45,020	00	4
3000	100		400			27000		19000		3000	1200		310,650	00	5
900			200		15000	4000	400	3000		3000	1500		68,655	00	6
1950	40		100					4750		3700	2700		125,500	00	7
30	10				1000	3000		2000		4000	1600		120,422	00	8
125	70	20			1200	5000		450	15	450	500		45,580	00	9
50	150		10		8000	2500		1350		900			74,357	00	10
7565	605	20	785		30200	797500	500	33800	15	26800	38000				
15130	6050	200	3140		1510	39875	1000	13520	15	40200	19000		1,521,019	00	
20	40	40				20000	500	450		2000	2000		88,642	00	1
	30	700			6000	100000		100		6000	850	500	196,335	00	2
	100	500		336000	50000	1400000					1500		171,900	00	3
	155	700											45,950	00	4
	10	450											19,210	00	5
20	335	2390		336000	56000	1520000	500	550		8000	4350	500			
40	3350	23900		16800	2800	76000	1000	220		12000	2175	12500	522,037	00	
	50												1,100	00	1
	20	50				10000		200		1600			71,520	00	2
	50	250	60		10000	40000	20000	400		2000			120,515	00	3
	15	450	40			4500		1200		5200	1200		201,945	00	4
	250	100				52000	200	1000		2500			122,995	00	5
	200	200				10000		200		1000	1000		44,250	00	6
515	1070	150			11100	116500	20200	3000		12300	2200				
1030	10700	1500			555	5825	40400	1200		18450	1100		562,325	00	
300	200					30000	600	500		25000	1000		395,080	00	1
20	50	360			1000	5000		100	4	2000	500	50	31,651	50	2
	20	850				2000		200					12,090	00	3
320	270	1210			1000	37000	600	800	4	2700	1500	50			
640	2700	12100			50	1850	1200	320	4	40500	750	1250	438,821	50	
10		40				1000	3	10							1
20		400				50	6	4					5,621	00	
8430	5300	3810	785	336000	93300	2582000	21803	38160	19	74500	47550	550			
16860	53000	38100	3140	16800	4915	129100	43606	15264	19	111750	23775	13750	3,175,008	50	

RECAPITULATION

Of the Yield and Value of the Fisheries in District No. 2, New Brunswick, for the Year 1895.

Kinds of Fish.	Quantity.	Price.		Value.
		\$	cts.	\$ cts.
Salmon, fresh.....	Lbs. 1,902,840	0	20	380,568 00
do in cans.....	" 8,000	0	15	1,200 00
do smoked.....	" 5,000	0	20	1,000 00
Herring, salted.....	Brls. 196,700	4	50	885,150 00
do fresh.....	Lbs. 191,000	0	02	3,820 00
do smoked.....	" 85,000	0	02	1,700 00
Mackerel.....	Brls. 2,000	14	00	28,000 00
do fresh.....	Lbs. 631,500	0	12	75,780 00
Lobsters.....	Cans. 2,519,200	0	14	352,688 00
do.....	" 176	75	00	13,200 00
Cod.....	Cwt. 82,899	4	50	373,045 50
do tongues and sounds.....	Brls. 88	10	00	880 00
Hake.....	Cwt. 4,180	2	50	10,450 00
do sounds.....	Lbs. 7,250	0	50	3,625 00
Haddock.....	Cwt. 1,100	3	50	3,850 00
Trout.....	Lbs. 106,000	0	10	10,600 00
Halibut.....	" 170,200	0	10	17,020 00
Smelts.....	" 7,628,500	0	05	381,425 00
Bass.....	" 391,200	0	10	39,120 00
Alewives.....	Brls. 12,382	4	00	49,528 00
Oysters.....	" 18,070	4	00	72,280 00
Clams.....	" 8,430	2	00	16,860 00
Eels.....	" 5,300	10	00	53,000 00
Shad.....	" 3,810	10	00	38,100 00
Squid.....	" 785	4	00	3,140 00
Flounders.....	Lbs. 98,300	0	05	4,915 00
Frost fish.....	" 2,582,000	0	05	129,100 00
Coarse fish.....	Brls. 21,803	2	00	43,606 00
Sardines.....	Cans. 336,000	0	05	16,800 00
Fish oil.....	Galls. 38,160	0	40	15,264 00
Seal skins.....	No. 19	1	00	19 00
Fish, as bait.....	Brls. 74,500	1	50	111,750 00
do manure.....	" 47,550	0	50	23,775 00
do guano.....	Tons. 550	25	00	13,750 00
Total.....				3,175,008 50

COMPARATIVE Statement of the Value of Fisheries in each County of District No. 2, New Brunswick, for the Years 1894 and 1895.

Counties.	Value in 1894.		Value in 1895.		Increase.
	\$	cts.	\$	cts.	
Restigouche.....	104,555	00	125,185	00	20,630 00
Gloucester.....	1,417,226	00	1,521,019	00	103,793 00
Northumberland.....	498,435	00	522,037	00	23,602 00
Kent.....	526,184	00	562,325	00	36,141 00
Westmoreland.....	393,785	00	438,821	50	45,036 50
^a Albert.....	4,772	50	5,621	00	848 50
Total.....	2,944,957	50	3,175,008	50	230,051 00

^a Albert was added to my district this year.

Marine and Fisheries—Fisheries Branch.

DETAILED STATEMENT of Lobster Plant and other Fixtures used in the Fishing Industry, District No. 2, New Brunswick, for the Year 1895.

COUNTIES.	LOBSTER PLANT.				No. of Hands employed.	OTHER FIXTURES USED IN FISHING.								
	Traps.		Canneries.			Freezers and Ice-houses.		Smoke and Fish-houses.		Piers and Wharves.		Steamers and Smacks.		
	No.	Value.	No.	Value.		No.	Value.	No.	Value.	No.	Value.	No.	Value.	
Restigouche	2,047	\$ 1,547	2	\$ 2,500	35		14	\$ 12,200	110	\$ 1,700	1	\$ 500	1	\$ 500
Gloucester	68,050	58,300	47	78,500	1,478		44	22,500	111	15,400	19	12,300	26	15,500
Northumberland	11,580	10,680	9	20,600	382		56	22,000	84	8,700	7	4,400	17	12,500
Kent	48,200	35,100	62	37,900	1,320		11	7,300	45	2,900	3	1,300	8	8,000
Westmoreland	26,500	17,500	60	21,000	850				30	800				
Albert	200	50												
Totals	157,177	123,177	180	160,500	4,065		125	64,000	380	29,500	30	13,500	52	36,500

NUMBER and Value of Vessels, Boats, Nets, Traps, &c., engaged in the Fisheries in District No. 2, **New Brunswick**, in the Year 1895.

Material.	Value.		Total.	
	\$	cts.	\$	cts.
197 vessels (aggregate tonnage, 2,362).....	90,450	00		
3,216 boats.....	113,676	00		
355,870 fathoms nets.....	247,250	00		
2,118 smelt nets.....	81,420	00		
450 bass nets.....	2,250	00		
2 mackerel trap-nets.....	5,000	00		
15 weirs.....	800	00		
			540,846	00
157,177 lobster traps.....	123,177	00		
180 lobster canneries.....	160,500	00		
			283,677	00
12 general canneries.....	13,000	00		
125 freezers and ice-houses.....	64,000	00		
30 piers and wharfs.....	18,500	00		
380 fish and smoke-houses.....	29,500	00		
52 steamers and smacks.....	36,500	00		
350 trawls.....	7,000	00		
950 smelt shanties.....	11,500	00		
			180,000	00
			1,004,523	00

Marine and Fisheries—Fisheries Branch.

NEW BRUNSWICK—DISTRICT NO. 3.

RETURN showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries; Quantity and Value of Fishing Materials; Kinds and Quantities of Fish, and the Total Number of Men Employed, &c., in District No. 3, Province of New Brunswick, for the Year 1895.

Number.	DISTRICTS.				FISHING VESSELS AND BOATS.						FISHING MATERIAL.						KINDS OF FISH.				
	Vessels.		Boats.		Gill-Nets.		Weirs.		Seine.		Salmon, salted, brls.	Salmon, fresh in ice, lbs.	Herring, salted, brls.	Herring, fresh or frozen, lbs.	Herring, smoked, lbs.	Number.					
	Number.	Tonnage.	Value.	Men.	Number.	Value.	Number.	Value.	Fathoms.	Value.							Number.	Fathoms.	Value.		
<i>St. John County.</i>																					
1	31	620	10	185	7400	370	30800	23000	28	9800	6	360	420	22770	1500	500000	1				
2	160	5200	32	44	2200	80	39600	29700	5	200	400	78000	300	24400	1500	500000	2				
3	60	1200	12	40	2000	80	32000	24000	12	4200	12	480	960	24000	1500	500000	3				
4	60	1200	12	16	800	32	12800	9600	12	4200	12	480	960	24000	1500	500000	4				
5	St. Martin's and Martin's Head.			18	720	32	10000	7500						500	200	500000	5				
	16	311	66	303	13120	594	125200	93800	40	14000	23	1040	1780	125670	3500	500000					
<i>Other Counties.</i>																					
6	King's			137	1840	212	13350	3064						15330	491	500000	6				
7	Queen's			189	4840	332	23070	13187						2255	198	4650	7				
8	Simsbury	1	12	240	4	81	810	162	9170	4580				810		500000	8				
9	York			100	2000	200	5500	1375						10800		500000	9				
10	Carleton			33	580	78	500	250						3500		500000	10				
11	Victoria			100	550	140	1500	750						2500		500000	11				
		1	12	240	4	646	10620	23206						35285	680	4650					
	Totals.	17	323	8460	70	949	23740	173290	40	14000	23	1040	1780	160955	4189	4650	500000				
	Grand Totals.																				

RETURN showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, &c.—New Brunswick—Con.

Number.	DISTRICTS.	KINDS OF FISH.												FISH PRODUCTS.		TOTAL VALUE.	Number.				
		Lobsters, alive or fresh, tons.	Cod, dried, cwt.	Cod, tongues and sounds, brls.	Hake, dried, cwt.	Haddock, cwt.	Pollack, cwt.	Trout, lbs.	Alewives, brls.	Eels, brls.	Shad, brls.	Sardines, brls.	Pickrel, lbs.	Flounders, lbs.	Coarse and mixed fish, brls.			Fish oils, galls.	Fish used as bait, brls.		
<i>St. John County.</i>																					
1	St. John Harbour and River					4500											2300		130,304 00	1	
2	Dipper Harbour.	75	127	2	1800	900	150			15000	100	1500			600			55	15,163 50	2	
3	Pisrineo.	20	80	5	1400	2800	880			150	75							35	35,724 00	3	
4	Musquash.	25	100	2	80	150	75								1700			30	19,849 50	4	
5	St. Martin's and Martin's Head.	50	75	3	800	250	150								1600			20	11,675 50	5	
	Totals.	170	382	12	4080	8600	1255			15150	175	1500			3900			140	212,716 50		
<i>Other Counties.</i>																					
6	King's.																			9,488 75	6
7	Queen's.																			16,189 00	7
8	Sunbury.																			8,448 00	8
9	York.																			6,288 00	9
10	Carleton.																			2,596 00	10
11	Victoria.																			4,220 00	11
	Totals.									59750	3261	69	1280		64545			200		47,229 75	
	Grand Totals.	170	382	12	4084	8600	1255			59750	18411	214	2780		64545			340		239,946 25	

Marine and Fisheries—Fisheries Branch.

RECAPITULATION

Of the Yield and Value of the Fisheries in District No. 3, New Brunswick, for the Year 1895.

Kinds of Fish.	Quantity.	Price.		Value.	
		\$	cts.	\$	cts.
Salmon, salted.....	Brls.	10	16 00	160	00
do fresh.....	Lbs.	160,955	0 20	32,191	00
Herring, salted.....	Brls.	4,189	4 50	18,850	50
do frozen.....	Lbs.	4,650	0 02	93	00
do smoked.....	"	500,000	0 02	10,000	00
Lobsters.....	Tons.	170	75 00	12,750	00
Cod, dried.....	Cwt.	382	4 50	1,719	00
do tongues and sounds.....	Brls.	12	10 00	120	00
Hake, dried.....	Cwt.	4,084	2 50	10,210	00
Haddock.....	"	8,600	3 50	30,100	00
Pollack.....	"	1,255	2 50	3,137	50
Trout.....	Lbs.	59,750	0 10	5,975	00
Alewives.....	Brls.	18,411	4 00	73,644	00
Eels.....	"	244	10 00	2,440	00
Shad.....	"	2,780	10 00	27,800	00
Sardines.....	"	3,900	1 50	5,850	00
Pickerel.....	Lbs.	64,545	0 05	3,227	25
Flounders.....	"	3,000	0 05	150	00
Coarse and mixed fish.....	Brls.	4,831	3 00	14,493	00
Fish oil.....	Galls.	340	0 40	136	00
Fish used as bait.....	Brls.	4,600	1 50	6,900	00
Total.....				259,946	25

NUMBER and Value of Vessels, Boats, Nets, Weirs, &c., engaged in the Fisheries of District No. 3, New Brunswick.

Material.	Value.		Total.	
	\$	cts.	\$	cts.
17 vessels (323 tons).....	8,460	00		
949 boats.....	23,740	00		
178,290 fathoms of nets.....	117,006	00		
40 weirs.....	14,000	00		
23 seines (1,040 fathoms).....	1,780	00		
			164,986	00
6,100 lobster traps.....	4,575	00		
26 ice-houses.....	5,350	00		
60 smoke and fish-houses.....	37,925	00		
6 steamers and smacks.....	6,000	00		
83 trawls.....	2,075	00		
60 wharfs and piers.....	15,700	00		
			71,625	00
Total value of material.....			236,611	00

RECAPITULATION showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries; Quantity and Value of Fishing Materials; Kinds and Quantities of Fish, and the Total Number of Men Employed, &c., in the whole Province of New Brunswick, for the Year 1895.

Number.	COUNTIES.				FISHING VESSELS AND BOATS.						FISHING MATERIAL.						KINDS OF FISH.			
	Vessels.		Boats.		Gill-Nets.		Smelt-Nets.		Weirs.		Seines.		Salmon, fresh in ice, lbs.		Salmon, preserved in cans, lbs.		Salmon, smoked, lbs.		Number.	
	Number.	Tonnage.	Value.	Men.	Number.	Value.	Men.	Fathoms.	Value.	Number.	Value.	Number.	Value.	Number.	Fathoms.	Value.	Number.	Value.		
1	Restigouche	185	2,152	84,550	574	1,255	3,480	352	25,180	27,680	224	13,780					196,000		1	
2	Gloucester	7	135	3,900	29	675	18,850	1,075	124,100	78,000	273	9,180					1,245,740		2	
3	Northumberland	5	75	2,000	20	696	24,200	1,572	37,700	110,790	631	23,170					390,750		3	
4	Kent									13,750	710	22,540					43,000		4	
5	Westmoreland								42,700	16,850	275	12,750					20,350		5	
6	Albert					3	150		630	180							7,000		6	
7	St. John	16	311	8,220	66	303	13,120	594	125,200	93,800			40	14,000	23	1,040	125,670		7	
8	King's					137	1,840	312	13,350	3,064							15,330		8	
9	Queen's	1	12	240	4	189	4,840	332	23,070	13,187							2,255		9	
10	Sunbury					81	810	162	9,170	4,580							810		10	
11	York					100	2,000	200	5,500	1,375							10,890		11	
12	Carleton					39	580	78	500	250							3,500		12	
13	Victoria					100	550	140	1,500	750							2,500		13	
14	Charlotte	60	1,159	24,725	275	1,228	68,118	1,290	23,800	7,283			286	136,855	296	9,350	600		14	
	Totals	274	3,844	123,635	968	5,393	205,534	9,421	557,960	371,539	2,118	81,420	326	150,855	319	10,390	2,064,395	8,000	5,000	

RECAPITULATION showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, &c.—**New Brunswick**—Continued.

Marine and Fisheries—Fisheries Branch.

Number.	KINDS OF FISH.													Number.			
	Herring, salted, brls.	Herring, fresh or frozen, lbs.	Herring, smoked, lbs.	Mackerel, salted, brls.	Mackerel, fresh or preserved, in cans, lbs.	Lobsters, preserved, in cans, lbs.	Lobsters, alive or fresh, tons.	Cod, dried, cwt.	Cod tongues and sounds, brls.	Hake, dried, cwt.	Hake sounds, lbs.	Haddock, cwt.	Pollack, cwt.		Trout, lbs.	Halibut, lbs.	Smelts, lbs.
1	Restigouche	2,300	30,000	10,000	1,240	122,500	30,000	7	180	2,280	3,500	1,080	.....	14,000	.....	617,000	.....
2	Gloucester	112,200	91,000	.....	150	35,000	950,900	33	80,740	2,250	250	.....	.....	22,200	152,200	1,055,000	23,800
3	Northumberland	11,100	.....	20,000	460	453,900	203,050	6	700	1,500	3,500	20	.....	38,000	5,500	2,187,500	281,500
4	Kent	27,000	.....	.....	.....	.....	663,250	15	1,150	.....	.....	.....	.....	17,800	12,500	2,793,000	73,400
5	Westmoreland	44,100	65,000	55,000	150	15,000	732,000	70	125	150	.....	.....	.....	12,000	.....	976,000	12,500
6	Albert	.....	5,000	.....	.....	.....	.....	45	4	.....	.....	.....	.....	2,000	.....	.....	.....
7	St. John	3,500	.....	500,000	.....	.....	.....	170	382	4,080	.....	8,600	1,255	.....	.....	.....	.....
8	King's	491	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	3,550	.....	.....	.....
9	Queen's	198	4,650	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,500	.....	.....	.....
10	Sunbury	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,700	.....	.....	.....
11	York	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8,000	.....	.....	.....
12	Carleton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13,000	.....	.....	.....
13	Victoria	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	30,000	.....	.....	.....
14	Charlotte	10,765	2,859,870	8,191,000	.....	.....	11,500	1,079	9,902	7,676	7,082	12,732	14,754	13,500	73,860	12,800	.....
	Totals	211,654	3,035,520	8,776,000	2,000	631,500	2,530,700	1,425	93,183	100	15,140	22,432	16,009	179,250	244,060	7,641,300	381,200

Marine and Fisheries—Fisheries Branch.

RECAPITULATION

Of the Yield and Value of the Fisheries of the whole Province of **New Brunswick**,
for the Year 1895.

Kinds of Fish.	Quantity.	Prices.		Value.		Total Value.	
		\$	cts.	\$	cts.	\$	cts.
Salmon, salted	Brls.	10	16 00	160 00			
do fresh	Lbs.	2,064,395	0 20	412,879 00			
do canned	"	8,000	0 15	1,200 00			
do smoked	"	5,000	0 20	1,000 00			
							415,239 00
Herring, salted	Brls.	211,654	4 50	952,443 00			
do fresh	Lbs.	3,055,520	0 02	61,110 40			
do smoked	"	8,776,000	0 02	175,520 00			
							1,189,073 40
Mackerel, salted	Brls.	2,000	14 00	28,000 00			
do fresh	Lbs.	631,500	0 12	75,780 00			
							103,780 00
Lobsters, preserved, in cans	"	2,530,700	0 14	354,298 00			
do alive or fresh	Tons.	1,425	75 00	106,875 00			
							461,173 00
Cod, dried	Cwt.	93,183	4 50	419,323 50			
do tongues and sounds	Brls.	100	10 00	1,000 00			
							420,323 50
Hake, dried	Cwt.	15,940	2 50	39,850 00			
do sounds	Lbs.	14,282	0 50	7,141 00			
							46,991 00
Haddock	Cwt.	22,432	3 50	78,512 00			
Finnan haddies	Lbs.	210,000	0 10	21,000 00			
							99,512 00
Pollack	Cwt.	16,009	2 50	40,022 50			
Trout	Lbs.	179,250	0 10	17,925 00			
Halibut	"	244,060	0 10	24,406 00			
Smelts	"	7,641,300	0 05	382,065 00			
Bass	"	391,200	0 10	39,120 00			
Alewives	Brls.	30,928	4 00	123,712 00			
Oysters	"	18,070	4 00	72,280 00			
Clams	"	13,531		23,236 25			
do canned and shelled	Lbs.	15,409	0 10	1,540 90			
							24,777 15
Eels	Brls.	5,544	10 00	55,440 00			
Shad	"	6,640	10 00	66,400 00			
Squid	"	1,028	4 00	4,112 00			
Sardines	"	185,025		363,100 00			
do canned	Cans	924,000	0 05	46,200 00			
							414,300 00
Pickarel	Lbs.	68,045	0 05	3,402 25			
Flounders	"	114,557	0 05	5,727 85			
Tom-cod or frost fish	"	2,583,550	0 05	129,177 50			
Coarse and mixed fish	Brls.	26,675		58,901 00			
Fish oils	Galls.	78,389	0 40	31,355 60			
Seal-skins	No.	25		37 00			
Fish used as bait	Brls.	83,112	1 50	124,668 00			
do manure	"	53,025	0 50	26,512 50			
do guano	Tons	909	25 00	22,725 00			
							414,300 00
Total for 1895.							4,403,158 25
do 1894							4,351,528 69
Increase							51,629 56

STATEMENT of the Number and Value of Vessels, Boats, Nets, &c., engaged in the Fisheries of **New Brunswick**, with Approximate Value of the Material, for 1895.

Articles.	Value.	Total Value.
	\$ cts.	\$ cts.
274 vessels, 3,844 tons	123,635 00	
5,393 boats	205,534 00	
557,960 fathoms of gill-nets	371,539 00	
319 seines, 10,390 fathoms	21,605 00	
341 weirs	151,655 00	
		873,968 00
177,920 lobster-traps	139,367 00	
184 do canneries (4,100 hands employed in canneries)	164,700 00	
		304,067 00
2,168 smelt-nets	81,950 00	
500 dip-nets	2,500 00	
450 bass-nets	2,250 00	
2 mackerel trap-nets	5,000 00	
2,500 hand-lines	2,500 00	
1,289 trawls	18,440 00	
15 general canneries	21,500 00	
12 fish-presses	1,200 00	
156 freezers and ice-houses	70,550 00	
1,490 smoke and fish-houses	180,917 00	
1 fish-curing factory	2,500 00	
950 smelt-shanties	11,500 00	
40 weir-scows	4,000 00	
71 steamers and smacks	48,050 00	
337 piers and wharfs	79,455 00	
		532,312 00
Total		1,710,347 00

Marine and Fisheries—Fisheries Branch.

APPENDIX No. 5.

PRINCE EDWARD ISLAND.

REPORT ON THE FISHERIES OF PRINCE EDWARD ISLAND FOR 1895,
BY INSPECTOR OF FISHERIES, ED. HACKETT.

TIGNISH, 2nd January, 1896.

To the Honourable
The Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit my report on the fisheries of this province for the season 1895, together with tabulated returns showing quantities and values by counties, of fish caught. I regret having to report that the operations for the year have not proved as successful as in 1894, and show a falling off in the principal branches. The total product for the year gives a decrease, as compared with the year 1894, of \$142,907.07.

This decline is noticeable in the different branches of the sea fisheries, as follows:—

Kinds of Fish.	Value, 1894.	Value, 1895.	Decrease.
	\$	\$	\$
Herring	203,909	185,552	18,557
Mackerel	145,625	98,993	46,632
Lobsters	380,770	372,041	8,729
Cod	107,892	77,517	30,375
Hake	28,899	19,980	8,919

The five branches noted above are the most important of our coastal waters and deep sea fisheries, and any shortage in the catch materially reduces the returns for the year.

GENERAL REMARKS.

As the season opened early fishermen were sanguine as to the results of the year's operations. *Herring* were on the coast the last week of April, and continued in great abundance until about the tenth of June. This fish being used chiefly as bait, having no commercial value as an export, fishing was not prosecuted with vigour after a sufficient supply of bait had been secured. On the greater part of the coast lobster fishing was going on at the same time, and as an ample supply of bait had been secured the men became careless with regard to the fishery, thence the falling off.

The *lobster* fishery was vigorously prosecuted, and shows fairly good results. There is a slight decrease as compared with the previous season, but the fishery is well up to the average, and the year's operations may be considered satisfactory.

Mackerel were scarce all through the season, and the product for the year shows a large falling off from the catch of 1894.

Cod fishing was poor in the first part of the season, as fish were of small size and scarce in coastal waters. As the summer advanced, however, they became more plentiful and of large size. Where prosecuted in the fall, good catches were made, but it was then too late to recover lost ground, and a considerable falling off in the yield has to be noted. Fishing for hake was not energetically prosecuted, the returns exhibiting a considerable decrease. This is not caused by a scarcity of hake, as fish were abundant in season. The men, however, being engaged in the other fisheries paid little attention to hake, and as a result the catch falls below the average.

Smelt fishing was fairly successful, but the total value shows a decrease of \$5,292 as compared with the year 1894.

Oysters give a slight increase, caused by better fishing on the beds in Queen's County. The fishery at Richmond Bay in Prince County, was not so successful as in former years. Oysters were scarce on the beds in the bay, and less boats and men were employed. The minor fisheries such as haddock, halibut, etc., not being prosecuted as separate industries, fluctuate but little from year to year.

Salmon, trout, eels &c., also remain about the same each year, the catch varying but little as to the total quantity taken.

I give under the different heading, in the body of the report, statements more in detail as to the condition of the fisheries of the province.

HERRING.

Large schools of herring were on the coast early in the season. The ice left the shore on the north side of the island about the last of April, and as soon thereafter as fishermen could get their nets into the water, herring were taken. Fish were in great abundance during the month of May, and large captures were made at Nail Pond, Tignish, Miminegash, West Point, Egmont Bay, George Town, St. Peter's, Rustico, New London, Malpeque, Alberton, &c. The first fish known as "spring herring" are thin and poor. They are of good size, but being so thin are not cured for export. The quantity taken is mostly used as bait in the mackerel and lobster fisheries, their abundance proving a great boon to fishermen, who are enabled to secure an ample supply of bait at small cost. Other schools of herring of fine size and excellent quality visit the coasts of the island during the summer and fall months, but the men being then engaged in the other fisheries pay little attention to them and very few are taken.

LOBSTERS.

As the spring came in early, lobster fishing commenced at some points on the north side about the end of April, and before the middle of May fishing was general around the coast. The first taken were of good size and plentiful at most places, but after a month or six weeks fishing became scarce and small. Towards the last of June fish were very scarce on the north side, and a number of factories closed early in July; as it did not pay to keep running on the small quantity of material offering. On the south side fishing did not commence so early, as lobsters did not seem to come inshore until well on in May, fishing was, however, continued later, the factories not closing until the 15th July. The total pack shows a decrease of 73,368 lbs., as compared with the year 1894, but is well up to the average of the last five years.

MACKEREL.

In the fishery I have to report an unusually small catch, the total product in salted and canned fish showing a decrease in value of \$46,632 as compared with the previous year. This fishery has been declining for the last ten years, and shows no sign of improvement, last season being one of the worst on record. The fish taken were of excellent quality and commanded extremely high prices. The fortunate fishermen who succeeded in capturing a few barrels, made good wages at the high prices realized, but this

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was not sufficient to compensate for the general failure of the fishery. Those who were equipped with nets did fairly well, but hook and line fishing was a complete failure. As great preparations were made for this fishery, the failure is severely felt by a large number of fishermen who depended mainly upon it to obtain supplies for the winter. Mackerel fishing has become so uncertain of late, that men who make a business of fishing, will have to attend more to the other branches, thereby securing better remuneration for their labour.

COD.

Fishing for cod commenced early, but in the first part of the season fish were so scarce and small that many abandoned the industry. As the season advanced however cod were quite plentiful, and of good size, affording those who continued the fishery an opportunity of making a successful voyage. With few exceptions fishermen here do not follow cod fishing exclusively. In May last several schooners from ports on the north side, fitted for the cod fishery, and left for the fishing grounds with high hopes of success. The scarcity of fish, however, in the first of the season had a damaging effect, and after a short trial the most of them returned with small catches. During the months of August, September and October, quite a fleet of small vessels and large boats from Gloucester County, New Brunswick, resort to the fishing grounds off North Cape, Prince County, in quest of cod, and generally make very successful trips. One hundred sail and more of those craft, were fishing in that locality last season, and succeeded in taking large quantities of cod and hake.

HAKE.

Hake shows a falling in value of \$3,919 for the year. This fishery was not so vigorously prosecuted as in former years. Fish were plentiful, and bait abundant in season, but the men preferred to remain at the mackerel and cod fisheries.

OYSTERS.

Fishing for oysters, especially on the beds at Richmond Bay, in Prince County, did not prove as successful as in former years. The beds in the bays and rivers of Queen's County have on the contrary produced well, and the total output shows an increase of 1,408 barrels over the year 1894.

There can be no doubt but the depleted condition of the beds at Richmond Bay is due to over-fishing. It has been the practice in the past for boats to come from all parts of the province to prosecute the oyster fishery in this bay. During the open season, hundreds of boats could be seen in all parts of the bay, with their busy crews employed from early morning until late at night, fishing for oysters. This incessant raking could only have one effect, that of reducing the supply, and at present a number of what used to be the best beds, have become unproductive, and fishing upon them has ceased altogether. Fishing in the bay, during the season just closed, was therefore not prosecuted as vigorously as in the past. Many of the fishermen going to the rivers and estuaries where the beds were found to be more productive. It is yet too soon to speak as to the effect the late regulations will have upon the fishery, but the returning of the small oysters alive to the water and the prohibition of mud digging in the immediate vicinity of the beds, must have a beneficial influence. The department should also seriously consider as to whether this fishery has not reached so low a point as to render further shortening of the fishing season necessary. The protection and preservation of the oyster in our waters are matters of very great importance, not only because of the employment afforded by the industry, but also as a means of supplying the inhabitants of the inland towns and villages, with this most nutritious and succulent bivalve.

SMELTS.

The product of this fishery exhibits a slight decrease for the year. The industry was, however, actively prosecuted, and gave employment to a large number of men during the season. Smelts are taken in all the principal streams of the province, and the nets and plant employed, continue to increase each year.

TROUT.

Fishing for trout is not prosecuted as an industry in this province. The quantity appearing in the returns being mainly taken by sportsmen, who follow angling for the recreation afforded. Some years ago sea trout of fine size and excellent quality, abounded in the streams of this island. The cutting away of the forest thereby reducing the volume of water in the streams and changing its temperature, the cultivating of farms along the banks of rivers together with the general pollution of the streams incident to the opening up of the country, have had the effect of greatly reducing the supply. In many of the best rivers such as the Morrell, Winter and Dunk, trout are yet fairly plentiful in season, and those streams are still largely resorted to by the sporting fraternity.

SALMON.

This fishery shows a slight increase for the year. Clean salmon are not found in the streams of this province. Consequently there is no river fishery, the quantity appearing in the returns being taken by nets set in tidal water in the estuaries, or on the outside coast. During the spawning season, however, salmon frequent the principal streams to deposit their eggs. Last season there was an immense run of parent fish, and as the rivers are small and the water shallow on the spawning beds, they were found most difficult to protect. Owing to the persistent and repeated attempts at poaching on the Dunk River, it was found necessary to increase the staff of guardians there during the months of November and December. The presence of additional men on the river, had the effect of keeping the poachers in check, and they did not succeed to any extent in carrying out their nefarious work.

Overseer Patrick McBride who had special charge of the river reports as follows:—

“The salmon did not go up on the spawning beds as early as usual. They remained in the tideway until the water had become discoloured by rain. Then they ascended the stream in large numbers. The spawning beds are all dug, showing that a large quantity of spawn has been deposited in the river this season. The extra force of guardians patrolled the river night and day and succeeded in very successfully protecting it during the close season. I am pleased to report that I do not believe one salmon was taken out of the river this season, although the poachers were on the alert but afraid to venture out. I may here state that the guardians promptly attended to their duties and show a desire and willingness to enforce the regulations. The present mode of protecting the rivers proves satisfactory.”

MARKETS.

The product of the fisheries here, so far as I can ascertain, is disposed of as follows:

Herring all for home consumption either for bait or food.

Mackerel: 95 per cent sold in United States.

5 “ “ Canada.

Lobsters: 40 “ “ Europe.

40 “ “ United States.

20 “ “ Canada.

Cod: 50 “ for home consumption.

50 “ sold in Canada.

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Hake : 50 per cent for home consumption.
50 “ sold in Canada.
Haddock—All for home consumption.
Smelts : 90 per cent sold in United States.
10 “ for home consumption,
Oysters : 95 “ sold in Canada.
5 “ for home consumption.

The year 1895 while not a successful one in the fisheries here, cannot be called a failure. The different branches with the exception of mackerel are up to the average of other years. The mackerel capture, however, show a tremendous shortage which has not been compensated by an improvement in any of the other branches, and accounts largely for the falling off in the total value. All of which is respectfully submitted.

I have the honour to be, sir,

Your obedient servant,

EDWARD HACKETT,

Inspector of Fisheries.

Marine and Fisheries—Fisheries Branch.

RETURN showing the Kinds and Quantities of Fish and Fish Products in the Province of Prince Edward Island, for the Year 1895.

Number.	DISTRICTS.	KINDS OF FISH.										Number.		
		Salmon, fresh, in ice, lbs.	Salmon, preserved, in cans, lbs.	Herring, salted, brls.	Herring, fresh or frozen, lbs.	Mackerel, salted, brls.	Lobsters, preserved, in cans, lbs.	Cod, dried, cwt.	Cod tongues and sounds, brls.	Hake, dried, cwt.	Hake sounds, lbs.		Haddock, cwt.	
<i>King's County.</i>														
1	Souris.....			1500		600	47230	2000		2500				1
2	Bay Fortune.....			1150		17	32028	52		52				2
3	Dundas.....			3000		175	142944	100		50				3
4	Georgetown.....			200		20	30240							4
5	Murray Harbour, North.....			1000		186	139000	100		150				5
6	Murray Harbour, South.....			2050		100	167612	2000		2500				6
7	Morell and St. Peter's.....			540		140	92448	1100		50				7
8	Naufrage.....			1200	500	100	90480	200		75				8
9	North Lake.....			975		585	78000	975						9
10	East Lake.....			510		135	64800	340						10
	Totals.....	9050	500	12125	50	2058	835682	6867	2	5377	9237	610		
	Value.....	\$ 1810	\$ 75	\$ 54562		\$ 28812	\$ 106281	\$ 30901	\$ 20	\$ 16131	\$ 4628	\$ 2135		

RETURN showing the Kinds and Quantities of Fish and Fish Products in the Province of Prince Edward Island, &c.—Continued

Number.	Districts.	KINDS OF FISH.							FISH PRODUCTS.			TOTAL VALUE.	Number.		
		Trout, lbs.	Halibut, lbs.	Smelts, lbs.	Alewives, brs.	Clams, brs.	Refs, brs.	Squid, brs.	Fish oils, galls.	Fish used as bait, brs.	Fish guano, tons.				
<i>King's County.</i>															
1	Souris.	500													
2	Bay Fortune.	1000		3880		175	10					1800	1500	75	44,591 10
3	Dundas.					75	20					120	1000	50	12,451 36
4	Georgetown.	100				100	40					225	3000	250	30,413 28
5	Murray Harbour, North.			1000		25	90					150	2500		3,884 30 4
6	Murray Harbour, South.			7000			50					2250	1800	50	29,044 00
7	Morell and St. Peter's	7500	1000	3000	250	10	50	5				800	400	50	55,228 44
8	Naufrage.	600		300								50	1100		26,148 76
9	North Lake.	1500	1000									600	600	50	20,927 60
10	East Lake.						2					170			28,865 00
	Totals	17200	5000	15180	250	3-5	212	5	6165	11250	525	276,874 84			
	Value.	1720	500	759	1000	1155	1272	20	2466	16875	5250				

Marine and Fisheries—Fisheries Branch.

RETURN showing the Number, Tonnage and Value of Vessels and Boats, and the Quantity and Value of all Fishing Material, &c.—
Prince Edward Island—Continued.

Number.	DISTRICTS.										FISHING MATERIAL.										KINDS OF FISH.								
	FISHING VESSELS AND BOATS.					Seines.					Gill-Nets.					Smelt-Nets.					Herring.		Mackerel.		Lobsters.				
	Number.	Tonnage.	Value.	Men.	Boats.	Number.	Fathoms.	Value.	Number.	Fathoms.	Value.	Number.	Fathoms.	Value.	Number.	Fathoms.	Value.	Number.	Fathoms.	Value.	Salted, brls.	Fresh or preserved, lbs.	Salted, brls.	Fresh or preserved, in cans, lbs.	Preserved, in cans, lbs.	Alive or fresh, tons.	Number.		
<i>Queen's County.</i>																													
1	52	1000	7	35	1750	97	4300	960	3	1000	600	25	650	20	500	922	12000	164	5000	85000	1	1	1	1	1	1	1	1	
2	1	1400	70	21	1400	70	2840	800	4	750	700	7	230	7	140	500	4000	250	300	81600	2	2	2	2	2	2	2	2	
3	10	2000	12	33	4180	48	1	150	3	200	150	3	75	12	180	200	2000	10	300	87392	3	3	3	3	3	3	3	3	
4	15	350	5	62	5200	190	1500	500	6	1800	900	4	80	3	45	2000	2000	5	5	125856	4	4	4	4	4	4	4	4	
5	1	15	350	5	62	5200	1500	500	6	1800	900	4	80	3	45	2000	2000	5	5	125856	5	5	5	5	5	5	5	5	
6	1	15	350	5	62	5200	1500	500	6	1800	900	4	80	3	45	2000	2000	5	5	125856	6	6	6	6	6	6	6	6	
7	8	200	14	8	200	14	200	40	9	150	80	9	150	80	80	80	80	80	80	210648	7	7	7	7	7	7	7	7	
8	80	1600	96	80	1600	96	80	1600	96	80	1600	96	80	1600	96	80	1600	96	80	1600	46704	8	8	8	8	8	8	8	8
9	27	230	46	27	230	46	27	230	46	27	230	46	27	230	46	27	230	46	27	230	46704	9	9	9	9	9	9	9	9
10	30	300	60	30	300	60	30	300	60	30	300	60	30	300	60	30	300	60	30	300	46704	10	10	10	10	10	10	10	10
Totals.	2	67	1350	12	297	15060	633	9340	14	3750	2350	44	1185	42	865	4002	18000	1079	5300	712704	1	1	1	1	1	1	1	1	
Values.																					15106	636	85524	75	75	75	75	75	

RETURN showing the Number, Tonnage and Value of Vessels and Boats, and the Quantity and Value of all Fishing Materials, &c.—
Prince Edward Island—Continued.

Number.	Districts.	KINDS OF FISH.														FISH PRODUCTS.			TOTAL VALUE.	Number.			
		Mackerel, preserved in cans, lbs.	Lobsters, preserved in cans, lbs.	Cod, dried, cwt.	Hake, dried, cwt.	Hake, Sounds, lbs.	Haddock, lbs.	Trout, lbs.	Hallibut, lbs.	Smelts, lbs.	Alewaves, brls.	Oysters, brls.	Clams, brls.	Eels, brls.	Shad, brls.	Flounders, lbs.	Tom cod or trout fish, lbs.	Fish oils, galls.			Fish used as bait, brls.	Fish guano, tons.	
<i>Prince County.</i>																							
1	T.ignish	1920	287232	1850	600	4000	200	1200	800	6100				10	87500			1000	2000			89,176	84
2	A.lberton		102144	1340	150		10	800		42000								600	1200			37,986	28
3	Narrows and Lot 11.		75080	120	35	500	5	300		12000				40		1000		120	800			23,449	10
4	Grand River.		35240	110				500		13000				40				65	100			27,695	80
5	Malbeque.		85440	1900	1000			300		47575				50				300	100			23,855	55
6	Tryon.		128186	1000				1000		15000				20					1600			21,692	32
7	Sunnernside and Richmond Bay		21160					450		10000												39,711	20
8	Carleton		66384																			10,261	08
9	Egmont Bay		304368	140				1800		17050				10		2500			800			88,314	16
10	Brae and West Point.		45360	400	200			1000		2000				3				300	1800			28,510	70
11	Miminegash		146016	683	213	600	20	1200	1000									500	2900	300		40,359	92
12	Nail Pond		204720					12800		70000				60								70,951	62
13	Bays and Rivers																					6,970	00
	Totals	32256	1501330	6543	1198	6100	235	21550	1800	234725	42	16999	53	233	87500	3500		2885	11200	400		490,844	57
	Values.	3870	180159	29443	3594	3050	822	2155	180	11736	168	67966	159	1398	80	375	175	1154	16800	4000		490,844	57

RECAPITULATION

SHOWING Yield and Value of the different Fisheries in the Province of Prince Edward Island, during the Year 1895.

Kinds of Fish.	Quantity.	Price.		Value.	
		cts.	\$	cts.	\$
Salmon, fresh, in ice Lbs.	10,850	0 20		2,170 00	
do preserved, in cans "	500	0 15		75 00	
Herring, salted Brls.	41,147	4 50		186,161 50	
do fresh or frozen Lbs.	19,050	0 01		190 50	
Mackerel, salted Brls.	6,749	14 00		94,486 00	
do preserved, in cans Lbs.	37,556	0 12		4,506 72	
Lobsters, preserved, in cans "	3,099,716	0 12		371,965 92	
do alive or fresh Tons.	1	75 00		75 00	
Cod, dried Cwt.	17,226	4 50		77,517 00	
do tongues and sounds Brls.	3	10 00		30 00	
Hake, dried Cwt.	6,660	3 00		19,980 00	
do sounds Lbs.	15,412	0 50		7,706 00	
Haddock, dried Cwt.	1,150	3 50		4,025 00	
Trout Lbs.	49,100	0 10		4,910 00	
Halibut "	7,700	0 10		770 00	
Smelts "	567,820	0 05		28,391 00	
Alewives, salted Brls.	720	4 00		2,808 00	
Oysters "	25,463	4 00		101,852 00	
Clams "	582	3 00		1,746 00	
Eels "	740	6 00		4,440 00	
Shad "	8	10 00		80 00	
Squid "	8	4 00		32 00	
Flounders Lbs.	7,500	0 05		375 00	
Tom cod "	6,050	0 05		302 50	
Fish oil Galls.	10,360	0 40		4,144 00	
Fish used as bait Brls.	26,480	1 50		39,720 00	
Fish used as manure "	25	0 50		12 50	
Fish guano Tons.	1,935	10 00		19,350 00	
Seal skins No.	15	1 00		15 00	
Total for 1895				976,836 64	
do 1894				1,119,738 07	
Decrease				112,901 33	

Marine and Fisheries—Fisheries Branch.

RECAPITULATION

SHOWING the Number and Value of Vessels, Boats, Nets, Lobster Canneries, Traps, &c., engaged in the Fisheries of the Province of **Prince Edward Island**, season 1895.

Number.	Article.	Value.	Total Value.
		\$	\$
25	Vessels, 771 tons.	14,050	
1,522	Boats.	57,080	
	Gill nets, 75,363 fathoms.	23,830	
4	Trap nets.	2,200	
39	Seines, 10,420 fathoms.	12,650	
135	Smelt nets.	3,461	
420	Trawls.	4,975	
228,725	Lobster traps.	135,703	118,246
193	Canneries.	186,135	
			321,838
80	Ice houses.	2,870	
54	Smoke and fish houses.	7,700	
43	Piers and wharfs.	22,585	
2	Steamers and smacks.	6,400	39,555
	Total value.		479,639

STATEMENT of the Lobster Plant, &c., in **Prince Edward Island**, for the season of 1895.

COUNTIES.	LOBSTER PLANT.				Number of hands employed.	OTHER FIXTURES USED IN FISHING.							
	Traps.		Canneries.			Freezers and Ice houses.		Smoke and Fish houses.		Piers and Wharfs.		Steamers and Smacks.	
	No.	Value.	No.	Value.		No.	Value.	No.	Value.	No.	Value.	No.	Value.
		\$		\$			\$		\$		\$		\$
King's.	55685	39430	46	52135	965	78	2770			18	14750	2	6400
Queen's.	55880	34593	49	42600	1127	2	100	14	600	16	2635		
Prince.	117160	61680	98	91400	1278			40	7100	9	5200		
Totals.	228725	135703	193	186135	3370	80	2870	54	7700	43	22585	2	6400

APPENDIX No. 6.

Q U E B E C .

REPORT ON THE GULF OF ST. LAWRENCE FISHERIES FOR THE YEAR
1895, BY COMMANDER WM. WAKEHAM, INCLUDING SYNOPSIS OF
THE LOCAL OVERSEERS' REPORTS.

GASPÉ BASIN, 2nd January, 1896.

To the Honourable
The Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit my report on the fisheries of the Gulf Division, province of Quebec, together with synopsis of the reports of the local officers, and the statistics of the division.

These returns show a considerable falling off in the yield of the main branches of the fishery. As the season advanced, it was generally held by the managers of the leading houses interested in the fisheries, that there would, at the end of the year, as compared with the previous one, show a diminution of about one-third. The completed statistics show that their estimate of the conditions was a close one. In 1894 we had a total value of \$1,971,199.77, the year now closed gives us a yield valued at \$1,518,829.43, showing a decrease of \$452,370.34.

O O D.

The season opened early, but the weather all through the summer fishery, which closes according to an old custom on the 15th of August, was too rough to permit of steady and regular fishing. Over the whole of the southern coasts of the division, it was noted that there did not appear to be the usual volume of codfish on the grounds, this did not appear to be due to any absence of bait, as herring and squid were always fairly abundant. My own opinion is that from some cause, most likely a plentiful supply of food, the great body of cod which usually moves into the southern gulf in May, never came in, but remained on the outer or grand banks; that this would seem to have been the case is, to some extent, borne out by the fact that fish were more than usually abundant on the outer banks, where some unusually heavy catches were made. Coupled with this decided scarcity of the cod we had an unusually rough, stormy summer, no decidedly heavy gales, but constant rough, stormy weather, with strong easterly winds, enough to keep the boats on shore for a week at a time. Towards the fall the volume of fish inshore seemed, as usual, to increase, and in some places where shelter was had, the fishing was good, but over the greater part of the coast, practically nothing was done after the 20th September. On the upper north shore, the fishery, while not being up to an average, was a long way from being a failure, and on the lower north coast below Natashquan, generally known as the Inner or Canadian Labrador, the fishery was one of the best of recent years; both the shore fishermen and the vessels from Nova Scotia and Newfoundland, all doing remarkably well. To the Newfoundland fishermen, after the catastrophe of last winter, the abundant fishery, made as it is on such a sheltered coast as our Labrador, where the outfit required is not an expensive one, was little short of a Godsend.

Marine and Fisheries—Fisheries Branch.

SALMON.

This fishery shows a decrease of about 190,000 lbs., which I consider wholly due to the condition of the weather in June; from all sides we had complaints of nets being driven on shore, and fishing stations being abandoned, either from absolute loss of gear, or the impossibility of resetting the sedentary nets once they had been carried away, as the bulk of our nets are not set in the more or less sheltered estuaries, but on the open sea coast, it will easily be understood how the fishing would be hampered by rough weather during the best of the run. Most of these nets are not set in deep water, 12 or 14 feet being as a rule the limit of depth at the outer end of a salmon net, it therefore follows that in heavy weather the salmon pass along shore beyond the nets, where the water is not disturbed to the bottom. Fly fishing in the rivers was good, the late sportsmen getting the best of it, as the water, which was low at the opening of the season, rose with the rains in June and July. Reports from the private guardians are uniformly that in October the pools were more than usually full of breeding fish.

HERRING.

The herring fishery shows an increase in the catch of some 3,000 brls. Spring herring was as abundant as ever, at the Magdalen Islands many thousands of barrels being taken early in May by vessels, for which our statistics get no credit. These herrings are taken either for the purpose of being smoked, or to be used as bait by cod, haddock or lobster fishermen from Prince Edward Island, Nova Scotia or the United States. Fall herring were not taken so abundantly, they did not seem to come inshore, and as the weather was too rough to risk nets out, or even to get them out, but little fishing was done.

LOBSTERS.

Lobsters show a slight falling off in the pack, the exact figures being for 1894,—1,168,998 lb. cans and in 1895, 1,002,492 lb. cans or a decrease of 166,506 lbs. This diminution may have been caused to some extent by the rough weather in June, but it exists in spite of the fact that more canneries were in operation, and more traps were fished. The fishery begun early, and the first reports from the canneries were that lobsters were abundant, and of a fair run, but they dropped away all at once, and many canneries were closed down before the season was half over, and before the rough weather could have anything to do with lessening the catch, we have long been overdoing the lobster fishing, the figures of the pack keep up, but it is because of the greatly increased amount of gear being used. There is an evident tendency to establish canneries on the north side of the gulf. This, by those who see that profitable fishing on the old grounds must soon come to an end. It should be remembered by those who are moving north that the northern limit of the lobster is at the Straits of Belle Isle, and that long before the actual limit has been reached the fish have been getting scarcer. Lobsters are found in fair quantities, but not by any means as abundantly as they were formerly on the south coast, all along the north shore from Point des Monts to Cape Whittle, at this latter point the coast trends off to the north, and the fish at once begin to diminish in number.

MACKEREL.

The catch of mackerel shows a decrease of some 1,300 barrels. These fish were abundant about the Magdalen Islands, and the bulk of the mackerel taken by the United States mackerel fishermen, who fished in the gulf, whether with seines, gill-nets or hook and line, was taken about the Magdalen Islands. The resident fishermen of the Magdalen Islands complain that their fishery, which is made inshore with hook and line, is being ruined by the practice of fishing with gill nets, as carried on by vessels from Nova Scotia and the United States. These vessels fish immense fleets of gill-nets, which are kept in the water day and night, and thus wall off the fish from the bays, and

inshore grounds generally Except at and about the Magdalen Islands large mackerel were nowhere else taken in the division. An unusual abundance of small mackerel were seen during the months of August, September and October all over the gulf. These young fish were first noticed in August, they were then about five inches in length. They literally swarmed all over the gulf, and were taken in the peches as far up the St. Lawrence as Rimouski. If, as is universally held, it is the case that fish always return to the waters where they were hatched out, then we may expect in a year or two to have the mackerel back again in the gulf in their former abundance.

SEALS.

The seal hunt on the ice in March and April was a failure. The number of vessels engaging in this fishery is gradually decreasing; the schooners that engage in it require to be constructed for the purpose, and as the price of the oil has greatly fallen off, the business does not warrant the construction of such specially strengthened vessels.

BAIT.

The supply of bait fish herring and squid on the south coast, and herring, capelin and launce on the north coast was normal. Where clams are plenty these are at all times largely used fresh. Small mackerel being had in abundance, were also largely used.

SYNOPSIS OF REPORTS OF LOCAL OVERSEERS.

BONAVENTURE COUNTY.

Restigouche Subdivision.

Overseer Verge reports a small catch of salmon, the actual decrease being about 24,000 lbs., as compared with the previous season. This was due to the very low state of the water, which kept the salmon in the channels, so that they escaped the nets, that a large run of salmon escaped the nets, and passed into the river is proved by the good catches made by the anglers, and the abundance of breeding fish seen in the main Restigouche and its tributaries, in the fall. The head guardian on the Restigouche, from the mouth of the Kedgewick to the uppermost reaches of the river, reports a steady increasing stock of parent fish, showing that the protection of the river, and the close observance of the regulations is producing its natural effect. Smelt fishing with bag-nets in the estuary has been good. Had the ice not moved out after the first cold snap, the fishing would have been better, as it was, about ten days' fishing was lost during the best of the run. The spring run of smelts was uncommonly large, showing that it had not been affected by the winter fishing.

The various fishery regulations have been closely observed.

CARLETON SUBDIVISION.

Overseer Dagneau reports a falling off of 27,000 lbs. in the salmon catch. This decrease he attributes to the prevalence of high winds during the fishing season, which carried away many of the salmon nets, and also kept the fish off shore in deep water. The cod fishery failed entirely in this subdivision; that is to say, in the upper part of the Baie des Chaleurs. Cod were never abundant, and in the fall when they usually come into shoal water, it was always too rough for fishing. Herring were about as usual. Lobsters show no increase, only one small cannery is now operated in this subdivision. The various regulations were strictly observed.

Marine and Fisheries—Fisheries Branch.

BONAVENTURE SUBDIVISION.

Overseer Smith reports a failure in the salmon and cod fisheries. In the case of the salmon, this was no doubt due to the continuance of rough weather during the time of the fishing. Fish kept off shore along the coast, and as soon as they struck the estuaries, kept to the channels, as the rivers were low. The failure in the cod fishing, Mr. Smith attributes to the scarcity of small herring, and the unusually rough fall. Lobsters show about the same return as last year, but no extensive fishing is now carried on for them in this subdivision. All the fishing regulations were carefully observed.

PORT DANIEL SUBDIVISION.

Overseer Ross reports a falling off of about 10,000 lbs. in the salmon-net fishing. This is generally attributed by the fishermen to the condition of the weather, as the decrease was greatest in exposed situations. Lobsters also failed, the returns showing only 52,000 lbs. as compared with 92,300 lbs. in 1894. There can be no doubt that lobster canning has been overdone in the past. The cod fishery also shows a decrease of about 3,000 cwt. Cod did not strike into the Bay Chaleur in their usual abundance. The herring fishing shows an increased catch, but the smelt failed to the extent of about 15,000 lbs. On the whole the fisheries of this subdivision show a falling off of about one-third in value. With the exception of the lobster fishery, this decrease is entirely due to natural causes. The regulations were all well observed.

COUNTY OF GASPÉ, GRAND RIVER SUBDIVISION.

Overseer Jones reports a falling off in every branch of the fishery except that for smelts. The lobster fishing which is the first to begin, shows a decrease of about 30,000 lbs. This is in part due to the stoppage of trawling, but there can be no concealment of the fact that lobsters are failing. The catch of salmon also shows a decrease. This was small, only about 5,000 lbs., and is entirely due to the unfavourable condition of the weather, up to the 1st October, but from that date to the close of the season, about the 15th November, they were very abundant, and heavy catches were made whenever the weather was fine enough to let the boats go out, on the whole, the season has been a poor one.

MOUNT LOUIS SUBDIVISION.

Overseer Lemieux reports that the cod fishing has been much below an average in his subdivision, especially in the upper part of the river. This failure in the cod was not due this season to the ravages of the white whales, as fewer were seen than usual. The herring fishery was constant and good, so that bait was abundant. The salmon fishery was about an average. The regulations were strictly observed.

STE. ANNE DES MONTS SUBDIVISION.

Overseer Sasseville reports that, though more boats were engaged in the cod fishery this season than usual, the catch was a very small one. The fishermen give two reasons for this: 1st, that the fish were scarce, and, 2nd, that the white whales drove them away. Herring were abundant. The salmon net-fishing was poor, as most of the nets were carried away by heavy weather. Fly-fishing in the Ste. Anne's River was good, 119 fish of an average of 20 lbs. being taken. Capelin and mackerel failed entirely. No violation of the regulations were reported. There is no over-netting, and the rivers were full of fish during the fall. The cod fishing shows a loss of a little more than 20,000 cwt. or about one-third of an average catch, the fish were scarce both inshore and on the banks usually fished by the boats from this part of the coast, showing that the usual volume of fish did not visit the south-western part of the gulf. Fish were slightly more abundant in the fall, but continuous stormy weather prevented anything from being done. Spring and fall herring were also a failure.

GASPÉ SUBDIVISION.

Overseer Annett reports a falling off in the salmon fishery of 19,542 lbs., also in the herring catch of 396 barrels. Cod did not strike until quite late, and continued scarce during the summer fishery; the fall fishery was good, but the prevalence of rough weather made it impossible to make up the loss in the fore part of the season, which has caused a decrease of 9,275 cwt. in the catch as compared with 1894. There was an increase of 4,580 lbs. in the lobster catch, and of 54,297 lbs. in the smelt fishery. All the fishery regulations were well observed.

FOX RIVER SUBDIVISION.

Overseer Theriault reports that herring were fairly abundant from May to November. Cod were scarce.

MAGDALEN ISLANDS SUBDIVISION.

Overseer Chevrier reports a considerable decrease in the fisheries carried on at the islands, the cod fishery especially being an almost entire failure. The seal hunt at the ice was below the average of recent years. Herring fishing in May was very abundant, many thousands of barrels being taken by vessels from Nova Scotia and the United States. The mackerel net-fishing carried on in June was not as good as usual; fishermen attribute this falling off to the immense quantity of gill-netting set by vessels around the islands, and especially off Pheasant Bay, which almost entirely walls off this fish from the shore fishermen. They also complain that the practice of dressing the fish off shore, as is done on board these vessels, is an injurious one. The summer and fall mackerel fishery, done with hook and line, is also below an average. Our local fishermen attribute this falling off, as well as that of the spring mackerel fishing, to the same cause, viz., the setting of immense fleets of gill-nets, which are kept in the water day and night, and which undoubtedly do prevent the fish from coming into the bay, where they were formerly taken by the shore fishermen. The fishermen of the Magdalen Islands are urgent in their demand that something be done to lessen the injury caused to them by foreign fishermen, who completely encircle the islands with their gill-nets. The lobster fishery opened well, but long before the close of the season many canners were forced to close down owing to scarcity of fish. The pack shows a slight falling off as compared with the previous season. No lobsters were packed out of season this year. This was due to the appointment of the extra guardians at Grand Entry Lagoon.

COUNTY OF SAGUENAY.

MOISIE SUBDIVISION.

Overseer Migneault reports salmon fishing began on the 20th of May, and closed on the 10th July. There was a decrease of 69,000 lbs. in the catch, this was solely due to the roughness of the weather, which prevented the nets, most of which are in more or less exposed situations, from being regularly fished. The water in the rivers kept high, and the fish ran right up, which led to the early closing of the net-fishery. Fly-fishing in the Moisie was good, 200 fish of a large average being taken by the rods. The cod fishery shows a falling off of 2,716 cwt. This was due to the prevalence of easterly winds, which often prevented the boats from getting out for eight or ten days at a spell, this during the ordinary fine weather season in summer. This rough weather also kept the capelin, which is the summer bait, off shore; fortunately the fall was finer, and fish being abundant the boats did well, but the time was too short to quite make up for the summer failure. Herring were plenty in the spring but scarce in the fall. Halibut shows a slight increase. No large mackerel were taken, but there was an abundance of small mackerel seen in August. No abuse of the regulations has to be reported for this subdivision.

Marine and Fisheries—Fisheries Branch.

MINGAN SUBDIVISION.

Overseer DuBerger reports the cod fishery as being far from satisfactory this year, there being a decrease of 18,420 cwt. as compared with last season. He attributes this to a continuance of unfavourable weather during the summer, at which time the most of the fishing is done in his division. The salmon fishery also shows a heavy falling off, due exactly to the same cause, unfavourable weather for fishing. The seal fishery made in the spring, also shows a great decrease, only 800 seals having been killed by the fleet from Esquimaux Point this last spring, as against 5,192 in 1894. Only two of the vessels did anything. The rest got jammed in the ice, and never got near the seals.

NATASHQUAN SUBDIVISION.

Overseer Gaudin reports the spring seal hunt as being very poor, the five vessels from Natashquan taking only 113 seals, as compared with 700 for three vessels last year. This decrease is not due to any scarcity of seals, as the crews reported seeing lots of them, which they were never able to get near. There has been an increase in the catch of salmon in Natashquan Bay and River, but at Agwanus and Nabisippi, the nets did badly. The summer school of cod was very small, although they struck earlier than usual, about the 25th of May. The best boat this season, during the summer fishing, only took 60 cwt., whereas, three years ago, the best boat during the same time, took 450 cwt. A few boats did fairly well on the off shore banks during the fall, when the weather permitted of their going out. Many people would have been badly off, owing to the failure of the cod and seal fishery, had it not been that the herring struck in abundantly in September. Three of the local schooners were loaded and despatched to Quebec, and the balance of the herring catch being disposed of to traders, a sufficiency of supplies was obtained to make all safe for the winter. Sixty cases of lobsters were put up in the small cannery at Watsheeshoo. The fishery regulations were all well observed.

BONNE ESPERANCE SUBDIVISION.

Overseer Whitely reports that the salmon failed again this season. He is forced to the conclusion from the experience of the last three seasons, in each of which the salmon have missed; that they have either failed to come in from sea or gone elsewhere. In his experience of many years on the Labrador the same thing has occurred, and after several years of scarcity, the fish have returned as abundantly as ever. The cod fishery was most abundant all over this subdivision. The weather was moderate and bait plentiful. The price was low, however, and next to no profit was left for supplies. The seal fishery was a poor one, but was better than last year. This industry depends entirely on the state of the Gulf ice. When the ice lingers in the Gulf until June, the seal fishing is good, but when, as this season, the ice passes out through the Straits of Belle Isle in April, or only in May, the seals go also, and do not return. The residents on the Labrador are all well supplied for the coming winter. A large fleet from Nova Scotia and Newfoundland carried on the fishing from the harbours of this division. They fished mostly with cod trap-nets, and seines, and all did well.

I have the honour to be, sir,
Your obedient servant,

WM. WAKEHAM,
Officer in charge of the Fisheries in the Gulf Division.

SYNOPSIS OF FISHERY OFFICERS' REPORTS IN THE PROVINCE OF QUEBEC (EXCLUSIVE OF THE GULF DIVISION), FOR 1895.

SOUTH SHORE, RIVER ST. LAWRENCE, FROM CAPE CHATTE TO POINT LÉVIS.

Overseer Johnny Joncas reports quite a falling off in the take of salmon, especially by the set nets of the St. Lawrence River, one of which did not capture a single salmon. Angling in Matane River was better than last year. More salmon ascended to the upper waters than ever. One day, as this officer was at the foot of Mr. Price's dam, he noticed that salmon vainly attempted to ascend the fish slide. On close examination he found it gutted with pieces of timber, which he had removed, and eight days after, all the salmon had ascended. Attempts at spearing were made in the upper waters, but he could not secure sufficient evidence to convict any of the culprits. Fascine fishery was a failure, neither herring nor sardines were taken therein. However, sufficient herring of good quality, to supply the whole county, were taken with gill-nets. About 10,000 lbs. of smelts and frost fish were caught with hook and line at the mouth of Matane River. A single fisherman sold sixty dollars worth of these small fish during August and September. The appearance of small mackerel three or four inches in length in that part of the St. Lawrence River was an event unheard of before. They were too small to gill in herring-nets, but some were taken in brush weirs. The fishery laws were fairly well observed. A single conviction, that of spearing two salmon, was made. The total value of the fisheries amounts to \$11,740, being a decrease of nearly 50 per cent as compared with last year.

Overseer L. E. Grondin states that salmon and sardines were scarce on the south side of the St. Lawrence, owing perhaps to the absence of east winds this season. Good capture of herring were made when it first struck in. He experienced some trouble to enforce the Sunday regulation. To prove its efficiency, this officer saw on a Sunday as much as a hundred and fifty barrels of herring in one weir escaping by the opening, to the great sorrow of the owner. No infraction of the fishing laws came under his notice. The fisheries catch in this district is valued at \$35,470.

Overseer H. Martin says that with the exception of sardines, which were scarce, the other kinds of fish gave about an average yield. He corroborates the statements of the appearance of young mackerel, but none were taken, as it was considered a loss. He has no infraction of the regulations to report. The total value of this catch is \$24,000.

Overseer Nap. Levesque reports a slight decrease in the general yield of fish in his district. The first run of herring was good, but of short duration, otherwise much more could have been utilized. About a third of the catch is used at home and the balance sold in Canadian markets. The close seasons as well as the modes of catching fish were duly respected. He estimates the yield at \$13,000, about the same as last year.

Overseer Xavier Pelletier reports an improvement in the yield of shad, herring and sardines, especially at St. André, Kamouraska, and St. Denis. The sardine factory at St. André packed 67,000 boxes of sardines during the season. A falling off is noticed in all other kinds of fish, attributed especially in case of eels, to the dry weather greatly lowering the waters of the inland streams. Only five belugas (white whales) were captured. About one-quarter of the catch is shipped to Canadian markets, the remainder being consumed at home. No violations of the law came to his notice excepting a case of saw-dust being allowed to escape in the stream, but the owner desisted without legal proceedings. The whole catch amounts to \$30,000.

Overseer Octave V. Beaubien reports an increased yield in every kind of fish in his division. Eels, which are the staple fish there, yielded over a quarter of a million pounds, being an excess over the preceding catch. Bass and sturgeon also show signs of improvement; even shad, which for the past few years seemed to have abandoned these coasts, were taken in fair quantities, about 30,000 lbs. of the latter were caught at Lévis and Beaumont alone. The entire catch valued at \$25,800 is disposed of on the Quebec City markets. The various close times were well observed.

Marine and Fisheries—Fisheries Branch.

NORTH SHORE, RIVER ST. LAWRENCE FROM QUEBEC TO BERSIMIS.

Overseer L. P. Huot states that the last fishing season was satisfactory; while the catch of shad and eels is double that of last year, salmon show an increase of two thirds. Bar fish and bass both show a considerable decline, sturgeon about the same as last year. He reports no violation of the fishery regulations. The whole catch valued at nearly \$20,000 is disposed of on the local market of Quebec City.

Overseer Ulysse Bhereur reports a slightly increased catch of fish over last year. A fair quantity of trout was captured in the inland waters. Ten belugas (or white whales) were captured at Les Eboulements. The total yield is valued at \$10,700.

Overseer L. N. Catellier reports a falling off in the yield of salmon, attributed to the strong gales, which destroyed or damaged nearly all nets on three different occasions, thereby causing great loss of time, money and fish. However, the net fishermen's loss was a gain to the salmon streams, which are reported to be teeming with parent fish. All salmon taken in the vicinity are sold on the Quebec and Montreal markets. Owing to low water in the rivers, angling was slightly inferior to that of the year before. There is a great demand for salmon fry to be planted in these streams. The Sunday close time has been well observed, as the salmon fishermen are very particular on this point. The brush weirs are generally set for home consumption. The quantity of small fish taken is about the same as usual. One hundred and ninety belugas, (or white whales), were captured in this division, being more than twice the number secured last season. The whole catch is reckoned at nearly \$27,000, about the same as last year.

INLAND DISTRICTS.

SHERBROOKE AND MEGANTIC DIVISION.

Overseer Allan McLeod reports a marked increase in the fisheries of Lake Megantic and vicinity, which he ascribes to efficient protection of the spawning beds during the close seasons, and to the fry planted therein some time ago. If proper supervision is kept, before many years these waters will become as well stocked as they were a quarter of a century ago. Sportsmen and tourists are getting more numerous every season. The steamer "Lena" did quite a business during the past summer carrying these pleasure seekers to and from the fishing grounds. There is still a tendency to poach by settlers and strangers purporting to hunt, but in reality to capture fish by illegal means, if possible. The dam on Spider River has been kept open nearly all summer. A fish pass is needed on the Chaudière River. The great number of logs floating about these waters is a drawback to fish life.

Overseer P. C. Bourke reports about an average catch, especially of trout and pickerel in the waters of Megantic County, but offers no remarks.

MAGOG AND BROME DIVISION.

Overseers N. A. Beach, for the Lake Memphremagog and *S. U. Courtney*, for Brome Lake, gave returns of about the usual take of fish in the waters under their charge, but made no report. The yield of fish for this district is estimated at \$8,260.

MISSISQUOI BAY.

Overseer P. E. Luke states that with the exception of one hoop-net to catch coarse fish, all fishing there is done with hook and line. The catch is therefore limited, and all used for domestic consumption. The close seasons were fairly observed, but attempts of illegal fishing were made at night. This officer seized two seines and a boat, but did not succeed in discovering the owners. There are no fish-ways in his district.

RICHELIEU RIVER.

Overseer James Finlay reports a larger catch of eels than that of the previous year. These fish are exported to the United States. The other kinds of fish yielded less than

usual. He seized and destroyed 17 hoop-nets in Rivers Du Sud and Richelieu which were illegally set. Some of the culprits went to jail, others escaped across the boundary line. No saw-dust was thrown in the streams this summer.

Overseer J. O. Dion states that notwithstanding the low water in the Richelieu River, the yield of fish exceeds the previous one, with the exception of eels, which were not captured in as large numbers as last year. However, one weir is reported to have taken 1,500 eels in a single night. The seine fishermen did not do so well as the others and stopped early, thereby allowing more fish to spawn. The fry were noticed in abundance at the mouths of small streams. Catfish are plentiful, and over 20,000 lbs. were taken. It is regrettable that the poor people do not make a provision of these fish by pickling them for winter use. It is stated that their bones disappear and they become firm and quite palatable. Perch is also becoming plentiful in these waters. The dam at St. Ours is still unprovided with a fish-pass. No official complaints reached this officer. He also gave attention to the supervision of the Little Montreal River and River des Hurons. The proceedings against one Taupier had good effect, as fishermen came early for their licenses.

CHATEAUGUAY AND LAPRAIRIE DIVISION.

Overseer A. Matte reports an increased catch of fish in his division. No poaching nor any violation to the close seasons came to his notice. The only fish-way in his district needs repairs, and a new one should be built in another dam. He is of opinion that seining should not be allowed in small streams. The whole catch amounts to \$16,000.

BEAUHARNOIS DIVISION.

Overseer John Kelly says owing to the low water and continued use of seines and gill-nets, the fish are steadily decreasing. The seine should be stopped as it not only destroys large numbers of young fish but even spawn. The close seasons were well observed. Fish-ways were kept in order and saw-mill owners complied with the regulations.

MONTREAL AND CHAMBLY DIVISION.

Overseer John Morris also attributes to the low waters the slight shortage of fish in the vicinity of the Canadian metropolis. He claims that the fishery laws were respected by the fishermen under his charge, but cannot say the same of these of Sorel and Berthier divisions, who ship to Montreal markets young fish unfit for food, which are thrown away with other debris. He weighed some of these and it took a dozen to the pound. He thinks this waste of immature fish could and should be stopped. He favours the prohibition of soft fish during July and August, as they turn bad in hot weather before they can be disposed of.

VERCHERES AND L'ASSOMPTION DIVISION.

Overseer Gédéon Magnan reports an increased yield, especially eels and coarse fish, but makes no remarks.

RICHELIEU COUNTY, INCLUDING ST. FRANÇOIS RIVER.

Overseers N. Lavallée and J. F. Picotin report a slight falling off in the fishery yield of last season. The latter, however, remarks that more pickerel and bass were taken in the St. Francis River than during the previous year. Abuses against the regulations are becoming scarcer. A few attempts to angle during the close season are the only violations he heard of. No fines were imposed. There are a few mill-dams which he would like to see provided with fish-ladders.

Marine and Fisheries—Fisheries Branch.

YAMASKA COUNTY AND RIVER.

Overseers Denis Shoener and J. Charbonneau make returns of a poor catch, nearly 50 per cent under that of last year, but ascribe no cause for this decline. *Mr. Charbonneau* reports the two fish passes on the Yamaska River in good order, but there are still two important dams unprovided with fish-ways on that stream.

NICOLET DIVISION.

Overseer Geo. Boisvert reports a slight improvement in the fisheries of his division. Shad was more abundant than last year. Part of the fish taken is shipped to Montreal and the balance used for local consumption. He recommends that set lines or nets should bear the number of their license on a visible float or post to enable the officers to detect the unlicensed ones and seize them. Last January he destroyed several nets fishing under the ice without license, which had a good effect. The fish-pass in Bécancour River was kept in good order.

THREE RIVERS DIVISION.

Overseer Chas. Vadeboncœur says that owing to the works going on in the St. Maurice River and to the excessive past fishing below Quebec, the fisheries of his district are on the decline. The most important item now is tom-cod or frostfish, of which he reports 2,000 barrels. The more stringent the regulations, the less trout are taken in the upper waters.

TERREBONNE DIVISION.

The statements sent by the overseers of this division show an increase value of 50 per cent over the preceding one. *Mr. Lauzon* remarks that with the exception of that part of his division above *Mr. Meunier's* dam, where fishermen do poorly, fish seem to hold their own, and he heard no complaints of scarcity. People now generally understand better than years ago the advantages of complying with the regulations enacted for their benefit in protecting the species.

Officer T. Cloutier also states that the fishery laws are better observed now than formerly. The catch was an average one. Several fish-ways are needed in his district, especially one at St. Jérôme.

Officer D. Filiatrault, of Ste. Rose, says that their fishing grounds are constantly visited by Montreal pleasure seekers, of whose catch no account is kept, but was certainly larger than last year.

Overseer J. Filiatrault, of Ste. Adèle, reports the capture of about 15,000 lbs. of trout from the inland waters under his charge.

LOWER OTTAWA DIVISION.

Overseer R. Jones states that even with a smaller number of fishermen the result is a catch as large as usual. The close seasons were well observed. Any offenders had their fishing implements immediately confiscated, as he finds it is the best way to deal with them.

UPPER OTTAWA DIVISION.

Overseer M. D. Clairoux says though the number of fishermen was larger than during the previous season, owing to the fact that a few licenses were granted in Lake des Chenes, the aggregate catch is not much in excess of 1894. Pickerel seems more abundant than last year owing to the better observance of the close season. Fishermen and others regret that the outlet of Black Bay to the Ottawa River is not deepened to save the enormous quantity of fish now smothered every spring in their attempts to reach deep water. This could be done at a small outlay, as the channel requiring dredging is not more than twenty yards wide. At present it is so shallow that the ice settles to the bottom. Angling is reported good in the Gatineau Lakes, now that netting is not allowed therein. The total yield of fish in both divisions is valued at \$37,500.

PROVINCE OF

RETURN showing the Number and Value of Vessels and Boats engaged in the Fish
of Men employed in the Fishing Industry of the County of

RESTIGOUCHE SUBDIVISION

Number.	DISTRICTS.	FISHING VESSELS AND BOATS.						FISHING MATERIAL.						Salmon, fresh, in ice, lbs.	
		Vessels.			Boats.			Gill-Nets.		Trap-Nets.		Seines.			
		Number.	Tonnage.	Value.	Men.	Number.	Value.	Men.	Fathoms.	Value.	Number.	Value.	Number.		Fathoms.	Value.
	<i>Bonaventure County.</i>			€		€			€	€			€		
1	Head of Tide to Maguasha.					17	255	34	4950	4950	65	3900			40362

CARLETON SUBDIVISION

1	Maguasha and Nouvelle.				60	800	120	2600	1200			5	170	70	12350
3	Carleton				90	1050	180	3400	1750			25	900	275	14175
2	Maria.				115	1750	230	52000	2000			20	600	190	24700
	Totals.				265	3600	530	58000	4950			50	1670	535	51225

BONAVENTURE SUBDIVISION

1	New Richmond.				17	160	15	1300	650						
2	Black Capes				21	147	20	2855	1740						7700
3	Capelin				180	1540	125	6700	2750			12	360	175	
4	Bonaventure.				230	3200	290	10100	5050			58	1360	850	1900
5	New Carlisle.				35	330	35	1050	420			23	625	525	500
6	Paspebiac				105	2020	240	1550	775			22	550	450	
	Totals.				538	7397	725	23555	11385			120	2895	2000	10100

PORT DANIEL SUBDIVISION

1	Hopetown				40	1500	96	540	560			9	220	100	1000
2	Nouvelle				52	1100	90	1060	600			8	230	280	
3	Shigawake.				73	720	70	900	390			3	70	60	
4	Port Daniel.				175	3420	240	2950	1811			17	430	510	21394
5	L'Anse aux Gascons.				180	5200	211	3711	2440			22	587	765	3800
	Totals.				520	11940	707	9161	5801			59	1537	1715	26194

TOTAL FOR THE COUNTY

1	Restigouche Subdivision.				17	255	34	4950	4950	65	3900				40362
2	Bonaventure do				538	7397	725	23555	11385			120	2895	2000	10100
3	Carleton do				265	3600	530	58000	4950			50	1670	535	51225
4	Port Daniel do				520	11940	707	9161	5801			59	1537	1715	26194
	Totals.				1340	13192	1996	95666	27086	65	3900	229	6102	4250	127881

Marine and Fisheries—Fisheries Branch.

QUEBEC—Gulf Division.

eries, Fishing Material, and the Kinds and Quantities of Fish, as well as the Number **Bonaventure**, Province of Quebec, for the Year 1895.

(Tide Head to Maguasha).

KINDS OF FISH.													FISH PRODUCTS.			TOTAL VALUE.	Number.			
Herring, salted, brls.	Herring, smoked, lbs.	Mackerel, salted, brls.	Lobsters, preserved, in cans, lbs.	Lobsters, alive or fresh, tons.	Cod, dried, cwt.	Cod tongues and sounds, brls.	Haddock, cwt.	Trout, lbs.	Smelts, lbs.	Clams, brls.	Eels, brls.	Squid, brls.	Tom-cod or frost fish, lbs.	Coarse and mixed fish, brls.	Fish-oil, galls.			Fish used as bait, brls.	Fish used as manure, brls.	\$	cts.
.....	5000	131407	40000	17,342	75	1

(Maguasha to Big Cascapedia River).

150	600	1	.....	.....	4	1	1	550	.....	15	4	.....	.....	150	15	.....	950	4,303	50	1
550	9000	20	7800	.....	10	2	2	206	.....	10	12	.....	400	30	30	.....	2400	8,491	00	2
800	10000	12	.....	4½	15	3	5	500	.....	.....	15	.....	.....	25	40	20	700	10,031	50	3
1500	19600	33	7800	4½	29	6	8	1250	.....	25	31	.....	400	205	85	50	4050	22,826	00	.....

(Big Cascapedia to Paspebiac Point).

100	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	.....	.....	.....	20	6	450	717	00	1
100	4000	.....	.....	.....	7	.....	.....	.....	.....	5	.....	.....	.....	12	5	700	2,488	80	2
1025	5000	.....	10500	.....	1000	.....	.....	.....	.....	10	.....	.....	.....	750	250	6300	14,557	50	3
1200	6000	.....	7488	.....	1500	5	8	.....	.....	100	.....	.....	.....	1125	350	7500	19,001	32	4
155	3000	.....	.....	.....	200	.....	.....	.....	.....	10	.....	.....	.....	150	75	3500	3,730	00	5
480	5000	.....	.....	.....	2000	6	75	.....	.....	200	.....	50	.....	1500	500	1000	14,542	50	6
3040	23000	.....	17988	.....	4707	11	83	.....	.....	330	.....	50	.....	3557	1186	19450	55,037	12	.....

(Paspebiac Point to Point Macqueresau).

320	.....	.....	33200	.....	190	.....	.....	.....	.....	.....	.....	.....	.....	180	300	326	7,828	00	1
120	.....	.....	.....	.....	200	.....	.....	.....	.....	.....	.....	.....	.....	150	200	100	1,850	00	2
190	.....	.....	.....	.....	510	.....	.....	.....	.....	.....	.....	.....	.....	380	594	160	4,273	00	3
380	.....	.....	17600	.....	2520	.....	.....	24000	.....	.....	.....	.....	.....	1500	990	875	23,515	30	4
470	.....	.....	1200	.....	2135	.....	.....	.....	.....	.....	.....	160	.....	1250	1076	.....	15,404	50	5
1480	.....	.....	52000	.....	5555	.....	.....	24000	.....	.....	.....	160	.....	3460	3160	1461	52,870	80	.....

OF BONAVENTURE.

3040	23000	.....	17988	.....	4707	11	83	5000	131407	.....	20	.....	40000	.....	.....	.....	.....	17,342	75	1
1500	19600	33	7800	4½	29	6	8	1250	.....	25	31	.....	400	205	85	50	4050	22,826	00	3
1480	.....	.....	52000	.....	5555	.....	.....	24000	.....	.....	.....	160	.....	3460	3160	1461	52,870	80	4	
6020	42600	33	77788	4½	10291	17	91	6250	155407	.....	355	51	210	40400	205	7102	4396	24961	148,076	67

RETURN showing the Number and Value of Vessels, Boats and
County
GRAND RIVER SUBDIVISION

Number.	DISTRICTS.				FISHING VESSELS AND BOATS.						FISHING MATERIAL.		
					Vessels.			Boats.			Gill-Nets.		Seines.
	Number.	Tonnage.	Value.	Men.	Number.	Value.	Men.	Fathoms.	Value.	Number.	Fathoms.	Value.	
	<i>Gaspé County.</i>						\$		\$		\$		
1	Newport				160	6500	370	5500	3090	4	150	100	
2	Pabos				58	3320	136	1386	1055	6	200	185	
3	Little River (West).....				27	2000	54	900	430	2	60	80	
4	Grand River.....				100	5000	230	4500	1695	5	150	140	
5	Little River (East).....				60	2650	120	1850	370	2	50	60	
6	Cape Cove and Anse à Beaufils.....				109	4200	213	5068	1680	6	200	220	
7	Bonaventure Island and Percé.....				138	9000	276	5500	1600	4	90	80	
8	Corner of Beach	1	90	1500	5	14	750	30	1500	2	65	50	
	Totals	1	90	1500	5	666	33420	1429	26204	10820	31	965	915

GASPÉ SUBDIVISION

1	Barachois.....				157	6990	179	1730	1630	11	400	380
2	Malbaie				55	1750	68	1210	610	3	84	125
3	Point St. Peter.....				67	1660	92	2220	745	4	112	140
4	Chien Blanc.....				97	2570	104	1270	660	3	60	70
5	Seal Cove.....				31	530	29	650	400			
6	Douglastown.....				90	2950	140	1789	1160	8	240	140
7	Sandy Beach.....				30	740	33	2100	2000			
8	Gaspé, North and South.....				39	400	43	3264	2230	15	300	750
9	Peninsula				18	300	29	1960	1620			
10	Cape Ozo.....				28	350	38	1300	1085	1	20	6
11	Little Gaspé.....				16	270	18	394	290			
12	Grande Grève and Ship Head.....				69	1500	71	1720	1110	7	280	200
13	Cap des Rosiers				62	1200	84	900	230	3	60	40
	Totals				759	21210	933	20498	13820	55	1556	1851

FOX RIVER SUBDIVISION

1	Jersey Cove.....				110	2200	124	2400	1250	1	30	25
2	Anse à Grisfonds.....				100	2500	108	2380	975	2	70	70
3	Fox River.....				210	5300	220	5200	2550	3	120	150
4	Little Cape.....				50	560	54	1180	450			
5	Echourie and Big Cove.....				32	400	31	720	380			
6	Pointe Jaune and Anse à Valeau.....				62	770	60	1350	950			
	Totals.....				564	11730	597	13230	6555	6	220	245

Marine and Fisheries—Fisheries Branch.

Fishing Materials, &c., in the Province of Quebec—Continued.

of Gaspé.

(Point Maquereau to Barachois, Malbaie.)

KINDS OF FISH.											FISH PRODUCTS.				TOTAL VALUE.	Number.	
Salmon, fresh, in ice, lbs.	Herring, salted, brls.	Herring, fresh or frozen, lbs.	Herring, smoked, lbs.	Lobsters, preserved in cans, lbs.	Cod, dried.	Cod tongues and sounds, brls.	Haddock, cwt.	Halibut, lbs.	Smelts, lbs.	Eels, brls.	Squid, brls.	Coarse and mixed fish, brls.	Fish oils, galls.	Seal skins, No.			Fish used as bait, brls.
4200	300	2000	600	25700	7450	8	100	1200	6000	100	100	100	4100	1700	44,773	00	1
15900	70	27	600	31400	3600	5	11	900	13550	125	45	125	2200	1035	23,503	50	2
750	350	1400	13992	7800	3	6	1000	8000	100	100	60	4200	1500	43,692	88	4	
200	100	33600	8600	3000	2	4	2000	10000	3	8	2000	125	7000	1500	49,712	00	6
13600	15	28800	10000	3000	3	5	1500	200	180	25	180	9000	1500	56,249	50	7	
13600	15	11200	910	11200	1	1	200	200	200	200	200	800	150	9,129	00	8	
34650	1062	2000	2000	114692	42460	28	139	7360	27550	760	760	30620	7835	253,016	38	8	

(Barachois, Malbaie, to Cap des Rosiers.)

1000	200	28600	6650	3000	3200	2400	36,055	00	1
520	140	1700	6000	1000	2000	1000	44,038	00	2
250	100	13920	1700	1000	800	800	9,750	00	3
1653	40	12300	1500	800	100	600	10,368	80	4
2645	200	1900	230	100	750	400	3,457	60	5
11188	80	100	1900	50	750	400	10,879	00	6
17485	10	100	100	50	50	20	3,097	60	7
9800	40	100	100	93445	5	50	8,264	25	8
6417	60	6400	270	50	100	100	2,685	00	9
1290	30	125	125	100	70	90	3,854	40	10
4275	200	1900	1900	700	500	500	1,118	50	11
300	900	900	900	500	250	250	1,335	00	12
56523	1500	61220	21375	96445	5	9320	5,975	00	13
56523	1500	61220	21375	96445	5	9320	6310	140,878	15

(Cap des Rosiers to Fame Point.)

150	330	2200	25	25	4000	100	65	1600	1	650	300	14,483	75	1
300	2000	15	25	1500	80	50	1600	1	700	300	13,078	75	2	
500	3250	25	50	15000	150	80	3000	2	1250	1000	23,217	50	3	
40	970	10	15	3000	50	30	700	1	280	150	6,062	50	4	
80	620	10	8	1200	31	22	510	1	200	100	4,143	25	5	
210	1500	12	15	4500	70	45	1150	2	450	250	9,995	00	6	
150	1460	10540	97	138	29200	481	292	8560	7	3530	2100	70,980	75	8

RETURN showing the Number and Value of Vessels, Boats and

County of

MONT LOUIS SUBDIVISION

DISTRICTS.	FISHING VESSELS AND BOATS.						FISHING MATERIAL.						Salmon, fresh, in ice, lbs.		
	Vessels.			Boats.			Gill-Nets.	Trap-Nets.	Seines.			Salmon, salted, brls.			
	Number.	Tonnage.	Value.	Men.	Number.	Value.	Men.	Fathoms.	Value.	Number.	Value.			Number.	Fathoms.	Value.
<i>Gaspé County.</i>															
Grand Etang					34	400	34	760	400			2	80	60	
Chlorydorme					101	1870	96	2800	1450						900
Petite Anse and Frigate Point.					58	570	50	1100	500						
Grande and Little Vallée.					68	1150	74	1500	900			1	30	60	1100
Magdalen River.					22	290	28	600	225						1800
Manche D'Épée and Gros Mâle.					35	260	51	580	155						250
Mont Louis and River à Pierre.					66	710	73	1230	530			2	75	55	3400
Totals.					384	5050	406	8570	4160			5	185	175	7450

STE. ANNE DES MONTS SUBDIVISION

Claude River to Martin River.					30	450	63	1897	948						
Ste. Anne.					59	885	92	3103	1051						1 2480
Cape Chatte.					37	555	57	1763	881						
Totals.					126	1890	212	6763	2880						1 2480

MAGDALEN ISLANDS

Amberst Island.	4	150	3500	35	146	2920	292	25550	14230			10	1600	3000	
Entry Island.					8	150	18	1500	900						
Bryon Island.					90	1800	180					1	60	75	
Grosse Isle and Old Harry.					54	1080	100	720	120			4	240	350	
Grand Entry and Wolf Island.					140	2500	280	1250	420	1	275	2	160	175	
S. Beach, Pointe Basse and Little Brig.					83	1490	176	1350	450			1	80	100	
Grindstone Island.					210	6900	450					5	650	1000	
House Harbour.	11	440	10000	60	6	120	10					1	120	150	
Totals.	15	590	13500	95	737	16360	1506	30370	16120	1	275	24	2910	4850	

TOTALS FOR THE

Grand River Subdivision.	1	90	1500	5	666	33420	1429	26204	10820			31	965	915	34650
Gaspé do					759	21210	933	20498	13820			55	1556	1851	56523
Fox River do					564	11730	597	13230	6555			6	220	245	150
Magdalen River do					384	5050	406	8570	4160			5	185	175	7450
Ste. Anne des Monts do					126	1890	212	6763	2880						1 2480
Magdalen Islands do	15	590	13500	95	737	16360	1506	30370	16120	1	275	24	2910	4850	
Totals.	16	680	15000	100	3236	89660	5083	105635	54355	1	275	121	5836	8036	1 101253

Marine and Fisheries—Fisheries Branch.

Fishing Material, &c., Province of Quebec—Continued.

Gaspé—Concluded.

(Fame Foint to Rivière à Pierre).

KINDS OF FISH.											FISH PRODUCTS.				TOTAL VALUE.					
Herring, salted, brls.	Herring, fresh or frozen, lbs.	Herring, smoked, lbs.	Mackerel, salted, brls.	Lobsters, preserved, in cans.	Cod, dried, cwt.	Cod tongues and sounds, brls.	Haddock, cwt.	Trout, lbs.	Halibut, lbs.	Smelts, lbs.	Clams, brls.	Eels, brls.	Squid, brls.	Coarse and mixed fish, brls.		Fish oils, galls.	Seal skins, No.	Fish used as bait, brls.	Fish used as manure, brls.	\$	cts.
30					800	1			200								250		4,460	00
110					2500	7			8900						2100		450	25	14,412	50
70					875	4			1600						750		145	23	4,981	50
285					1725	3		400	2000						1100		450	300	10,800	00
69					300	1			300						225		75	60	2,252	50
110					400				600						325		110	45	2,722	50
275					620				1150						480		200	80	5,354	50
940					7220	16		400	14750						5780		1680	533	44,983	50

(Rivière à Pierre to Cape Chatte).

400					810			400	700						405		175	220	6,089	50
580					1530			750	1500						765		300	135	11,055	50
493					492			750	690						246		117	100	4,900	40
1473					2832			1900	2890						1416		592	455	22,045	40

SUBDIVISION.

1750		2085	96360	2576	7	100		4000		80	50			690	300	1500		66,765	04
200		100	14400	20										365	90	200		4,964	50
1900		1800	115200	250				2000		75				1650	500	1900		55,713	00
1550		545	84000							50	10			1000	250	1550		29,752	50
2200		440	133680	88						5				324	103	2500		38,754	55
1300		625	35568	60						40						1300		21,999	52
4000		2000	139200	750	3	100		5000		150	15			3300	1000	2500		76,963	00
250		25	960											7500	2500	150		7,959	40
13150		7620	619344	3744	10	200		11000		400	75			14829	4743	11300		302,871	51

COUNTY OF GASPÉ.

1062	2000	2000		144692	42460	28	139		7360	27550		760		30620		7835		253,016	38	
1500				61220	21375				96445		5			9320		6310		140,878	15	
1460					10540	97	138		29200			481	292	8560	7	3530	2100	70,960	75	
940					7220	16		400	14750					5780		1680	533	44,983	50	
1473					2832			1900	2890					1416		592	455	22,045	40	
13150				7620	619344	3744	10	200	11000		400	75		14829	4743	11300		302,871	51	
19585	2000	2000	7620	825256	88171	151	477	2300	65200	123995	400	80	1241	292	70525	4750	31247	3068	834,775	69

RETURN showing the Number and Value of Vessels, Boats and

County of

GODBOUT SUBDIVISION

Number.	DISTRICTS.	FISHING VESSELS AND BOATS.						FISHING MATERIAL.				
		Vessels.				Boats.			Gill-nets.		Trap-nets.	
		Number.	Tonnage.	Value.	Men.	Number.	Value.	Men.	Fathoms.	Value.	Number.	Value.
	<i>Saguenay County.</i>			\$		\$			\$		\$	
1	Manicouagan.....	2	22	450	5	5	100	6	500	450	.....
2	Godbout.....					12	240	14	1200	1000	.....
3	Point des Monts and Trinity Bay.....					14	288	26	2300	1850	1 150	
4	Cariboo and Egg Island.....					36	720	44	2500	2000	.....
5	English Point.....					36	720	60	2000	1600	.....
6	Penticost and Cailles Rouges.....					10	200	20	750	500	.....
	Totals.....	2	22	450	5	113	2268	170	9250	7400	1 150	

MOISIE SUBDIVISION

1	Jambons and Ste. Marguerite.....	4	98	2125	15	17	760	34	1650	1240	.....
2	Seven Islands.....	7	171	3750	40	34	2750	58	1185	748	.....
3	Moisie.....	2	32	550	6	35	2200	70	5434	4709	.....
4	Cormorant Point and Pigou.....	1	13	250	6	3	150	6	150	92	.....
	Totals.....	14	314	6675	67	89	5860	168	8419	6789	.....

MINGAN SUBDIVISION

1	River au Grain and Chaloupe River..	1	10	150	2	21	850	60	100	40	.....
2	Sheldrake.....					59	2400	128	400	200	1 200
3	Thunder River.....	1	60	1000	4	60	2400	120	400	200	2 1000
4	Dock Ridge Point and Jupitagan.....					64	2650	166	300	200	.....
5	Magpie.....					100	5000	200	400	300	.....
6	River St. John.....					90	4500	190	1200	1200	.....
7	Long Point.....					20	500	55	300	300	.....
8	Mingan and Romaine Rivers.....					3	190	6	400	300	.....
9	Esquimaux Point.....	12	484	12000	76	146	3300	266	1000	500	3 1050
10	La Corneille.....					2	100	2	200	100	.....
	Totals.....	14	554	13150	82	565	21890	1193	4700	3340	6 2250

NATASHQUAN SUBDIVISION

1	Watsheeshoo, Nabisippi & Agwanus..	2	56	1300	9	27	1110	51	700	310	.....
2	Isle à Michon.....					3	90	5	100	40	.....
3	Natashquan.....	5	115	2500	30	36	2900	81	4850	1600	.....
4	Kegashka to Coacoachoo.....					20	600	20	1500	750	.....
	Totals.....	7	171	3800	39	86	4700	157	7150	2700	.....

Marine and Fisheries—Fisheries Branch.

Fishing Materials, &c. Province of Quebec—Continued.

Saguenay.

(Manicouagan to Jambons).

Seines.		KINDS OF FISH.											FISH PRODUCTS.				TOTAL VALUE.	Number.				
		Number.	Fathoms.	Value.	Salmon, salted, brls.	Salmon, fresh, in ice, lbs.	Herring, salted, brls	Lobsters, preserved, in cans, lbs.	Cod, dried, cwt.	Cod tongues & soundns.	Haddock, cwt.	Trout, lbs.	Halibut, lbs.	Smelts, lbs.	Clams, brls.	Coarse and mixed fish, brls.			Fish oils, galls.	Seal skins, No.	Fish used as bait, brls.	Fish used as manure, brls.
2	150	150	.....	3000	24	.....	200	.....	1800	1000	.....	.....	.....	.....	15	1200	400	.....	50	1758	00	1
1	60	70	.....	23000	75	.....	340	.....	2300	3700	.....	.....	.....	.....	.....	1200	310	50	30	6441	25	2
1	60	50	.....	15000	210	.....	2870	.....	500	6500	.....	.....	.....	.....	.....	1730	10	300	25	18727	00	3
1	50	50	.....	6000	620	.....	5790	.....	750	6000	.....	.....	.....	.....	.....	3000	15	450	20	32623	75	4
1	50	40	.....	3500	25	3060	1200	.....	500	1000	.....	.....	.....	.....	.....	860	28	150	.....	7394	90	5
6	370	360	.....	73000	1021	3060	10400	.....	5850	18200	.....	.....	.....	.....	15	8340	838	1000	125	74818	90	6

(Jambons to Pigou).

2	202	300	.....	2200	120	.....	407	7	200	758	.....	58	.....	267	39	82	.....	.....	3545	85	1
2	75	85	.....	12499	110	.....	800	7	.....	12087	.....	67	.....	989	153	241	.....	.....	8156	85	2
5	190	270	.....	127103	.....	.....	2045	6	900	12700	.....	39	.....	2000	135	340	.....	.....	37716	85	3
1	25	50	.....	.....	.....	.....	90	1	.....	400	.....	25	.....	75	4	10	.....	.....	630	00	4
10	492	705	.....	141802	230	.....	3342	21	1100	15945	.....	189	.....	3331	331	673	.....	.....	50049	55	.....

(Pigou to Watsheeshoo).

4	135	180	.....	.....	.....	.....	950	3	90	1400	1800	.....	.....	750	14	360	35	.....	5725	00	1
3	250	350	1	.....	.....	.....	2470	4	150	3500	800	.....	.....	2000	25	425	80	.....	13504	75	2
2	180	200	2	.....	.....	.....	2500	2	50	1500	.....	.....	.....	2080	20	350	60	.....	13039	00	3
5	270	155	7	.....	.....	.....	3660	1	70	1900	.....	.....	.....	2500	15	620	25	.....	18988	25	4
4	300	400	21	.....	600	.....	7600	2	40	500	.....	.....	.....	5600	10	800	30	.....	40913	50	5
4	150	300	.....	22000	.....	.....	7800	2	30	1000	800	.....	.....	5700	15	1150	25	.....	43841	25	6
2	100	100	6	.....	.....	.....	1800	3	40	1000	.....	.....	.....	1500	30	300	30	.....	9568	50	7
1	30	25	26	.....	.....	.....	100	.....	300	.....	.....	.....	.....	1000	300	10	.....	.....	1686	00	8
12	600	1300	.....	.....	150	.....	6600	.....	50	500	.....	.....	.....	6400	800	1100	.....	.....	35810	00	9
..	.....	.....	5	.....	.....	.....	.....	.....	1000	.....	.....	.....	.....	90	30	.....	.....	.....	253	50	10
37	2015	3010	68	22000	750	33400	17	520	2300	11100	2600	27620	1259	5115	285	183329	75

(Watsheeshoo to Coacochoo).

5	150	100	12	.....	100	2880	1090	.....	.....	.....	.....	.....	.....	390	.....	270	.....	.....	6511	20	1
7	250	320	162	15100	760	.....	1170	.....	.....	.....	800	.....	.....	1025	115	470	.....	.....	15535	75	3
2	60	60	40	.....	50	.....	300	.....	.....	.....	.....	.....	.....	300	30	100	.....	.....	2522	50	4
14	460	480	218	15100	910	2880	2620	.....	.....	800	.....	.....	.....	1740	145	850	.....	.....	25028	45	.....

RETURN showing the Number and Value of Vessels, Boats and Fishing

County of

ST. AUGUSTINE SUBDIVISION

Number.	DISTRICTS.	FISHING VESSELS AND BOATS.						FISHING				
		Vessels.			Boats.			Gill-Nets.		Trap-Nets.		
		Number.	Tonnage.	Value.	Men.	Number.	Value.	Men.	Fathoms.	Value.	Number.	Value.
				\$			\$			\$		\$
1	Wolf Bay and Etamamju					6	120	6	350	180		
2	Pointe à Mourier and Harrington					55	1140	66	500	250	6	2400
3	Whale Head West					31	620	30	750	375	4	1200
4	Mutton Bay					44	865	56	560	280	5	2000
5	La Tabatière, Big Meccatina					21	485	21	670	335	3	900
6	Whale Head East					15	255	28	795	397	1	400
7	St. Augustine					8	174	14	1050	525		
8	Pointe à Giroux and Anse à Portage					6	100	7	350	175		
9	Canso and Chicatica					9	350	10	400	200	2	600
	Totals					195	4109	239	5425	2717	21	7500

BONNE ESPÉRANCE SUBDIVISION

1	Nabitippi and Bull Cove					4	200	5	300	150		
2	Rocky Bay and Dog Islands					14	700	26	700	550	5	500
3	Old Fort and Burnt Island					30	1500	56	700	650	6	1500
4	Bonne Espérance					34	2150	64	800	650	10	3000
5	Pigeon Island and Stick Point	1	30	1000	8	16	900	24	600	450	5	1250
6	Salmon Bay					30	2000	60	500	400	6	1500
7	Little Fishery and Five League					6	400	10	400	400	2	400
8	Middle Bay and Belles Amours					15	1000	40	300	200	4	800
9	Bras D'Or Bay and Long Point					30	1500	60	2000	1000	6	1500
10	Greenly Island					40	2000	100	1000	600	6	1500
11	Blancs Sablons					10	500	20	400	400	1	300
	Totals	1	30	1000	8	229	12850	465	7700	5450	51	12250

THE ISLAND

1	Fox Bay and Salmon Bay					11	620	25	200	150		
2	Mauzerolle and Capelin Bay					15	960	35	800	510		
3	Macdonald's Cove					21	1090	49	950	600		
4	English Bay					12	600	28	500	290		
5	Strawberry Cove					24	960	53	610	366		
6	Shallop Creek and Goose Point					11	300	17	150	90		
7	Cormorant Point and South Point					15	340	30				
	Totals					109	4870	237	3210	2006		

Marine and Fisheries—Fisheries Branch.

Materials, &c., in the Province of Quebec—Continued.

Saguenay—Concluded.

(Coacoachoo to Chicatica).

MATERIAL.			KINDS OF FISH.							FISH PRODUCTS.				TOTAL VALUE.		Number.
Number.	Seines.		Salmon, salted, brls.	Herring, salted, brls.	Lobsters, preserved in cans, lbs.	Cod, dried, cwt.	Cod tongues and sounds, brls.	Trout, lbs.	Halibut, lbs.	Fish oils, galls.	Seal skins, No.	Fish used as bait, brls.	Fish used as manure, brls.	\$ cts.		
	Fathoms.	Value.												\$	cts.	
1	60	30	3	...	...	280	...	...	...	230	...	46	...	1,469	00	1
6	1000	1000	2	...	...	2750	...	...	...	1833	...	450	...	13,815	20	2
3	200	100	2	...	...	1500	...	...	...	1600	200	250	...	8,047	00	3
5	800	700	5	...	...	3500	...	...	...	2483	50	580	...	17,755	70	4
5	350	280	6	55	8640	520	...	...	...	2537	730	76	...	5,934	40	5
...	...	...	17	...	5760	100	...	650	...	405	113	17	...	1,922	15	6
3	150	100	27	...	...	250	...	4250	...	256	30	40	...	2,181	90	7
1	30	20	15	...	...	150	...	1500	...	100	...	25	...	1,142	50	8
2	60	40	3	...	...	350	...	...	...	233	...	60	...	1,806	20	9
26	2650	2270	80	55	14400	9400	...	6400	...	9677	1123	1544	...	54,074	05	

(Chicatica to Blancs Sablons).

...	...	...	6	30	...	10	...	...	...	10	...	10	...	295	00	1
1	40	100	5	10	...	400	...	...	...	960	120	150	...	2,684	00	2
4	160	400	6	...	...	3000	...	...	...	2600	125	900	...	16,142	25	3
6	600	1500	15	...	...	6000	...	...	...	4000	...	2000	...	31,840	00	4
4	340	850	6	...	...	1800	...	...	...	1100	...	700	...	9,686	00	5
4	300	400	6	...	...	3000	...	...	...	2000	...	1000	...	15,896	00	6
2	100	200	8	...	...	400	...	...	...	450	120	100	...	2,408	00	7
4	400	800	4	50	...	1000	...	...	...	600	40	300	...	5,529	00	8
4	200	400	3	200	...	1000	...	...	...	1750	1000	400	...	7,998	00	9
8	1000	2000	...	...	...	3000	...	...	...	3000	500	1000	...	16,825	00	10
1	40	100	...	...	...	200	...	...	...	3000	1000	50	...	3,425	00	11
38	3180	6750	59	290	...	19810	...	...	...	19470	2905	6610	...	112,728	25	

OF ANTICOSTI.

2	360	460	6	170	20208	150	...	...	200	160	18	170	...	4,726	62	1
3	470	460	...	85	...	790	...	1	1700	600	20	410	...	4,997	50	2
5	660	560	3	150	...	1050	...	3	2300	750	10	500	...	6,770	50	3
2	320	410	...	120	...	450	...	6	2400	300	10	250	150	3,447	50	4
2	350	450	...	240	...	960	...	2	4800	600	20	400	150	6,840	00	5
...	...	...	5	...	22560	...	...	...	...	...	...	190	...	3,523	40	6
...	...	...	...	...	36340	...	...	...	...	...	...	370	...	5,642	60	7
14	2160	2340	14	765	79108	3400	12	...	11400	2410	78	2900	300	35,948	12	

RECAPITULATION.

SHOWING the Number and Value of Vessels, Boats and Fishing Material, &c., in the County of Saguenay and the Gulf Division, for the Year 1895.

TOTAL FOR THE COUNTY OF SAGUENAY.

Number.	DISTRICTS.				FISHING VESSELS AND BOATS.						FISHING MATERIAL.						KINDS OF FISH.					Number.
	Subdivisions.				Vessels.		Boats.		Gill-Nets.		Trap-Nets.		Seines.		Salmon, salted, brls.		Herring, fresh or frozen, lbs.		Herring, smoked, lbs.	Mackerel, salted, brls.		
	Number.	Tonnage.	Value.	Men.	Number.	Value.	Men.	Fathoms.	Value.	Number.	Value.	Number.	Fathoms.	Value.	Salmon, fresh, in ice, lbs.	Herring, salted, brls.	Herring, fresh or frozen, lbs.	Herring, smoked, lbs.	Mackerel, salted, brls.			
			\$						\$		\$											
1	22	450	5	113	2268	170	9250	7400	1	150	6	370	360	79000	1021	.....	.....	.....	.....	1
2	314	6675	67	89	5860	168	8419	6789	10	492	10	492	705	141802	230	.....	.....	.....	.....	2
3	554	13150	82	565	21890	1193	4700	3340	6	2250	37	2010	3010	22000	750	.....	.....	.....	.....	3
4	171	3800	39	86	4700	157	7150	2700	14	460	14	460	480	15100	910	.....	.....	.....	.....	4
5	30	1000	8	195	4109	238	5425	2717	21	7500	26	2650	2270	80	55	.....	.....	.....	.....	5
6	109	2850	229	12850	465	7700	3210	5450	51	12250	38	3180	6750	59	230	.....	.....	.....	.....	6
7	109	4870	237	109	4870	237	3210	2006	14	2150	14	2150	2340	14	765	.....	.....	.....	.....	7
Totals	38	1091	25075	201	1386	56547	45854	30402	79	22150	145	11327	15915	439	251902	4021	.....	.....	.....	.....

TOTAL FOR GULF DIVISION - PROVINCE OF QUEBEC.

1	16	680	15000	100	1340	23192	1996	95666	27086	65	3900	229	6102	4250	.....	.....	.....	.....	.....	.....	1
2	38	1091	25075	201	1386	56547	2628	105635	54535	1	275	121	5836	8036	101253	2000	.....	.....	.....	.....	2
3	54	1771	40075	301	5962	169399	9707	247155	111843	145	26325	495	29285	28201	481036	29626	2000	44000	46000	7620	3
Grand totals	108	3542	80150	602	23288	375921	12711	348656	193464	211	66050	845	31423	51006	1003289	29626	2000	44000	46000	7653	

RECAPITULATION.

STATEMENT showing Yield and Value of the Fisheries of the Gulf Division, Province of Quebec, for the Season of 1895.

Kinds of Fish.	Quantity.	Prices.		Value.	
		\$	cts.	\$	cts.
Salmon, salted.....	Brls. 440	16	00	7,040	00
do fresh in ice.....	Lbs. 481,036	0	20	96,207	20
Herring salted.....	Brls. 29,626	4	50	133,317	00
do fresh in ice.....	Lbs. 2,000	0	01	20	00
do smoked.....	" 44,600	0	02	892	00
Mackerel, salted.....	Brls. 7,653	14	00	107,142	00
Lobsters, canned.....	Lbs. 1,002,492	0	14	140,348	88
do fresh.....	Tons. 4½	75	00	337	50
Cod, salted.....	Cwt. 180,894	4	50	814,023	00
do tongues and sounds.....	Brls. 218	10	00	2,180	00
Haddock, salted.....	Cwt. 1,088	3	50	3,808	00
Trout.....	Lbs. 24,200	0	10	2,420	00
Halibut.....	" 122,645	0	10	12,264	50
Smelts, fresh in ice.....	" 282,002	0	05	14,100	10
Clams.....	Brls. 944	5	00	4,720	00
Eels, salted.....	" 131	10	00	1,310	00
Squid.....	" 1,451	4	00	5,804	00
Tommy cods.....	Lbs. 40,400	0	05	2,020	00
Coarse and mixed fish.....	Brls. 512	3	00	1,536	00
Fish oils.....	Galls. 150,215	0	40	60,086	00
Seal-skins.....	Pieces 11,429	1	25	14,286	25
Fish used for bait.....	Brls. 53,725	1	50	80,587	50
do do manure.....	" 28,759	0	50	14,379	50
Total.....				1,518,829	43
Total value in 1894.....				1,971,199	77
do do 1895.....				1,518,829	43
Decrease in 1895.....				452,370	34

Marine and Fisheries—Fisheries Branch.

STATEMENT showing Number of Men, with Quantity and Value of Material employed
in the **Gulf Division Fisheries**, Season of 1895.

Description.	Value.
	\$ cts.
54 vessels of 1,771 tons, manned by 301 men.....	40,075 00
5,962 boats, fished by 9,707 men.....	169,399 00
247,155 fathoms of gill-nets.....	111,843 00
145 trap and smelt-bag nets.....	26,325 00
495 seines, of 23,285 fathoms.....	28,201 00
78 lobster canneries, employing 1,876 hands.....	40,900 00
88,036 lobster-traps, with trawl lines, buoys, &c.....	61,423 00
134 freezers and ice-houses.....	8,825 00
860 smoke and fish-houses.....	166,880 00
183 piers and wharfs (private).....	45,470 00
824 trawl lines (cod).....	6,924 00
Total value.....	706,265 00

PROVINCE OF QUEBEC—Continued—EXCLU

RETURN of the Number and Value of Fishing Boats and Nets, Number of Men, St. Lawrence River from Cape Chatte

Number.	FISHING LOCALITIES.		FISHING BOATS.		Number of Fishermen.	KINDS OF NETS USED.					
			Number.	Value.		Gill-Nets.			Brush or Eel-Weirs.		
						Number.	Fathoms.	Value.	Number.	Value.	
		\$.					\$			\$	
1	Capucins.....	12	180	16	10	200	120				
2	Petit Mechins.....	15	225	15	16	360	230				
3	Mechins.....	20	300	30	22	520	390				
4	Grosses Roches.....	12	180	18	13	300	200				
5	Ste. Félicité.....	25	375	36	38	800	500	6		120	
6	Matane.....	19	285	20	18	500	340	13		260	
7	Rivière Blanche.....	19	250	19	19	500	300	1		20	
8	Sandy Bay.....	20	300	40	20	600	400	1		20	
9	Métis.....	1	15	2				5		100	
10	Ste. Flavie.....	5	75	10	1	30	20	3		60	
11	Ste. Luce.....				2	60	40	18		360	
12	Ste. Anne.....	3	45	6				12		240	
13	Rimouski.....	8	85	17				8		130	
14	Isle St. Barnabé.....	7	275	5				2		200	
15	Islet à Canuel.....	2	50	6				3		175	
16	Sacré Cœur.....	7	58	16				8		340	
17	Rivière Hatée.....	1	12	9				4		60	
18	Cap à l'Original and Bic.....			6				6		150	
19	St. Fabien.....	1	20	8				8		88	
20	St. Simon.....	4	40	6				6		96	
21	Inland waters, Rimouski and Témiscouata.....										
22	Trois Pistoles.....	2	100	3	2			5		350	
23	Isle Verte.....	35	2800	64				34		3050	
24	Cacouna.....			11				11		1000	
25	Fraserville.....	1	300	3	3	150	150	3		300	
26	Notre-Dame du Portage.....			13				11		710	
27	St. André.....			40				20		1470	
28	Kamouraska.....			16				8		500	
29	St. Denis.....			14	12	650	200	15		300	
30	Rivière Ouelle.....			39	34	2550	730	40		1400	
31	Ste. Anne de la Pocatière.....			27				24		440	
32	Inland waters, Counties Kamouraska and L'Islet.....										
33	St. Roch.....			30				30		1500	
34	St. Jean Port Joli.....			40				40		2800	
35	Trois Saumons.....			3				3		160	
36	L'Islet.....			30				30		2000	
37	Anse à Giles.....			4				3		200	
38	Isle aux Grues.....			20				20		2000	
39	Cap St. Ignace.....			13				13		730	
40	Montmagny.....	2	35	23				23		1800	
41	Berthier.....	4	36	20				20		3450	
42	St. Valier.....	6	170	2				2		3000	
43	St. Michel.....	5	180	5				5		2800	
44	Beaumont.....	9	270	4				4		2050	
45	Lévis.....	10	400	6				6		3050	
	Totals.....	255	7061	715	210	7220	3620	474		37479	
	Values.....		\$								

Marine and Fisheries—Fisheries Branch.

YIELD OF THE GULF DIVISION.

together with the Yield, Value and Kinds of Fish, &c., on the south shore of the Point Lévis, during the year 1895.

KINDS OF FISH.										VALUE.		Number.
Salmon, lbs.	Trout, lbs.	Shad, lbs.	Herring, brls.	Eels, lbs.	Sturgeon, lbs.	Sardines, brls.	Whitefish, lbs.	Pickarel, lbs.	Coarse and small fish, lbs.	\$	cts.	
	200		115						33000	867	50	1
			152						26000	944	00	2
1750	200		400						28750	2,457	50	3
500			212						60250	1,656	50	4
200	200		448						5400	2,130	00	5
2600	3500		125	1400					16800	1,684	50	6
			400						20000	2,000	00	7
240			1120							5,088	00	8
760			505						2000	2,444	50	9
240			373							1,726	50	10
1990			1665							7,890	50	11
1350			2800			6				12,888	00	12
900			1125	2000		20		1000		5,432	50	13
410		25000	900			16				5,680	00	14
170		500	1480			29				6,811	00	16
170			1390			10			27400	6,593	00	15
730		250	120			12			10400	841	00	17
1025		50	190							1,063	00	18
400		500	125	800		15				765	50	19
700				400						164	00	20
200	20000									2,040	00	21
300		1500	40		400	7			14000	515	00	22
1110		10600	350	700	6800	540			116000	* 6,943	00	23
2700		2000	70	200	900	400			20000	2,441	00	24
375		4000		30	700				160000	1,968	80	25
80			110	3500		60			22000	1,121	00	26
		330	2315	1780		790				12,914	10	27
200		10050	700	1400	16500	170				5,377	00	28
800		6000	400	16050	600	425				4,594	00	29
		2100	800	25330	420				2000	† 5,411	00	30
		875		12900	1100				20700	1,099	50	31
	10000									1,000	00	32
			9330						15000	709	80	33
			11200						18000	852	00	34
			800						1000	58	00	35
			15000						15000	1,050	00	36
			3000							180	00	37
			41300						4000	2,518	00	38
			700	1000			500	450	4400	208	50	39
210		2790	15000	9000			6900	21000	5400	3,305	40	40
370		3790	24600	3400			9760	1300	2200	2,849	20	41
620		3700	28000	7200			6110	200	2800	2,984	80	42
450		6600	49600	2220			2900	1030	3400	3,912	70	43
520		17500	22500	1550			2840	800	2400	2,888	20	44
670		12360	35600	1000			1900	1650	3600	3,342	10	45
22740	34100	110495	18430	323120	52790	2500	30910	26430	662900	.....	.....	.....
4548	3410	6630	82935	19387	3167	7500	2473	1322	6629	139,400	60	.....

* Include here 64,000 lbs. smoked herring, \$1,280.

† In No. 30 include 5 white whales (belugas), 250 galls. oil, value in all, \$120.

RETURN of the Number and Value of Fishing Boats and Nets, Number of Men,
St. Lawrence River, from Quebec to Bersimis, in the

Number.	FISHING LOCALITIES.		FISHING BOATS.		Number of Fishermen.	KINDS OF NETS USED.				
			Number.	Value.		Gill-Nets.		Brush Or Eel-Weirs.		
						Number.	Fathoms.	Value.	Number.	Value.
	<i>Island of Orleans.</i>			\$			\$	\$		
1	St. Laurent				12	12	4000	3000	1	100
2	St. Jean				16	12	3000	1630	4	400
3	St. François (south side)				15				15	1100
4	Argentenay				9				9	600
5	St. François (north side)				3				3	75
6	Ste. Famille				14	1	250	250	13	1300
7	St. Pierre				10	5	1250	1000	5	800
8	Ste. Pétronille				1	1	220	200		
	<i>North Coast.</i>									
9	Ange Gardien				1				1	150
10	Château Richer				7				7	425
11	Ste. Anne				5				5	200
12	St. Joachim				23				23	2000
13	Ile Madame				2				2	300
14	Baie St. Paul and lakes in vicinity				10				10	50
15	Ile aux Coudres				40				40	250
16	Les Eboulements				35				40	250
17	St. Irénée				10				12	75
18	Malbaie				15	2	200	50	15	160
19	St. Fidèle				10	1	80	15	10	50
20	St. Siméon				10	1	100	25	9	45
	<i>Saguenay Division.</i>									
21	St. Firmin	4	245		5				3	60
22	Tadoussac	6	225		8	3	430	260	1	25
23	Bergeronnes	3	60		3	3	350	210		
24	Bon Désir	2	20		2	1	50	30	1	20
25	Escoumains	9	140		9	5	480	280	4	80
26	Sault au Mouton	4	80		4				4	80
27	Mille Vaches	4	80		4	1	80	48	3	60
28	Portneuf	4	80		4	3	300	180	1	20
29	Sault au Cauchon	1	20		1	1	100	60		
30	Islets Jérémie	3	60		3	2	150	90	3	60
31	Bersimis	2	40		2	1	80	50	1	20
32	Inland waters									
33	Lake St. Jean Division†				125					
	Totals	42	1050		418	55	11120	7378	245	8695
	Values		\$							

*In this amount include 10 white whales (belugas) total value, \$240. †Estimated. ‡From No. 21 to 25,

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together with the Yield, Value and Kinds of Fish, &c., on the North Shore of the Province of Quebec, during the year 1895.

KINDS OF FISH.										VALUE.		Number.
Salmon, lbs.	Trout, lbs.	Shad, lbs.	Herring, brls.	Eels, lbs.	Sturgeon, lbs.	Sardines, brls.	Whitefish, lbs.	Pickarel, lbs.	Coarse and small fish, brls.	\$	cts.	
1170		8750		50400			2785	1056		4,058	60	1
4175		4900		45600			14760	2700		5,180	80	2
				22200						1,332	00	3
				13600						816	00	4
				1400	200		1680	660	6	275	40	5
16				20000	2600		9960	3540	39	2,411	00	6
32		280		23800			6000	1620		2,012	20	7
8		60		3000			960	240		274	00	8
				2400						144	00	9
				9600	2000		2640	580	11	958	20	10
				3400			900	200		286	00	11
				28700						1,722	00	12
				6000						360	00	13
	50000			500						5,030	00	14
				500		375				*1,395	00	15
				500		30			10	140	00	16
				500		30			10	110	00	17
900	4000		26			30			40	867	00	18
40	4000		30			30			10	653	00	19
400	6000		405			10			10	2,552	50	20
1000	2000		15			5			200	1,882	50	21
19440	4000		13						300	4,946	50	22
10900	1000									2,280	00	23
2800			7						150	891	50	24
7920	1500		38			4			200	2,317	00	25
1000	500		25			10			150	692	50	26
5600	800		28			10			400	2,156	00	27
7460	2000		12			12				1,782	00	28
2500	1000									600	00	29
6860	500		23			8			100	1,749	50	30
5200	3000		15			10			75	1,587	50	31
	25000									2,500	00	32
	12000						18000	43000	400	\$12,190	00	33
77421	117300	13990	637	231600	4800	564	57685	53596	2111	.....	.....
15484	11730	839	2867	13896	288	1692	4615	2680	4222	69,712	70	

include 190 white whales (belugas) total value, \$4,560. §Include 100,000 lbs. Winninish, 12,000 lbs. pike.

RETURN of Fishing Stations, Number and Value of Fishing Boats and Nets, Number extending from Quebec to Upper Ottawa, in the

Number.	FISHING BOATS.		Number of Fishermen.	KINDS OF NETS USED.										
				Gill-Nets.			Seines.		Hoop-Nets.		Eel Fisheries.			
				Number.	Fathoms.	Value.	Fathoms.	Value.	Number.	Value.	Number.	Value.		
		\$			\$		\$		\$		\$			
1	Sherbrooke and Megantic			Angling and trolling.										
2	Magog and Brome			do do										
3	1	8	3					1	20					
4	100	700	107	8	100	400	430	410	50	780	8	17000		
5	45	550	45	40	800	100	600	450						
6	58	870	115	36	720	54	240	280	5	25				
7	48	480	88	3	85	5	270	360	9	18				
8	Verchères and L'Assomption County		88	700	100	1	50	45	600	450	73	365		
9	Richelieu Co. and St. Francis River		80	600	80	2	50	10	460	525	30	120	4	80
10	Yamaska Co. and River		43	200	90	76	850	180	300	135	117	230	5	60
11	Nicholet Co.		19	335	25	3	60	6	200	175	5	60	15	60
12	Three Rivers		5	100	7			70	50					
13	Berthier, Maskinongé and Montcalm		64	760	65	7	110	15	200	50	35	80		
14	Terrebonne		160	1000	160			250	165	37	74	3	10	
15	Lake Two Mountains, Isle Perrot and Soulanges		25	250	30	67	700	100		5	25			
16	River Ottawa fronting Co. Argenteuil		12	180	12	40	300	300						
17	River Ottawa and Counties Ottawa and Pontiac		175	1750	175	376	5640	1400						
18	Gatineau Lakes								Angling and trolling.					
	Totals		923	8483	1102	659	9465	2615	3620	3050	367	1797	35	17210
	Values		\$											

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of Men, together with the Yield, Value and Kinds of Fish, &c., within the District
Province of Quebec, during the Year 1895.

KINDS OF FISH.											VALUE.	Number.	
Trout, lbs.	Shad, lbs.	Eels, lbs.	Sturgeon, lbs.	Whitefish, lbs.	Maskinonge, lbs.	Bass, lbs.	Pickereel, lbs.	Pike, lbs.	Coarse and small fish, lbs.	Perch, lbs.			\$	cts.
34000		4000		6500		21000	21000	2000	23000	41000	8,260	00	1
103000		8000		15000	12300	18500	22700	26000	53200	4300	17,456	00	2
					1500	4000	5000		16000		900	00	3
		16730	1100			1670	2900	6600	64530	8600	3,193	60	4
	900	8000	144900		1000	450		17000	253000	28700	16,086	00	5
		19400	11100		2170	2670	6150	7640	25250	4900	3,461	90	6
	10000	25000	16000		3500	4000	7000	10000	20000	3000	4,850	00	7
	3450	12000	680		1000		3030	5030	53245		2,495	70	8
100	1500	7600	1000		1100	2400	7040	7560	50150		2,559	00	9
		23700	6200	200	4000	2120	8770	11500	161325	1000	6,447	20	10
	27200	18550	5520	600	800	1300	1530	1950	16000	6470	3,938	30	11
1100	8800	2000	2000	1600		200	1500	2500	4000		* 4,298	00	12
40000	300	1800	1400	45000	750	150	5000	6200	172000	22000	12,524	00	13
62000	1330	3220	900		1050	7900	9670	6050	27520	5600	8,568	40	14
	300	3200	14700		8600	6820	15000	18900	58000	200	4,878	20	15
1000	750	2500		2000	750	2000	5000	10500	49000	4500	2,510	00	16
200		67850	74600	11000	63200	5100	67450	77900	102800	61100	24,701	50	17
106000			10000			15000	11000				12,850	00	18
347400	54530	223550	280100	91900	101720	95280	199740	217330	1149020	191370			
34740	3272	13413	16806	7352	6103	5717	9987	10867	22980	5741	139,977	80	

* Add 2,000 brls. Tom-cods, \$3,000.

RECAPITULATION

YIELD and Value of the Fisheries of the Province of Quebec (exclusive of the Gulf Division) for 1895.

Kinds of Fish.		Price.	Quantity.	Value.
		\$ cts.		\$ cts.
Salmon	Lbs.	0 20	100,161	20,032 20
Trout.....	"	0 10	498,800	49,880 00
Shad	"	0 06	179,015	10,740 90
Herring	Brls.	4 50	19,067	85,802 00
do smoked	Lbs.	.....	64,000	1,280 00
Eels	"	0 06	778,270	46,696 20
Sturgeon	"	0 06	337,690	20,261 40
Sardines	Brls.	3 00	3,064	9,192 00
Whitefish	Lbs.	0 06	180,495	14,439 50
Maskinongé	"	0 06	101,720	6,103 20
Bass.....	"	0 06	95,280	5,717 00
Pickarel.....	"	0 05	279,766	13,988 30
Pike.....	"	0 05	229,330	11,467 00
Winuonish.....	"	0 06	100,000	6,000 00
Perch.....	"	0 03	191,370	5,741 10
Tom-cod.....	Brls.	1 50	2,000	3,000 00
Coarse fish.....	Lbs.	.....	2,234,120	33,830 30
White whale (beluga) skins	No.	4 00	205	820 00
do oil.....	Galls.	0 40	10,250	4,100 00
Total for 1895.....				349,091 10
do 1894.....				332,186 77
Increase.....				16,904 33

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RECAPITULATION

Of the Yield and Value of Fisheries in the **whole Province of Quebec**, for 1895.

Kinds of Fish.	Quantity.	Value.
		\$ cts.
Salmon, salted.....	Brls. 440	7,040 00
do fresh.....	Lbs. 581,197	116,239 40
Herring, salted.....	Brls. 48,693	219,119 00
do fresh.....	Lbs. 2,000	20 00
do smoked.....	" 108,600	2,172 00
Mackerel, salted.....	Brls. 7,653	107,142 00
Lobsters, canned.....	Lbs. 1,002,492	140,348 88
do fresh.....	Tons. 4½	337 50
Cod, dried.....	Cwt. 180,894	814,023 00
do tongues and sounds.....	Brls. 218	2,180 00
Haddock.....	Cwt. 1,088	3,808 00
Halibut.....	Lbs. 122,645	12,264 50
Trout.....	" 523,000	52,300 00
Smelts.....	" 282,002	14,100 10
Eels, salted.....	Brls. 131	1,310 00
do.....	Lbs. 778,270	46,696 20
Shad.....	" 179,015	10,740 90
Sturgeon.....	" 337,690	20,261 40
Sardines.....	Brls. 3,064	9,192 00
Whitefish.....	Lbs. 180,495	14,439 50
Maskinongé.....	" 101,720	6,103 20
Bass.....	" 95,280	5,717 00
Pickeral.....	" 279,766	13,988 30
Pike.....	" 229,330	11,467 00
Winnonish.....	" 100,000	6,000 00
Perch.....	" 191,370	5,741 10
Squid.....	Brls. 1,451	5,804 00
Clams.....	" 944	4,720 00
Tom-cod or frost fish.....	Lbs. 240,400	5,020 00
Coarse and mixed fish.....	Brls. 11,682	35,366 30
Seal-skins.....	No. 11,429	14,286 25
White whales (beluga) skins.....	" 205	820 00
Fish oils.....	Galls. 160,465	64,186 00
Fish as bait.....	Brls. 53,725	80,587 50
Fish as manure.....	" 28,759	14,379 50
Total for 1895		1,867,920 53
do 1894		2,303,386 54
Decrease		435,466 01

STATEMENT

Of the Number and Value of Boats, Nets and other Fishing Material used in the Inland Waters of **Quebec** (exclusive of the Gulf Division), for 1895.

Articles.	Value.
	\$ cts.
1,220 fishing boats, 2,235 men	16,594 00
27,805 fathoms gill-nets	13,613 00
3,620 do seines	3,050 00
754 brush or eel-weirs	63,384 00
367 hoop-nets (verveux)	1,797 00
Total	98,438 00

RECAPITULATION

Of all Fishing Vessels and Boats and other Fishing Material employed in the whole **Province of Quebec** for 1895.

Articles.	Value.	Total.
	\$ cts.	\$ cts.
54 vessels of 1,771 tons, 301 men	40,075 00	
7,182 boats, 11,942 men	185,993 00	
274,960 fathoms gill-nets	125,456 00	
26,905 do seines	31,251 00	
145 trap and smelt bag-nets	26,325 00	
754 brush or eel-weirs	63,384 00	
367 hoop-nets (verveux)	1,797 00	474,281 00
78 Lobster canneries, 1,876 hands	40,900 00	
88,036 do trap-lines, &c	61,423 00	102,323 00
134 freezers and ice-houses	8,825 00	
860 smoke and fish-houses	166,880 00	
183 Piers and wharfs, private	45,470 00	
824 trawl-lines, cod	6,924 00	228,099 00
Total		804,703 00

APPENDIX No. 7.

ONTARIO.

SYNOPSIS OF FISHERY OVERSEERS' REPORTS IN THE PROVINCE
OF ONTARIO FOR THE YEAR 1895.

LAKE OF THE WOODS DIVISION.

Overseer C. W. Chadwick, of Rat Portage, states that Lake of Woods yielded more than double the quantity of fish caught therein last year. This result is due to a more vigorous prosecution of the fishing industry. More fishermen with more tugs, boats and nets were engaged on the Canadian side of these waters than ever before. The number of pound nets reached 76. The whole catch computed at \$114,440 is exported across the border.

Although the catch of whitefish nearly reaches a half a million pounds, sturgeon is by far the staple fish of this large district. The produce of sturgeon caviar and bladders is also worth noticing, as it represents alone a value of over \$21,000, of which no mention was ever made in Ontario statistics. Sturgeon being the most merchantable as well as the most profitable fish in his district, this officer has carefully considered the propagation of their species and recommends the selection of some suitable river, tributary to the Lake of the Woods, to be swept with a seine of every fish from its mouth to the first falls, then after stretching a wire barrier across the mouth, to place about one hundred male and female sturgeon for spawning purposes. There, the ova would be secure from the depredations of the fish that generally prey upon them, and the fry would pass out into the lake through the mesh of the barrier, thus the process of propagation could go on indefinitely. This should be done in the spring, before sturgeon begins spawning, and the entire work could be done in a single trip by one outfit. He says that the issuing of licenses to the actual fisherman does not work well, and he recommends that the equivalent of six licenses be granted to the owner of fishing plant who will be the responsible head and who will hire the labouring fishermen to do the work. The close seasons were thoroughly placarded at the important points of the divisions and implicitly respected. Two cases of illegal fishing were investigated. In the first, eight pound nets were seized in Sabaskong Bay and the owner prosecuted for fishing without a license. The court, however, saw fit to dismiss the case. In the second case, four pound-nets were confiscated from the Arion Fish Company of Minnesota, in Nimakin Lake. Before attempting this seizure, Mr. Chadwick made sure that these nets were within the Canadian waters, as considerable comment had been made *re* the international boundary. These nets brought to Rat Portage, a distance of 260 miles, were offered for sale at auction, and subsequently sold at private sale for \$200. Two other infractions against subsec. 2, sec. 15, Fisheries Act, *re* pollution of streams were reported, one at Poplar Bay and the other at Hungry Hall. After a vigorous investigation, he was reluctantly compelled to abandon proceedings for the want of identity of the offenders. The only fish-way in this district is in the Keewatin Power Co.'s dam; it is reported efficient in all respects.

This officer, in showing what he considers the principal duty of an overseer, *viz.*, to prevent illegal fishing, says:—

“This district embraces an expanse of country containing some 300 miles of international waters, and for the proper protection of Canadian fishermen it requires a man of keen perception, forethought and executive ability, coupled with the determination to uphold the time-honoured maxim ‘Canada for Canadians.’ This, I submit, I have

done far beyond the nominal encouragement I have received by way of salary, which, as compared with the revenue and value of the catch, is entirely inadequate. The district, so far as rail and stage roads are concerned, is entirely inaccessible, and as for steamboats, the few passenger and freight boats plying do not cover the ground, which, of necessity, an overseer must cover in order that he may have a general supervision of his district; in fact, the only means of reaching objective points without special means of transport, is by the fishermen's boats, and it must be patent to the most casual observer that efficient service cannot be effected by an officer, when forced to travel on the boats of the very men he is endeavouring to keep a sharp eye upon. The fishermen are quite as discerning a class of men as are to be found in other lines of business, and it is not to be expected that they will carry an officer on their boats to points where irregularities may exist. Again, by reason of the country adjacent to the fishing grounds containing no white settlers, there is no one but the fishermen themselves to report irregularities or infractions, and as it would not be prudent on their part to report one another for fear of possible reactionary effect, the overseer has no aid or assistance from that source, as in other districts, and the only way to surmount the difficulty, is to place the salary of the overseer at a figure commensurate with the duties and requirements of the office and its surroundings, and thereby enable him to devote more of his time and attention to this, one of the most important of the industries of this district, upon which a goodly portion, and in some localities the entire population are dependant for their means of livelihood. It would also be an incentive to him to give especial attention to markets and freight rates for the fishermen of the inland lakes—as distinguished from the Lake of the Woods,—and not have the cream of values absorbed by the United States' dealers."

LAKE SUPERIOR.

Overseer D. F. Macdonell sends returns of a slightly increased catch in the upper part of Lake Superior, valued at \$107,300, but makes no remarks.

Overseer T. H. Elliott says that in the lower part of Lake Superior under his charge, the decrease of whitefish as compared with the previous year is 64,800 lbs., that of salmon-trout, 39,165 lbs., and pickerel, about 4,000 lbs. This decline is partially due to over fishing, but chiefly to the rough weather during September and October. Many fishermen suffered heavy losses by having their nets and boats destroyed during the heavy fall gales. The government sail boat did good service, but it was found necessary after the rough weather was over to use a small row boat in order to move quickly from point to point after night to detect the seiners. The catch consisting chiefly of whitefish and salmon-trout is computed at about \$100,000, making a total value for the whole lake of \$206,000, being a diminution of \$18,000 from the previous yield.

LAKE HURON.

North Channel or Manitoulin Division.

The above overseer who has also charge of this division, complains that fishermen and even large firms neglect to send him the returns of their catch. Some means should be adopted to compel them to report at the end of each season.

The steady decline of these fisheries is attributed to over fishing and to the towing of logs in those waters. With the exception of about two tons, all fish caught in this division are shipped to Detroit, Buffalo and Chicago. The principal abuses are trap-netting and seining. While the former is not so commonly resorted to, the latter seems prevalent. Many Indians and white men carry seines in their boats and haul them at night to prevent detection. Ten seines, seven trap-nets and five boats were confiscated for illegal use, and six convictions made. The privilege of fishing for herring during November affords those who are so disposed an opportunity of catching whitefish and trout. The use of pound-nets to capture herring during the close season for

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whitefish and trout in waters frequented by these fish should not be allowed. Tons of these fish were noticed in the pounds ready to spawn and as these nets are in the water sometime five and six days without being lifted, a large quantity of eggs are destroyed. Mr. Elliott urges that the mesh of pound-nets should not be less than four inches in extension to prevent the destruction of young and immature fish now accomplished by the smaller mesh. If all fishing boats, tugs and nets were numbered it would be of great assistance to the officers in the discharge of their duties. Licenses should be granted to *bona fide* fishermen only, who actually go out to the nets and not to companies, firms or traders who often try to monopolize the fisheries to the exclusion of the actual fisherman. A uniform system of licenses for the great lakes should be adopted. There are no fish-ways in this district, but a cheap contrivance could be advantageously used on a few streams. This officer is of opinion that unless some means is devised for the better protection of whitefish, these waters will soon be depleted of this valuable food product, which is steadily decreasing.

Officer Lamorandière also corroborates the decline of fisheries in the vicinity of Killarney. A practical fisherman informed him that the result of last season's operations was 30 per cent below the previous one. Large quantities of young and small fish are wasted, being hauled ashore with seines and left there to decay, while only the salable fish are shipped. The illegal fish are generally taken to stations where there is no officer, as at Squaw or Round Islands. The total yield of this division is computed at \$204,500, being \$90,000 less than last year.

GEORGIAN BAY.

Overseer F. J. Smith reports that fishing was light all summer, and the fishermen who expected to make it up during the fall were badly disappointed, as the catch of October must have been about 250 tons short of the previous one. Trout, whitefish and pickerel are the staple fish of this division, nearly three million pounds being taken. A new way of fishing pickerel through the ice with hooks has been inaugurated; nearly 200 small houses were on the ice at one time; even boys can average more than a dollar per day by this primitive and inexpensive way of fishing. If traps and seines are kept out of the bay and close seasons adhered to, the pickerel cannot be fished out in any reasonable time. Mr. Smith visited the spawning beds of the Severn River and other rivers during the close season, and found fish so abundant that they were actually shoving each other out of their natural element. Salmon-trout and whitefish spawned at least two weeks earlier than usual, having all left the beds by the 8th of November. The mill-owners are doing all in their power by building docks and piling space for lumber, to keep saw-dust and rubbish out of the water. The towing of saw-logs across the bay seems to injure the whitefish grounds the most. He saw parts of nets completely ruined with bark grounded by the movements of these logs. He has confiscated and destroyed thirty trap and hoop-nets and one seine for illegalities, besides ten nets and twelve leaders and three traps when cruising on the patrol vessel "Dolphin," with Capt. Pierson. The yield of this division exceeds \$100,000.

Overseer J. Donaldson says that although some fishermen complain, the season was fairly good, but there is no doubt that the fish are not so plentiful as they were years ago. The decline, according to this officer, is attributed to the use of small meshed nets capturing yearly tons of immature fish, and to overfishing, which he would check by raising the license fee. He thinks that the waters are somewhat polluted by the drainage and dumping of filth from our towns and cities bordering on the lake shores. The whole catch is valued at \$84,000.

Overseer R. Edmonstone states that some tugs of his district were fishing in other divisions most of the season, and several boats only fished part of the time or with less nets than formerly. Owing to excessive fishing on the north-east shore of the bay, trout and whitefish are getting scarce. Three fourths of the fish caught there is sold in Canada.

Overseer Isaac Lennox reports a considerable falling off in whitefish, attributed to the scarcity of the species, whose feeding grounds are being ruined by the bark peeled off the logs towed across the bay. Owing to a larger number of persons engaged in the trout, herring and pickerel fisheries, the yield exceeds the previous one. All the pickerel, 80 per cent of herring, and 50 per cent of the trout and whitefish are exported, the balance is used at home. The close seasons are better observed as people see the officers determined to enforce the law. He has seized and destroyed nineteen trap-nets illegally set. He recommends that all kinds of fish shipped should be plainly marked, and should the one package contain two or more kinds, to be so specified on the labels.

The total value of the Georgian Bay fisheries, viz., from French River to Cabot's Head is computed at \$273,200, a decrease of 8 per cent from the preceding yield.

LAKE HURON CONTINUED.

(From Cape Hurd to Point Edward.)

Overseer Charles Briggs makes returns of about the same quantity of fish caught by the five tugs and 47 boats of his district, as last year. The large falling off in whitefish is made up by the surplus in salmon-trout. Notwithstanding the fact that few herring were caught in October and November, the yield is slightly in excess of the previous year. The weather was so rough and stormy that hardly any fishing was done during October and November. Many fishermen who set their nets in the beginning of October never visited them for twenty days after, and others never saw them again. So, practically the fish had a two months close time. This officer also complains of the nuisance from the bark of logs rafted across the lake. After a west wind a great deal of this bark is deposited on shore. He would like to see their waters rid of such coarse and voracious fish as suckers, mullets and pike, which prey on the ova of the finer grades of fish. Of this fact he has distinct evidence, having opened several and found them full of trout spawn. There was little or no illegal fishing carried on this year, nor any violations of the saw-dust and rubbish regulations. The only fish-way in his division near Southampton has been kept in good repair. Three-fourths of the catch, valued at \$82,500, is either exported or sold in Canada, the balance being used for home consumption.

Overseer Hugh McFayden says that speckled trout was not as plentiful in the Saugeen River as usual. Owing to the dry weather the streams were very low; however, he estimates the catch at 20,000 pounds. Very few abuses exist in his district; only one conviction was made therein. The streams are well provided with fish-ways, which have been kept in good repair. A new one was constructed this summer.

Overseer H. W. Ball reports a decreased catch which he ascribes more to casual circumstances than to the scarcity of fish. As the frozen fish of the previous season were not all disposed of, the fishermen were late in starting, then the stormy weather during October made the fishing season a short one, which greatly contributed to the better observance of the close season. Salmon-trout may have declined in size, as the fish now caught are smaller than twenty years ago, but more are captured and the average quantity is kept up. The difference in the mesh may have some effect on the decrease in the size of the fish taken. According to this officer, fishing for herring should not be permitted during the month of November, which is close time for whitefish and trout. To support his contention he gives the following reasons. Herring are getting scarce in Lake Huron and Georgian Bay. November fishing never did and never will pay on the eastern shore. The gales then prevailing always prevent proper attention to these set nets. During these storms many nets are blown away and lost to their owners, but they are still in the waters gilling and teething fish until they become so loaded that they sink to the bottom to pollute the neighbouring waters to the detriment of marine life. Of course fishermen generally use their oldest nets during this period, so their intrinsic value does not amount to much. Near shore where her-

Marine and Fisheries—Fisheries Branch.

ring fishing is carried on, trout coming in to spawn are teethered in these small mesh nets, and in many cases even trout nets are set, and in a short time a herring barrel is filled with trout, which, of course, will be repacked after the close-season. The scarcity of herring is also attributed to the fact that other species feed on the young and immature fish. Of the whole catch, valued at \$63,700, about 80 per cent of the finer grades of fish and about 15 per cent of the coarse fish are exported.

Overseer H. B. Quarry says that fish seemed generally as plentiful as ever. The season's operations would have been more satisfactory had they not been curtailed by the mighty gales of October and November, which destroyed many pound and gill-nets. To these storms is specially attributed the decline noticed in sturgeon and pickerel, as the largest captures of these fish are usually effected in October. The fishermen ascribed the good supply of fish to the planting of fry from the hatcheries. The fishery laws were well respected and obeyed. Only one fine was imposed, and that was for illegal fishing under the ice.

Overseer J. C. Pollock states that pound-net fishing in the Lake Huron part of his division was satisfactory, the yield being the best for years; but on River St. Clair the seine fishermen commenced late and did poorly. A better feeling now prevails between the fishermen and the officer than when he took charge of the district, and the regulations are better obeyed. The total value of fish in that part of Lake Huron south of Cape Hurd is given at \$221,800, a slight increase over last year's product. For the whole lake, including North Channel and Georgian Bay, the total value is computed at \$700,000, a decrease of 12½ per cent.

LAKE ST. CLAIR DIVISION.

Overseer Joseph Boismier reports an increased catch in all kinds of fish and specially pickerel. Hook and line fishing was good in Detroit River. His only trouble was with foreign anglers in our waters. The fishermen of his division well observe the different regulations.

Overseer C. W. Raymond states that owing to the low water in Mitchell's Bay seining was poor. Angling was fair. Spearing was the only kind of illegal fishing that came under his notice. He claims to have spent 86 days in active protection of fisheries during which he sailed over 1,800 miles. For the better protection of bass, Mr. Raymond recommends spearing for pike and other coarse fish during the winter months.

THAMES RIVER.

Overseer Theo. Pelletier says owing to spring freshets and ice-jams, the fishing operations were delayed, however, a fair catch was effected. A new fish, called German carp, made its appearance in the Thames River. This fish appears to be very prolific and grows to a large size. Some of the specimens taken weighed 22 lbs.

Overseer John Crotty reports a decrease in pickerel, but an increase in carp. He does not consider the latter a desirable fish in our waters. It is true they are very prolific, but being of the same nature as the mullets, they suck the spawn of the better class of fish, and are as voracious as the pike. The saw-dust regulations were well looked after by him.

Overseer Peter McCann, of the upper waters of the Thames River, says that owing to the lateness of spring freshets the first run of fish was not as early as usual. Rod fishing seems to grow in popularity and the followers of this sport were enthusiastic over some of their large catches of fine bass. Fortunately these fish seemed more plentiful than coarse fish. Anglers are doing all in their power to protect bass by educating the public to its importance, they are advocating the prohibition of young bass under 10 inches in length. No doubt many of these immature fish are now

captured and wasted, especially by boys along the banks of this river. Several reports of spearing came to his notice but he could not make a single conviction. Two new fish-ways were built this season, making now thirteen, all in good repairs.

The total yield of the Thames River is computed at \$7,860, about the same as last year.

LAKE ERIE DIVISION.

Capt. E. Dunn, commander of the cruiser "Petrel," in his report says that fishing in Lake Erie was in most places reported light, except in the vicinity of Rondeau, where the catch was far above the average. He attributes the shortage to the calm weather during the summer, the water becoming very warm near the shore, consequently the fish made for deeper waters. Capt. Dunn was informed that the water east of Rondeau was much colder than elsewhere along the shore, which is attributed to large springs of water in the vicinity. When the wind was north-east driving the colder water to the westward the fishing in that direction at once improved and *vice versa*. As another proof of his theory with reference to the warm water, he adds: "The fishing west of Pelee Point was almost an entire failure, the water in the vicinity being more shallow than any other portion of the lake. The shore fishing near Long Point and in Port Dover Bay was also light, while gill-net fishing in the deep water to the south of the Point was extra good."

Overseer Jas. F. Quick says the fishing season began early and was favourable till July, when the water became so warm that no fishing was done during that month and August, but resumed again in September. Herring and sturgeon yielded as much as the year before, but whitefish, bass and pickerel show a serious diminution. Anglers contend that more bass were caught by hook and line this season than for a number of years past. He observed them in abundance quite near shore during the month of May. The shortage in the general yield is attributed to the heavy gales of October. The fact that there were three pound-nets less fishing this season than last also makes quite a difference. The close seasons were well observed by our fishermen but unfortunately the same cannot be said of our neighbours, who seem determined to poach on our side whenever an opportunity offers. However, Capt. Dunn of the cruiser "Petrel" kept a close surveillance and confiscated several fishing implements. The catch is valued at \$6,500

Overseer Hy. Linley says although the fishing operation commenced later than usual, the weather was exceptionally favourable until the heavy gales experienced in October damaged the nets. The catch of herring (2,690,000 lbs.) is above the average. This improvement in the staple fish of these waters is due to the protection given them on our spawning grounds, against foreign poachers who still persist in their unlawful methods. Sturgeon also shows a substantial increase; whitefish about the same, but pickerel yielded less than in 1894. Prices ruled low in the United States markets. Sportsmen complain that German carp are increasing too rapidly to the detriment of bass and other better class of fish frequenting Rondeau Bay. There is a growing inclination to take up nets and stakes earlier to avoid loss by the stormy fall weather. The consignment of whitefish fry was successfully planted off Cedar Springs. The close seasons were well observed by our fishermen. The catch of the county of Kent division is reckoned at \$121,550, an increase over the previous one.

Overseer Wm. Freeland says that fishermen have not succeeded as well as heretofore, owing to calm weather fish remained in deep water, and at no part of the season was the yield more than medium. One good haul at least is reported by a fisherman who captured a ton of whitefish at once. In this division the storms of October were also severely felt, especially in the eastern part not protected by Rondeau Point. This naturally shortened the season and the catch in proportion. The fishery laws and regulations are reported well observed. The value of the fish caught here is given at \$77,368, a decrease of 21 per cent as compared with the previous catch.

Marine and Fisheries—Fisheries Branch.

Overseer D. Sharp says that fishing in Inner Bay was the best for years, in fact fishing with pound and gill-nets was good everywhere until the summer, when the fishermen fared poorly. Then the fall fishing was greatly interfered with by the rough weather already alluded to by overseers of the western districts. To this more than to the scarcity of fish, must the decline of over 25 per cent be attributed. The decrease was general to all kinds of fish except whitefish which held its own. Only a couple of violations of the close seasons came under his notice and in both cases the nets were seized.

Overseer C. H. McCrae observes that to the low water in Lake Erie must be ascribed the shortage in the catch of fish, as the large captures on the other side would indicate no failure in the supply. Many nets were also destroyed or damaged in this division by the now famous gales of October. The fishermen of Grand River below Dunnville had a short season of it. The opening of the river was late and the freshets were of short duration before the close season began, so that the low water soon told on the fishing operations, but while it lasted fish were plentiful. Above Dunnville, angling and trolling were quite satisfactory, and splendid specimens of bass, pickerel, maskinongé, and even of coarse fish were secured. This officer favours the issue of a few dip-net licenses in their stream, but for domestic use only. It would afford the farmers an opportunity of securing a few coarse fish in the spring time when they are in their best condition. Carp are getting numerous, but are considered very poor food fish, even inferior to suckers. The fishery laws are well observed by licensed fishermen, but it is the outsiders whom he has to contend with. Since the foreign anglers are charged a fee, they are not so numerous nor so forward as in the past, all to the betterment of our fisheries. During the high winds of autumn quantities of dead pickerel were thrown ashore. The only fish-way in his division is in good order and works excellently.

Overseer W. P. Croome says that angling was fair in the upper waters of the Grand River under his charge. He considers the sewage of Brantford draining in this river as a serious nuisance, polluting the waters of that vicinity. With the exception of boys angling during the close season, whose fishing tackle he seized and destroyed, the laws were well respected. There are nine fish passes in this district and they are all in fair working order.

LAKE ONTARIO DIVISION.

Overseer F. Kerr, whose division comprises the east end of Lake Erie and the west end of Lake Ontario, linked by the famous Niagara River, reports the fishing operation generally better than for years past, while herring, salmon trout and pickerel have yielded considerably more than in the previous year. Whitefish and sturgeon have held their own. The catch of the Lake Erie part is valued at \$9,380, and that of Lake Ontario at \$41,130, aggregating \$50,500. The catch of herring, the staple fish of the division, is the largest of the past fifteen years, especially in Lake Ontario. The heavy run commenced in the last week of August and was maintained until the first week in December. During this unprecedented long run there was no visible sign of diminution in either size or catch. Some splendid individual hauls were reported at the different stations, one boat often capturing as much as 8,000 in a single night. Fishermen get about one dollar per hundred, which is considered profitable remuneration when fish is so abundant. These blue back herring, at their spawning time, come from deep water towards the shore in immense schools, remaining in the vicinity for some weeks, then retiring some two miles out to spawn, after which they scatter. It is then that large hauls are made, after which the schools disperse or disappear from observation until they congregate once more the following season. To maintain the average size of this commercial fish a regulation mesh should be adopted and enforced. Towards the end of the season when their size diminishes a smaller mesh is resorted to. The herring of Lake Erie are larger than those of Lake Ontario. The disappearance of the once valuable ciscoe herring from the latter lake is attributed by him to the use of the different sizes of mesh capturing young, small and large ones. More than double the quantity of salmon-trout was taken than during the previous season. It is true more men were engaged in this fishery, but trout were also

more plentiful. These fish, mostly of a splendid size and quality, were nearly all caught on the reliable old grounds of Winona and Grimsby. While the above improvement is noticed in salmon-trout, the same cannot be said of whitefish, of which only a few are occasionally gilled in the trout-nets. Sturgeon is getting to be a valuable fish and is in constant demand in the United States markets. Although it receives no protection and is sought after nearly the whole year round, the supply has not apparently diminished, but these are smaller than formerly. One fisherman near Ridgeway captured 10,000 lbs. alone in his pound-net. A great many are caught with night lines in the Niagara River. On the whole, sturgeon yielded more than in 1894. Pickerel were plentiful in Niagara River and large catches were made with hook and night-lines. Some anglers capturing as much as 500 lbs. in a few hours, while some years ago, a few fish would have been considered fair fishing. A fact worth noting is that these fish seem to take the bait better after night fall, and a great many farmers and others would line the wharfs at Bridgeburgh and Fort Erie in the evening, pulling in pickerel by the score. The above noted improvement is ascribed to the prohibition of seines in the vicinity and to the prevention of dumping of garbage from Buffalo. Since the seizure of the United States tugs they dump their scows seven miles out in their own waters, thereby leaving our waters in purer state. The placing of our cruiser had also a good effect on the gill-netters who mostly remained on the other side of the boundary. Between Point Abino and Fort Erie our fishermen now use more night lines than gill-nets, thus giving the fish a better chance to approach the river which was at one time a great spawning ground. During the heavy gales at the end of November, millions of dead young pickerel four to six inches long were washed ashore. The same misfortune happened in Burlington Bay near Dynes' Point where tons of catfish were spread on the shore mixed with pieces of broken ice. In this case, the fish were not dead and fishermen had quite a harvest for the short time it lasted, again verifying the old saying—"it is an ill wind that blows nobody good." As perch is becoming a valuable table fish, Mr. Kerr considers it should be included in the list of protected fish by a close season. They are always in demand and may be caught at almost any season of the year. This officer issued 44 angling permits to foreigners during the summer. The seizure of a boat with implements as well as the arrest of the delinquents for contravention to our regulations had the effect of dampening the ardour of these foreign anglers, but they need constant watching to keep them on their side of the river, when fishing is better on ours. A few seizures were also made in Burlington and Ashbridge Bays for illegalities by our own people, but generally the laws were well observed. During the absence of the regular cruiser "Petrel," this overseer had charge of the "Joe Milton" and cruised for three weeks in Lake Erie.

Overseer Wm. Sargent reports a decline in ciscoe herring, but the common herring seems to hold its own, while the former, a deep water fish, is caught from 10 to 15 miles out, the latter is taken from three to four miles. The half a million pounds of herring reported by this officer are all smoked and valued by him at over twice the rate adapted for statistical purposes for the fresh article. Bass seem to be increasing, and some good catches were effected by angling and trolling in the Twelve Mile and Sixteen Mile creeks. Trout is also improving, owing to the fry planted there some years ago. Farmers and others secured good fares of coarse fish during the spring freshets.

Overseer James Stanley states that while the catch of fish was light in the western part of his division, the eastern portion was better than in 1894, especially salmon-trout, whitefish and pike. Herring shows a considerable falling off. Coarse fish is about an average yield. Fishermen are strongly opposed to seining in this part of Lake Ontario, as they consider it injurious to all kinds of fish. One conviction for illegal trout fishing was made, and a fine imposed. An infraction to the saw-dust regulation was promptly checked by this officer.

Overseer A. R. Eagleson says that fishing is not overdone in the western part of Rice Lake under his charge. Two parties were fined for trolling during the close season.

Marine and Fisheries—Fisheries Branch.

Overseer N. Simmons reports a slightly decreased catch of fish in the Trent River district.

Overseer Jos. Redmond says that the fisheries of his district are not diminishing, considering the amount of net used. For a time in the spring so many young whitefish were caught in the eastern part of his district, that he compelled the fishermen to desist. Angling for bass in East, West and Consecon Lakes was good and attracted a great many tourists. Nine convictions were made and two sets of hoop-nets were seized for illegalities.

Overseer W. P. Clarke complains of the difficulty of securing reliable returns from the fishermen. If the catch of whitefish and herring in Bay Quinté was larger than last year, it is because seines were allowed this season. Catfish, pike and other coarse fish show a large increase, which he ascribes to the abundant food supply for these fish in the bay. About two-thirds of the catch is shipped to Buffalo and Cape Vincent, the remainder is used at home. Angling was better than it has been for years, but fishing through the ice was poor, as the bay was full of so-called alewives. The close time was well observed. The mill-owners did not dump any refuse in these waters lately. No illegalities came to his notice.

Overseer James McGlynn reports the fish more plentiful around Wolfe Island than they have been for years. This he ascribes to the better observance of the fishery regulations. He is of opinion that a license fee should be imposed on the numerous tourists who visit his district during the summer months for the purpose of angling and trolling. The catch is valued at \$4,700, nearly double that of the previous year.

Overseer E. H. Sills states that the total yield slightly exceeds that of last year. This improvement is almost general in every species. The fish were of a large size and of good quality. Excepting the spring fishing, pike and coarse fish were more plentiful than in 1894. Herring and whitefish show an average catch, but the fierce gales experienced in the fall not only shortened the season, but undoubtedly kept the fish from their accustomed haunts. The low water during the summer months also kept the fish in deeper water where the nets were set, hence the good captures effected. The punishment meted out to transgressors last year had a good effect, as no illegalities were noticed this season, and mill-owners were exceptionally careful with their sawdust and rubbish. Mr. Sills recommends that a metallic tag bearing the name of the licensee, with number of his license, be attached to each net or licensed fishing gear. Should this be adopted, it would no doubt greatly facilitate the performance of the officers' duties in detecting illegal apparatus. Many foreign anglers come for a few days' pleasure, and if not noticed by the overseer, will return in their boats without the regulation permit. To obviate this, the customs officer should be authorized to issue the said permits to anglers, or at least notify the local overseer of the arrival of such parties.

FRONTENAC, LEEDS AND LANARK COUNTIES.

Overseer John Purdy reports a larger yield of fish than last year. Illegal fishing has been discontinued, and licensed fishermen prosecuted their calling with renewed energy. Nearly the whole catch, valued at \$7,900, is exported to the United States by the way of Cape Vincent, N. Y. The close seasons as well as the saw-dust regulations have been well complied with. There are no fish-ways in this district.

Overseer George Lake reports about an average catch, half of which is sold to dealers and the balance used for domestic consumption. Only one case of illegal fishing came to his notice, two sets of hoop nets were seized and the culprit fined. No saw-dust or rubbish is allowed to drift in the streams. Repairs were ordered to the only fish-way in this district. He again recommends the placing of another fish-pass in the dam at the foot of Bob's Lake.

Overseer R. A. Gilbert reports good fishing with the rod. As no netting has been allowed in those inland waters for several years, fish are now abundant. Pleasure seekers and settlers are now able to get all the fish they need for their own use in a legal manner. These people are being convinced that by respecting the close seasons they derive the benefit during the remainder of the fishing time. Over

18,000 lbs. of fine trout are reported from this district alone. Many applications for netting are received by this officer, but these are mostly from transients who wish to capture fish for sale regardless of consequences. The lakes are now being surrounded by permanent settlers who delight in angling a few fish between busy farming periods; and for their sake, netting should not be allowed to deplete the waters in their immediate vicinity. Mr. Gilbert would like to see some of these lakes stocked with bass or pickerel.

Overseer H. R. Purcell reports fish generally improving in the inland waters, under his charge. Netting for domestic use is limited to lakes not frequented by game fish. Many of these waters well stocked with whitefish, bass, pickerel and herring, are visited by numerous tourists who spend part of the summer in that vicinity. The lakes where fry were planted years ago, now show decided improvement.

Overseers Jeacle and others in the county of Leeds report an average catch, especially in coarse fish, which is all used for home consumption.

BROCKVILLE TO LANCASTER.

Overseers Mooney and others on this part of the St. Lawrence River make returns of an average catch. No netting is permitted in this district, but by angling and trolling, with a few night lines for sturgeon, fair catches of fish are reported. Numerous tourists hire boats for that purpose, thereby giving more reliable employment to boatmen than if they were actually fishing. The amount thus left by visiting sportsmen is quite considerable.

Officer Davis says that owing to the present protection given to these waters, fish are getting so plentiful, that people can now secure all they want without resorting to nets; the violators of the past are becoming the informers of the present, so desirous are they to see that part of the mighty St. Lawrence become one of the finest sporting waters on the continent.

PRESCOTT AND RUSSELL COUNTIES.

The overseers of this district make returns of about the same quantity of fish as last year. *Overseer M. Riddle* states that with few exceptions the only persons fishing are farmers who use all their catch at home. About 35 fathoms of unlicensed nets were seized at Norway Bay, but he was unable to detect the owner. There are no fish-ways in his district, but he thinks there should be one at Galetta, on the Mississippi River.

RENFREW COUNTY.

The overseers of this large county return an insignificant catch of fish, estimated under \$1,000.

LAKE NIPISSING.

Overseer J. S. Richardson states that since no netting is allowed in this lake the fish are becoming more plentiful. The catch with hooks and trolls consists mostly of pike.

PARRY SOUND AND MUSKOKA.

Overseer George R. Steele says he visited the lakes and rivers under his charge, and that the law is fairly observed. With a couple of exceptions, the mill-owners complied with the regulations. Attempts of illegal fishing at Eagle Creek during the close season were detected in time, but the would-be poachers decamped and could not be identified. There are no fish-ways in his division, but one should be placed in the dam at the outlet of Deer Lake.

Overseer E. Forsyth states that although fish are as plentiful as ever, the quantity caught was not up to the average, owing to a less vigorous prosecution of this sport. All fish taken are used for domestic purposes. Mill-owners are generally willing to observe the saw-dust regulations. The close seasons were well respected. There are no fish-ways, nor does he consider any necessary in his district.

Marine and Fisheries—Fisheries Branch.

PETERBOROUGH DIVISION.

Overseer G. W. Fitzgerald reports bass and maskinonge more plentiful, but prices ruled lower than last year. The few fish shipped by the tourists to their respective homes are the only fish exports of this division. Sixteen cases of illegal fishing were dealt with by this officer, all were fined. In one case, that of allowing saw-dust to fall into the Burnt River, the mill owner was fined \$20. The fish-ladder built at Bobcaygeon proved quite efficient, Mr. Fitzgerald saw the fish himself going through. This should help the propagation of bass and maskinonge in Sturgeon Lake.

Overseer D. Breeze says maskinonge first commenced running up the creeks about the 26th April, and bass on 14th May. The change of close time for the latter fish has met with general approval there. One man was fined for having bass in his possession during prohibited season. Two boats and nets were also confiscated and destroyed for illegalities. On one occasion this officer met six boats containing about twenty persons starting on a spearing tour, all he could do was to capture two boats, being unable to arrest any of the parties, as they were disguised and armed. Mr. Breeze recommends that if overseers changed districts during the best part of the close season it would be easier to detect poachers who would not recognize the officer. The damming up of the waters between Lakefield and Peterborough by the construction of the Trent Valley Canal will afford splendid breeding grounds for fish, as the river in some places will be made both large and deep with a clean gravel bottom. The eight dams now between Rice and Clear Lakes should be provided with fish-ways, then these waters would become the best resort in the province for the propagation of bass and maskinonge. The saw-mills are provided with machinery to remove dust and debris; they were visited often and found in good order.

SIMCOE DIVISION.

Overseer Wm. McDermott says all kinds of fish found in this division were as plentiful as last year except brook trout, which seem to steadily diminish. As an offset, bass and pike are increasing in Holland and Nottawasaga Rivers. The fact that he has only a single conviction to report shows that illegal fishing has been reduced to a minimum, though not absolutely stamped out. The mill-owners have at last shown a commendable spirit in strictly complying with the provisions of the Saw-dust Act.

All fish-ways with one exception were found in good working order, and the deficient one has no doubt been repaired since.

Overseer George Clark states that the effect of the stringent enforcement of the fishery regulations are already being felt. Trout was more abundant in Lake Simcoe than for years past. Whitefish are also increasing. Bass fishing was not so good as usual. Spearing maskinonge in Holland River was often attempted during their spawning time and caused this officer a great deal of trouble. Three parties caught fishing with nets, which are not allowed in these waters, were fined severely, as he is determined to check poaching. Mill-owners seem to comply with the law now.

SCUGOG DIVISION.

The overseer of this division report a somewhat decreased catch, consisting chiefly of bass, maskinonge and coarse fish.

WELLINGTON COUNTY AND VICINITY.

Overseer David Coleman says owing to the good protection now given to speckled trout it is rapidly increasing. The upper waters of Credit and Nottawasaga Rivers having gravel bottoms afford excellent spawning beds for this valuable game fish. Private companies distribute fry every year to improve their reserves, at the same time destroy as many suckers as possible. Notwithstanding the high price of trout (50 cents per lb.), poaching is decreasing owing to the vigilance of officers and private guardians.

Overseer J. Graham is of opinion that the season for trout fishing should commence a month earlier and close a month sooner, as 90 per cent of the trout caught during the last month are full of spawn.

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RETURN of the Number and Value of Vessels, Boats and Fishing Material, and Number Ontario, for

Number.	DISTRICTS.	VESSELS, TUGS AND BOATS EMPLOYED.						FISHING		
		Vessels 'or Tugs.			Boats.			Gill-Nets.		
		Number.	Tonnage.	Value.	Men.	Number.	Value.	Men.	Fathoms.	Value.
				\$			\$			\$
	<i>Lake of The Woods.</i>									
1	Rainy River District.....	6	110	16200	19	66	4430	119	15430	1320
	Values.....	\$								
	<i>Lake Superior.</i>									
1	Lakes in Thunder Bay District—Whitefish, Arrow, Lac des Mille Lacs, Northern Light, Loon and Scotel.....					14	1800	28	11000	2475
2	Port Arthur.....	4	115	8500	20	10	2100	20	25000	3750
3	Nepigon.....	1	20	900	4	5	1000	10	14000	2850
4	Rosport.....	2	32	1600	7	7	1300	14	19000	3100
5	Jackfish.....					2	320	4	3500	700
6	Port Caldwell.....	2	37	2700	9	2	500	4	7000	1400
7	Caribou Islands.....					5	1170	10	15000	2300
8	Michicoten Island.....					5	1050	10	15000	2300
9	Otter Head.....					3	475	6	9000	930
10	Richardson Harbour.....					2	260	4	3400	640
11	Ganley's Harbour.....					3	475	6	7000	930
12	Dog River.....					3	500	6	9000	1200
13	Little Gros Cap.....					2	200	4		
14	Indian Harbour.....					3	140	1	1000	100
15	Gargantua.....					2	350	4	4000	575
16	Lizard Islands.....	2	35	7000	15	5	1000	10	27000	6000
17	Mica Bay.....					2	110	4	8000	800
18	Point Mamaise.....					2	300	4	7500	900
19	Batchewana.....					2	350	4	5000	600
20	Goulais Bay.....					6	300	12	2000	200
21	Gros Cap.....					2	300	4	7500	700
	Totals.....	11	239	20700	55	87	14000	174	199900	32150
	Values.....	\$								

Marine and Fisheries—Fisheries Branch.

ARIO.

of Men employed, &c., with the Kinds and Quantities of Fish in the Province of the Year 1895.

MATERIAL.				KINDS OF FISH.											
Pound-Nets.		Hoop-Nets.		Whitefish, brk.	Whitefish, lbs.	Trout, lbs.	Trout, brls.	Herring, fresh, lbs.	Sturgeon, lbs.	Maskinongé, lbs.	Pickerel, lbs.	Pike, lbs.	Coarse fish, lbs.	VALUE.	
Number.	Value.	Number.	Value.											Number.	Value.
	\$		\$											\$	cts.
76	12690	10	400	.....	466500	4800	.....	.....	715950	940	209600	54665	80000	.....	1
.....	.....	.....	.....	.....	37320	480	.....	.....	42957	56	10480	2187	1600	*116,440	00
.....
23	3450	.....	.....	165	19000	13500	.....	.....	.....	.....	9000	5000	.....	3,520	00
1	150	.....	.....	40	275000	215000	125	17000	20000	.....	16000	.....	.....	48,910	00
5	800	.....	.....	70	56000	48000	85	4000	1500	.....	3500	.....	.....	10,915	00
.....	.....	.....	.....	.....	85000	125000	125	1500	3600	.....	2200	.....	.....	21,621	00
.....	.....	.....	.....	.....	15000	27000	55	.....	.....	.....	.....	.....	.....	4,450	00
3	574	.....	.....	.....	39000	80000	650	.....	4500	.....	.....	.....	.....	17,890	00
.....	.....	.....	.....	.....	1770	140175	.....	.....	.....	.....	.....	.....	.....	14,159	10
2	600	.....	.....	.....	42520	145200	.....	1200	.....	.....	.....	.....	.....	17,957	60
.....	.....	.....	.....	.....	5760	23800	.....	.....	.....	.....	.....	.....	.....	2,840	80
.....	.....	.....	.....	.....	23075	28520	.....	.....	.....	.....	.....	.....	.....	4,698	00
.....	.....	.....	.....	.....	19820	22000	.....	.....	.....	.....	.....	.....	.....	3,785	60
.....	.....	.....	.....	.....	25350	20200	.....	.....	.....	.....	.....	.....	.....	4,048	00
2	1000	.....	.....	.....	23840	16260	.....	.....	.....	.....	.....	.....	.....	3,533	20
.....	.....	.....	.....	.....	7050	1610	.....	.....	.....	.....	.....	.....	.....	725	00
.....	.....	.....	.....	.....	5410	18200	.....	.....	.....	.....	.....	.....	.....	2,252	80
5	1000	.....	.....	.....	138320	195200	.....	.....	.....	.....	.....	.....	.....	30,585	60
.....	.....	.....	.....	.....	2660	760	.....	.....	.....	.....	.....	.....	.....	288	80
.....	.....	.....	.....	.....	20420	20420	.....	.....	.....	.....	.....	.....	.....	3,675	60
5	1000	.....	.....	.....	41660	25270	.....	.....	4040	.....	2450	.....	.....	6,224	70
3	1000	.....	.....	.....	6340	5850	.....	.....	.....	.....	.....	.....	.....	1,092	20
.....	.....	.....	.....	.....	22400	11865	.....	.....	.....	.....	.....	.....	.....	2,978	50
.....
49	9575	.....	.....	275	875395	1183830	1040	23700	33640	.....	33150	5000	.....	.....	.....
.....	.....	.....	.....	2750	70032	118383	10400	711	2018	.....	1657	200	.....	206,151	50

*In No. 1 include 65,800 lbs of sturgeon caviar and bladders valued at \$21,360.

RETURN of the Number, Tonnage and Value of Vessels, Boats and

Number.	DISTRICTS.	VESSELS, TUGS AND BOATS EMPLOYED.						FISHING MATERIAL.				
		Vessels and Tugs.				Boats.		Gill-Nets.		Pound-Nets.		
		Number.	Tonnage.	Value.	Men.	Number.	Value.	Fathoms.	Value.	Number.	Value.	
	LAKE HURON DIVISIONS.			⌘					⌘		⌘	
	<i>North Channel, Manitoulin Island and Vicinity.</i>					⌘			⌘		⌘	
1	St. Joseph's Island					6	850	12	4000	360	7	2100
2	Thessalon					7	1025	14	12000	2550	7	2700
3	Cockburn Island					3	400	6	9000	1000		
4	French Island					2	150	3			5	1500
5	Algoma Mills	1	19	3000	5	2	200	5	12000	2500	4	800
6	John's Island					2	250	4			5	1600
7	Newport					2	300	3	6000	960		
8	Aird Island	1	16	2000	3	2	225	3	800	15	5	1500
9	Spanish River and La Cloche					3	225	6	1500	250		
10	Gore Bay, Manitoulin Island	1	19	1500	6	3	200	6	5000	550	5	2000
11	Kagowong, Manitoulin Island	1	10	1000	3	3	300	6	11000	1500	1	200
12	Little Current, Manitoulin Island	1	4	500	3	3	500	6	14000	2200		
13	Wikwimikong, Manitoulin Island					5	170	10	4300	745		
14	Round Island					5	285	10	15000	1080		
15	Killarney					23	2100	50	69000	7000		
16	Bad River					1	150	2	2000	300		
17	Bustard Island	1	8	3500	5	2	560	4	12000	2500		
18	Squaw Island	3	90	11000	24	15	2200	30	63000	17800		
19	Louely and Club Islands					7	670	14	4900	1150		
20	Fitzwilliam Island					8	300	16	3000	300		
21	South Bay Mouth	1	15	3000	6	12	900	24	19000	1080		
22	Duck Islands					5	430	10	11000	2000		
23	Green Island	2	15	4000	12	2	450	4	15000	2500	5	1500
24	Burnt Island					2	225	4	6000	1000		
	Totals	12	196	29500	67	125	13065	252	299500	49340	44	13900
	Values			⌘								

Marine and Fisheries—Fisheries Branch.

Fishing Material, &c., in the Province of Ontario—Continued.

KINDS OF FISH.										TOTAL VALUE.	Number.
Whitefish, lbs.	Trout, lbs.	Herring, brls.	Herring, fresh, lbs.	Sturgeon, lbs.	Basas, lbs.	Pickereel, lbs.	Pike, lbs.	Coarse fish, lbs.	Perch, lbs.			$ cts.
19700	8000		1500	520	700	3400	10000	12920	200	3,328 60	1
51900	48900	160		1900		6800		700		10,230 00	2
6700	38600		4500					550		4,542 00	3
12000	6000			10000		10000		200		2,664 00	4
10000	100000		10000	400		2000		200		11,228 00	5
4600	6250		2000	11470		75700		600		5,538 20	6
16000	14000							100		2,682 00	7
24325	12600		3000				500	105		3,318 10	8
300	250		10000					250		354 00	9
52000	17300			8650		12650				7,041 50	10
33950	16530			50		2400	100	300		4,502 00	11
52700	19880		6000		430	500		340		6,441 60	12
15840	4780				20	650	220	50		1,788 70	13
22120	7370					1000	450	200		2,578 60	14
150360	48400			1540	40	6400	2040	890		17,383 00	15
1400			5500	6200		1500	3500	200	200	874 00	16
26000	32000		5000					50		5,431 00	17
136100	228990									33,787 00	18
1500	51500				1000	500		600		5,367 00	19
260	15290					100	100			1,558 80	20
27860	237360		4900					500		26,121 80	21
9300	137600		30700					1000		15,445 00	22
32000	271274							150		29,690 40	23
6330	21000		2000					320		2,672 80	24
713245	1343874	160	85100	40730	2190	123600	16910	20225	400	.....
57060	134387	720	2553	2144	131	6180	676	405	12	204,568 10	

RETURN of the Number, Tonnage and Value of Vessels, Boats and

LAKE HURON

Number.	DISTRICTS.	VESSELS, TUGS AND BOATS EMPLOYED						FISHING			
		Vessels or Tugs.				Boats.		Gill-Nets.		Pound-Nets.	
		Number.	Tonnage.	Value.	Men.	Number.	Value.	Fathoms.	Value.	Number.	Value.
				\$			\$		\$		\$
<i>Georgian Bay Division.</i>											
25	Byng Inlet.....	1	15	3000	6	14	2200	30	60000	9000	
26	Point au Baril.....	1	12	3500	5	11	1650	25	50000	8000	
27	Shawanaga, Mink Island and Campbell's Rock.....	2	20	6000	12	18	2800	42	200000	15000	
28	Umbrella Islands.....					5	600	14	15000	3000	
29	Copperhead, Western Islands, Midland and Penetanguishene.....	1	13	1000	5	25	3500	55	200000	13000	
30	Victoria Harbour.....	1	15	1400	6	19	3000	65	55000	7500	
31	Waubashene.....	1	5	700	4	17	2000	40	35000	5400	
32	Nottawasaga Bay, including Collingwood and vicinity.....	6	75	30000	50	30	4500	90	270000	30000	
33	Meaford.....	2	27	7500	10	1	25	2	27000	2700	
34	Owen Sound Bay, from Cape Rich to Big Bay.....					28	1320	54	62000	6150	
35	Colpoj's Bay to Cabot's Head.....	6	150	30000	30	36	3350	72	87000	7250	
	Totals.....	21	332	83100	128	204	24945	489	1061000	107000	
	Values.....	\$									

LAKE HURON

36	Cape Hurd to Southampton.....	5	85	8100	30	47	5600	102	115000	14000	
37	Saugeen River.....					4	600	10	27000	3000	
38	Port Elgin to Kincardine.....	1	18	1500	6	6	1000	15	63000	10000	1
39	Port Albert to Goderich.....	3	85	8500	18	10	1670	25	13790	2240	300
40	Bayfield and vicinity.....					1	10	16	1900	320	
41	Drysdale and vicinity.....					9	555	20			10
42	Grand Bend.....					7	260	15	3200	575	1840
43	Stony and Blue Points.....	1	11	2500	6	3	150	6			7
44	Plympton.....					26	1830	48			3
45	Sarnia.....								380	565	20
	Totals.....	10	199	20600	60	113	11675	257	224270	30700	41
	Totals for Georgian Bay.....	21	332	83100	128	204	24945	489	1061000	107000	
	do North Channel.....	12	196	29500	67	125	13065	252	299500	49340	44
	Grand Totals for the whole of Lake Huron.....	43	727	133200	255	442	49655	998	1584770	187040	85
	Values.....	\$									

Marine and Fisheries—Fisheries Branch.

Fishing Material, &c., in the Province of Ontario—Continued.

—Continued.

MATERIAL.		KINDS OF FISH.										TOTAL VALUE.		
Hoop-Nets.		Whitefish, lbs.	Trout, lbs.	Herring, brls.	Herring, fresh, lbs.	Sturgeon, lbs.	Bass, lbs.	Pickarel, lbs.	Pike, lbs.	Coarse fish, lbs.	Perch, lbs.	\$	cts.	Number.
Number.	Value.													
		90000	80000			2000	500	40000	3000	9000		17,650	00	25
		72470	114530			2780	660	31630	4100	10650		19,415	50	26
		80000	120000			2000		12000	4000			19,280	00	27
		35000	30000	200								6,700	00	28
10	100	30600	88000	1300		4000		14000	2000	4000		18,195	00	29
17	200	2000	1000	50				238000	127000	48000		18,425	00	30
15	175	10000	15000	150		1800	700	70000	110000	37500		11,775	00	31
		285460	556400	80	43100	26600	1490	38030	3040	7340		83,985	10	32
		2000	102000									10,360	00	33
		2500	233800	10	7500							23,850	00	34
		32000	378000	150	45000			25000				43,635	00	35
42	475	642030	1718730	1940	95600	39180	3350	468660	253140	116490				
		51362	171873	8730	2868	2351	201	23433	10126	2330		273,273	60	

Proper)—Concluded.

		3300	737200	1640	39100							82,537	00	36
			20000									2,000	00	37
		6000	110000		26000		9000	2500	150	23100	29000	14,263	00	38
		4100	436000		18000	4000	24000	2000	1200	55100	70000	49,498	00	39
			52700		12500					930	1250	5,701	50	40
			50		20600					50		624	00	41
		28000	2850		27400	20150		23800		17200	2050	6,151	50	42
		1760	81600	10	86200	13300		29500		4500		13,294	80	43
		220	200		12260	12900		21570		350		2,264	90	44
		14850	9750	62	156540	466800		206560		4000		45,554	20	45
		58230	1450350	1712	398600	517150	33000	285930	1350	105250	102300	221,888	90	
42	475	642030	1718730	1940	95600	39180	3350	468660	253140	116490		273,273	60	
		713245	1343874	160	85100	40730	2190	123600	16910	20225	400	204,568	10	
45	475	1413505	4512954	3812	579300	597060	38540	878190	271400	241965	102700			
		113080	451296	17154	17379	35824	2312	43910	10856	4839	3081	699,730	60	

RETURN of the Number, Tonnage and Value of Vessels, Boats and

Number.	NAME OF STATION.	VESSELS, TUGS AND BOATS EMPLOYED.						FISHING			
		Vessels or Tugs.				Boats.		Gill-Nets.		Seines.	
		Number.	Tonnage.	Value.	Men.	Number.	Value.	Fathoms.	Value.	Fathoms.	Value.
				\$			\$		\$		\$
<i>Lake St. Clair Division.</i>											
1	River St. Clair				9	510	18			1000	900
2	Lake St. Clair including Mitchell's Bay				33	955	60			1400	1320
3	Thames River				22	175	66			450	710
4	Detroit River				7	210	43			600	560
	Totals				71	1850	187			3450	3490
	Values	\$									
<i>Lake Erie Division.</i>											
1	County of Essex	2	100	9500	10	54	4800	72	1000	250	
2	Pelee Island				12	1400	21	1800	300		
3	County of Kent	2	218	14400	16	42	5320	58			
4	County of Elgin	6	94	16700	14	29	3055	52	1550	140	
5	Port Burwell	2	28	5000	8	4	400	8			
6	Clear Creek	1	6	100	2	3	700	3			
7	Port Rowan				10	260	28	1300	350	1200	425
8	St. Williams				8	200	32			1600	745
9	Normandale				15	485	31	5500	550	400	140
10	Port Dover	3	80	5200	14	8	640	24	7700	740	
11	Selkirk				4	200	9	1000	100		
12	Cayuga to Moulton Bay including Grand River	2	32	4500	7	18	1085	30	9000	2500	1200 225
13	Low Banks				2	40	4	1000	400		
14	Port Colborne				6	300	6	4000	400		
15	Ridgeway	1	8	1500	3	8	550	18	10000	1500	
16	Fort Erie				16	750	26	12000	2000		
	Totals	19	566	56900	74	239	20185	422	55850	9230	4400 1535
	Values	\$									

Marine and Fisheries—Fisheries Branch.

Fishing Material, &c., in the Province of Ontario—Continued.

MATERIAL.				KINDS OF FISH.										VALUE.			
Pound-Nets.		Hoop-Nets.		Whitefish, lbs.	Herring, fresh, lbs.	Sturgeon, lbs.	Maskinonge, lbs.	Bass, lbs.	Pickereel, lbs.	Pike, lbs.	Coarse fish, lbs.	Perch, lbs.	Number.	\$ cts.			
Number.	Value.	Number.	Value.											\$	cts.		
4	700	19	330	1175	19400 1300	17120 42110 650	2235 3510 33000	340 24770 35600	60870 9250 14050	95500 173500	5450 3150	.....	.....	4,782	10	1
.....	.....	.....	.....	19500	.....	.....	100	100	100	225	1500	.....	.....	7,864	00	3
4	700	19	330	20675	20700	59880	2885	36950	121340	23525	275950	3150	4
.....	1654	621	3593	173	2217	6067	941	5519	94	20,879	40
39	21000	.....	.....	30000	675000	75100	.....	15600	60900	.....	601300	160000	.....	47,963	00	1
18	5700	.....	.....	9300	62930	38400	4900	.....	15320	.....	25800	.....	.....	6,511	90	2
54	21600	.....	.....	18640	2689300	53610	.....	4000	660350	.....	145500	.....	.....	121,554	30	3
55	19950	.....	.....	56300	1196300	73500	.....	10600	573400	.....	50000	75300	.....	77,368	00	4
8	2400	.....	.....	11960	47550	12530	.....	200	57100	.....	7460	5720	.....	6,323	20	5
5	1500	.....	.....	10550	52700	68000	.....	.....	19000	.....	3300	1500	.....	3,894	00	6
.....	.....	.....	.....	.....	3800	.....	.....	500	28600	13300	12750	18950	.....	2,929	50	7
.....	.....	.....	.....	.....	.....	.....	.....	4070	25650	8170	45000	24060	.....	3,475	30	8
.....	.....	.....	.....	.....	118430	.....	.....	2460	14280	2060	8350	58000	.....	6,398	70	9
18	3500	.....	.....	8600	192080	18810	.....	2525	72250	.....	35220	29880	.....	12,943	80	10
4	800	.....	.....	2260	24330	5820	.....	125	3680	.....	7900	7100	.....	1,822	40	11
.....	.....	.....	.....	400	32230	.....	540	2750	13700	3100	13100	8000	.....	2,507	30	12
.....	.....	.....	.....	.....	5000	.....	.....	100	3000	.....	2000	.....	.....	346	00	13
.....	.....	.....	.....	.....	6000	.....	.....	1000	1000	.....	5000	.....	.....	390	00	14
3	1800	.....	.....	.....	30060	10000	.....	1500	25000	2000	11300	8200	.....	3,393	80	15
.....	.....	.....	.....	.....	4000	25000	.....	.....	69700	2000	4000	.....	.....	5,265	00	16
204	78280	148010	5139710	319570	5440	45430	1642930	30650	977680	396720
.....	11841	154191	19174	326	2726	82146	1226	19554	11902	303,086	20

*Estimated.

RETURN of the Number, Tonnage and Value of Vessels, Boats and

Number.	DISTRICTS.	VESSELS, TUGS AND BOATS EMPLOYED.						FISHING MATERIAL.						
		Vessels or Tugs.				Boats.			Gill-Nets.		Seines.		Pound-Nets.	
		Number.	Tonnage.	Value.	Men.	Number.	Value.	Men.	Fathoms.	Value.	Fathoms.	Value.	Number.	Value.
	<i>Lake Ontario, including Niagara River and other tributaries.</i>			€		€		€	€		€		€	
1	Niagara				10	950	20	10000	1500					
2	Queenstown				4	120	6					3	1000	
3	Welland						5							
4	Port Dalhousie	1	8	1800	3	4	500	10	10000	1500				
5	Beamsville				6	350	14	6000	600					
6	Burlington Beach				15	1185	15	25000	2970					
7	Angling and trolling in the above districts													
8	Counties of Halton and Peel				14	2150	40	46800	4800					
9	County of York				7	700	9	7900	1500					
10	County of Ontario				4	125	8	1000	100					
11	Counties of Durham and Northumberland				20	1200	30	22000	1100					
12	Rice Lake													
13	Trent River				30	460	60							
14	County of Prince Edward	3	125	9000	11	60	2000	200	14850	3000	300	150		
15	Bay of Quinté				53	1400	120	14700	1300	1200	945			
16	Off County Lennox, including Napanee River				39	865	51	5600	700	150	100			
17	Amherst Island and vicinity				16	240	32	4125	375					
18	Wolfe Island and vicinity				24	580	24	5250	720					
	Totals	4	133	10800	14	306	2825	644	173225	20165	1650	1195	3 1000	
	Values	\$												

Marine and Fisheries—Fisheries Branch.

Fishing Materials, &c., in the Province of **Ontario**—Continued.

Hoop-Nets.		KINDS OF FISH.											TOTAL VALUE.		Number.		
		Whitefish, lbs.	Trout, lbs.	Herring, lbs.	Eels, lbs.	Sturgeon, lbs.	Maskinonge, lbs.	Bass, lbs.	Pickarel, lbs.	Pike, lbs.	Coarse fish, lbs.	Perch, lbs.					
Number.	Value.																
	\$													\$	cts.		
			6000	35000		2800		5000	30000		10000	3000	5,420	00		1	
				40000				2000	5000		20000	5000	2,120	00		2	
								2000	2000		2000	3000	350	00		3	
		2000	6000	160000							4000	12000	6,000	00		4	
		2000	12000	165000							2000	12000	6,710	00		5	
		500	5000	230000	4000			2000		5000	11000	10000	8,520	00		6	
								25000	129000	48000		78000	120,010	00		7	
		1300	2000	520000	400			1000		1000	41000	600	16,866	00		8	
			2500	34800						1000	7500		1,484	00		9	
				3650						50	100		113	50		10	
18	270	5400		20000	900			1000		40000	20000		3,146	00		11	
								65000			5000		*8,800	00		12	
74	1550		3000		10000	1000	50000	50000	35000	40000	135000	8000	13,250	00		13	
10	200	60000	70000	30000	2000	5000	2000	4000	4000	8000	102500	8000	16,290	00		14	
89	2020	15100		114000	5800		100	3200	11780	130000	215900	31800	16,235	00		15	
51	1000	20050		54000	7330	1240		1450	22250	136700	104400	49500	13,978	70		16	
		9700	2800					2500	2300	3800		1800	1,527	00		17	
25	600	10600		800	7070	4050			4420	36600	34500	26340	4,704	40		18	
267	5640	126650	109300	1407250	37500	39290	117100	179150	245750	445150	714900	249040					
		10132	10930	42218	2250	2357	7026	10749	12288	17806	14298	7471	137,524	60			

*Estimated.

RETURN of the Number and Value of Vessels, Boats and

Number.	DISTRICTS.	VESSELS, TUGS AND BOATS EMPLOYED.						FISHING MATERIAL.				Whitefish, lbs.	
		Vessels or Tugs.			Boats.			Gill-Nets.		Hoop-Nets.			
		Number.	Tonnage.	Value.	Men.	Number.	Value.	Men.	Fathoms.	Value.	Number.		Value.
	<i>Frontenac, Leeds and Lanark.</i>			\$		\$			\$		\$		
1	Howe Island					6	90	7	1658	225	5	100	.....
2	Kingston and Pittsburg					19	350	19	2000	150	29	662	.....
3	Frontenac County					47	470	100	4000	770	11	88	1000
4	*Gananoque to Rockport					50	2250	150	.....	.....	3	25	.....
5	Charleston, Beverly and other lakes in Leeds and Lanark					13	230	22	140	45	39	840	1000
	Totals.....					135	3390	298	7798	1190	87	1715	2000
	Values..... \$												160
1	†St. Lawrence River from Brockville to Lancaster .....												.....
2	†Prescott and Carleton Counties.....												200
3	†Renfrew County.....												.....
4	†Lake Nipissing.....												.....
5	†Parry Sound and Muskoka.....												2500
6	†Peterborough and vicinity.....												.....
7	†Scugog Lake and vicinity.....												.....
8	†Lake Simcoe and vicinity.....												31000
9	†Wellington County and vicinity.....												.....

* Angling and trolling.

† With night-lines, hooks or troll.

Marine and Fisheries—Fisheries Branch.

Fishing Materials, &c., in the Province of Ontario—Continued.

KINDS OF FISH.										TOTAL VALUE.	Number.
Trout, lbs.	Herring, fresh, lbs.	Eels, lbs.	Sturgeon, lbs.	Maskinongé, lbs.	Bass, lbs.	Pickereel, lbs.	Pike, lbs.	Coarse fish, lbs.	Perch, lbs.			$ cts.
.....	.....	1200	.....	100	600	.....	9400	7300	.....	636 00	1
.....	.....	30000	.....	.....	.....	.....	97560	109150	450	7,898 90	2
19300	16000	1100	.....	.....	4800	1700	3300	27000	1200	3,657 00	3
.....	.....	29000	15000	1600	40500	1000	195000	78000	18000	15,116 00	4
8000	1500	1800	.....	.....	12500	2500	16200	145200	1800	5,514 00	5
27300	17500	63100	15000	1700	58400	5200	321960	366650	21450	32,821 90	.....
2730	525	3786	900	102	3504	260	12878	7333	644	.....	.....
.....	.....	2700	16800	1200	12400	1000	12500	4500	.....	2,626 00	1
.....	.....	7050	400	5450	7200	6200	10300	67700	7250	3,515 50	2
150	.....	1650	3000	.....	1500	2050	5500	4600	550	815 00	3
.....	.....	.....	.....	4000	2000	.....	5300	5700	.....	686 00	4
14750	2000	.....	.....	4000	11750	13900	7900	25200	1900	4,252 00	5
16700	.....	10300	.....	88200	126300	.....	.....	46200	6000	16,262 00	6
.....	.....	8300	.....	105100	66400	.....	.....	82500	1000	12,468 00	7
76000	25000	.....	.....	17800	78000	140000	35000	33000	.....	25,638 00	8
12500	.....	400	.....	.....	1200	100	400	10500	.....	1,577 00	9

RECAPITULATION of the Number and Value of Tugs, Boats and Fishing Material, and Number of Men employed, &c., with the Kinds and Quantities of Fish in the Province of Ontario, for the Year 1895.

Number.	NAMES OF DIVISIONS.	TUGS AND BOATS EMPLOYED.						FISHING MATERIAL.						KINDS OF FISH.						
		Number.	Tonnage.	Value.	Men.	Number.	Value.	Boats.	Men.	Value.	Men.	Gill-Nets.	Seines.	Pound-Nets.	Hoop-Net.	Value.	Whitefish, lbs.	Whitefish, brs.		
1	Lake of The Woods.	6	110	16200	19	66	4430	119	15430	1320				76	12690	10	400	4665000	1	
2	Lake Superior.	11	239	20700	55	87	14000	174	195900	32150				49	9575		275	875395	2	
3	Lake Huron, including Georgian Bay.	43	727	133200	255	442	49885	998	1584770	187040				85	23090	42	475	1413505	3	
4	Lake St. Clair.					71	1850	187						4	700	19	330	20675	4	
5	Lake Erie.	19	566	56900	74	239	20185	422	58850	9230				204	78250	267	5640	143010	5	
6	Lake Ontario.	4	133	10800	14	306	2825	644	173225	20765				3	1000			126650	6	
7	Frontenac, Leeds and Lanark.					135	3390	298	7798	1190						87	1715	2000	7	
8	St. Lawrence River, Brockville to Lancaster																		200	8
9	Prescott and Carleton Counties																			9
10	Renfrew County																			10
11	Lake Nipissing.																			11
12	Parry Sound and Muskoka.																			12
13	Peterborough and vicinity.																			13
14	Seuog Lake and vicinity.																			14
15	Lake Simcoe and vicinity.																			15
16	Wellington County and vicinity.																			16
	Totals.	83	1775	237800	417	1346	96365	2842	2036973	251095				421	126305	425	8560	275	3086435	

Marine and Fisheries—Fisheries Branch.

RECAPITULATION of the Number and Value of Tugs, Boats and Fishing Material, &c.—Province of Ontario—Concluded.

Number.	NAMES OF DIVISIONS.	KINDS OF FISH.										VALUE. \$	Number.					
		Trout, lbs.	Trout, brls.	Herring, brls.	Herring, fresh, lbs.	Fels, lbs.	Sturgeon, lbs.	Maskinonge, lbs.	Bass, lbs.	Pickarel, lbs.	Pike, lbs.			Coarse fish, lbs.	Perch, lbs.			
1	Lake of The Woods.	4800					715950	940									116,440 00	1
2	Lake Superior.	1183830	1040		23700		33640										206,151 50	2
3	Lake Huron, including Georgian Bay.	4512954		3812	579300		597030										699,730 60	3
4	Lake St. Clair.				20700		50880	2685	36540								20,879 40	4
5	Lake Erie.				5189710		319570	5440	45430	1649330	306530	977590	396720	303,086 20	5			5
6	Lake Ontario.	1069300			1407250		382300	117100	179150	245750	445150	714900	249040	137,524 60	6			6
7	Frontenac, Leeds and Lanark.	27300			17500		15000	1700	58400	5200	321960	366650	21450	32,821 90	7			7
8	St. Lawrence River, Brockville to Lancaster						16800	400	7200	1200	10300	67700	4500	2,626 00	8			8
9	Prescott and Carleton counties.						400	5450	1500	2050				815 00	9			9
10	Renfrew County.	150					3000	1650						550	10			10
11	Lake Nipissing.							4000	2000					4600	11			11
12	Parry Sound and Muskoka.	14750			2000		4000	4000	11750	13900				1800	12			12
13	Peterborough and vicinity.	16700					88200	126300						46200	13			13
14	Sevcoz Lake and vicinity.							105100	66400					82500	14			14
15	Lake Simcoe and vicinity.	76000			25000			17800	78000	140000				35000	15			15
16	Wellington County and vicinity.	125000						400	1200	100				400	16			16
	Totals	5958284	1040	3812	7215160	131000	8006590	353815	665220	3299410	1229250	2937045	789760	1,584,473 70				

RECAPITULATION

Of the Yield and Value of the Fisheries of the Province of Ontario, for the Year 1895.

Kinds of Fish.	Quantity.	Price.		Value.	
		\$	cts.	\$	cts.
Whitefish	Brls. 275	10	00	2,750	00
do	Lbs. 3,086,435	0	08	246,914	80
Trout	" 5,958,284	0	10	595,828	40
do	Brls. 1,040	10	00	10,400	00
Herring	" 3,812	4	50	17,154	00
do fresh	Lbs. 7,215,160	0	03	216,454	80
Eels	" 131,000	0	06	7,860	00
Sturgeon	Lbs. 800,590	0	06	108,035	40
do caviare	" 62,624	0	30	18,787	20
do bladders	" 3,216	0	80	2,572	80
Maskinonge	" 353,815	0	06	21,228	90
Bass	" 665,220	0	06	39,913	20
Pickarel	" 3,299,410	0	05	164,970	50
Pike	" 1,229,250	0	04	49,170	00
Coarse fish	" 2,937,045	0	02	58,740	90
Perch	" 789,760	0	03	23,692	80
Total for 1895				1,584,473	70
do 1894				1,659,968	66
Decrease				75,494	96

Marine and Fisheries—Fisheries Branch.

STATEMENT

Showing the Number of Fishing Tugs, Boats, Nets, &c, used in **Ontario**, for the
Year 1895.

Articles.	Value.
	\$ cts.
83 tugs and vessels (1,775 tons, 417 men).....	237,800 00
1,346 boats (2842 men).....	96,365 00
2,036,973 fathoms of gill-nets.....	251,095 00
9,500 do seines.....	6,220 00
421 pound-nets.....	125,305 00
425 hoop-nets.....	8,560 00
	725,345 00
220 freezers and ice-houses.....	67,960 00
101 piers and wharfs.....	38,200 00
Total value.....	831,505 00

APPENDIX No. 8.

MANITOBA.

REPORT ON THE FISHERIES OF MANITOBA, FOR THE YEAR 1895, BY
THE INSPECTOR, R. L. TUPPER.

SELKIRK, MAN., 2nd January, 1896.

To the Honourable
The Minister of Marine and Fisheries.

SIR,—I have the honour to inclose my report, with synopsis of the reports from the different fishery officers of Manitoba, as well as the statements of the catch for the season of 1895.

[*Extracts from Inspector Tupper's Report.*]

“Last season was not a prosperous one for the fishermen for many reasons. The depression in the western states, which is our principal market, prevented the purchase of fish there, and consequently prices were low. Added to this, the lakes froze up very brokenly, making it almost impossible to run the nets under the ice, thus hindering the winter fishermen in their work, and causing them loss. I am glad to be able to report that although the commercial fishing is carried on principally at Horse Island, in the extreme north of Lake Winnipeg, a distance of 300 miles, yet another year has passed without any wreck of boats or loss of life in the prosecution of the fisheries. The new range light, placed by your department at the mouth of the Red River, has been of the greatest benefit to steamers and sail-boats, whose owners have expressed their satisfaction.

COMMERCIAL FISHING.

“The commercial companies fishing in the northern end of the lake have had a very satisfactory catch this summer. I visited them in June and inspected all their freezers and the manner of work done. I found the utmost cleanliness prevailing, all offal carefully kept from the lake water as far as possible, in fact it was all removed except the washing of the decks of the tugs and boats after a catch, when the slime, blood, etc., has to be washed overboard. In the case of the companies whose plant is in the harbour of Selkirk Island, I do not think it matters, as none of this stuff goes out of the harbour, but is taken there by millions of young fry of the spring spawning fishes, so that none gets into the whitefish grounds farther out in the lake.

A NEW METHOD OF SHIPPING WHITEFISH.

“The Manitoba Fish Company, through Mr. Overton, brought in from Selkirk, splendid specimens of lake trout, whitefish, etc., unfrozen, which were forwarded to the World's Fair simply packed in ice and which were pronounced by Commander Wakeham and others to be in perfect condition on arrival at Chicago. Last season a demand arose in the United States for similar fresh fish which has not been frozen; of course they were for immediate use and do not, except to a very small extent, interfere with the sale of frozen fish as the market for each is at a different time of the year. These fresh fish were packed in broken ice at Selkirk Island, brought in the cold storage hold of the

Marine and Fisheries—Fisheries Branch.

steamer, teamed over to East Selkirk, (a distance of four miles); from there they went to market in refrigerator cars, and in every instance arrived in perfect condition.

“Preparations for shipping largely in this manner are being made, and as it requires a greater outlay and gives more employment here, it will tend to the increased well-fare of the fishermen on the lake. The returning prosperity across the border and the consequent assurance of a market has stimulated the fishermen here, and I believe that seventy-five thousand dollars will be expended this winter in improved freezers, steamers, and other methods of handling fish.

STURGEON.

“A good deal of time and money was spent looking for sturgeon fishing grounds and finding out the best method of capturing them. Some of the cotton nets used in Delaware Bay and other points on the Atlantic coast were tried and found useless here. It seems that linen gill-net and pound net must be used.

“The fishing regulations in Manitoba need revising, owing to the many partial changes made in them, and the changed condition of fishing on the lakes. The so-called “domestic” license issued to resident fishermen is used really for commercial fishing, and there are no less than seven small freezers now on the lake, owned by fishermen living on the lake, and these are used for storing fish for export. It will be necessary to frame new regulations regarding them.

“The close seasons here have been well observed, with the exception of a very few cases in the Red River, last spring, and of a few Indians taking white-fish in the close time for their own use.

SYNOPSIS OF FISHERY OFFICERS' REPORT.

Assistant Inspector, M. Sutherland, of Winnipeg, reports that owing to extreme low water on the opening up of the Red River there was not a great run of fish in the former part of the season, however, from the middle of June until the end of July the river rose considerably, and the number of fish caught during the whole season compares favourably with that of last year. The fishery laws and regulations were well observed throughout the whole district, and both the fishermen and people are generally well satisfied with them, and the prevailing opinion is that it would be difficult to improve them.

Overseer Daniel Deulin of St. Laurent states that during his tour of inspection of the different fishery points he visited northward Oak Point, Marshy Point, Swan Creek Point, Rabbit Point, Rocky Point, and Longue Point, but, no infractions of the fishery laws came under his observation. Afterwards he visited to the South Lake Francis Creek, Rocky Island, Clandeboy Bay, Portage Creek and Toboggan, and also found the regulations duly observed. He inspected Blackwood Bros.' freezer, and found it well operated. In November, he made a special trip to the principal fishing grounds, but detected no wrong. His returns show that the following fish were marketed, 40,760 lbs.; whitefish at 4½ cents, 210,070 lbs. doré at 3½ cents, and 185,408 lbs. pike at 1½ cents, valued at \$12,431.28, besides 20,070 lbs. mixed fish for home consumption, valued at \$501.75; bringing the total catch for 1895 to represent a value of \$12,933. Some of the fishermen requested permission to catch a few whitefish for home consumption during close season, but if this privilege were granted it might lead to fraud and under any circumstances it would make it difficult to discriminate who was evading the law or not. As the ice began forming around the lake shores on 9th November, he considered it useless to proceed any further as all fishing was effectually stopped in consequence.

Overseer H. Martineau, of the Narrows, Lake Manitoba, reports that he has visited the several fishing grounds under his supervision, comprising part of the public waters of Lakes Manitoba, Ebb and Flow and Dog Lake, from Crane River to Big Point and White Mud River, on the west side of Lake Manitoba, a distance of 137 miles, including the

Crane River Reservation, Round Island, Crane Bay, The Bluff, The Narrows of Lake Manitoba (west side), Ebb and Flow Lake Reservation, Village Manitoba, Manitoba House, The Icelandic Settlement, Sandy Bay Reservation and Big Point on the east side of Lake Manitoba; and from Elm Point, Dog King Bay, The Narrows, east side, Dog Lake, Birch Island and Lillie Bay, on the east side of Lake Manitoba, a distance of one hundred and ten miles, with all the creeks and streams adjacent thereto; and found that the close season was generally well observed.

Fishing operations are always carried on in winter, as the inhabitants fish mostly for a living during the balance of the year. Last year, owing to the fact that he could not notify all the fishermen of the alterations in the fishery regulations, they were too late to realize the situation, and in consequence December was allowed to pass without fishing, thus giving rather a poor return. The spawning season for whitefish was earlier this year than last by one week, beginning early in September to the first week in October. All the fishermen and the settlers agree that the close season for whitefish should be from the 10th of September to the 15th of November, covering all the period during which they spawn. The ordinary gill-nets are used solely by the fishermen, the quantity used amounted to 16,470 fathoms, valued at \$1,483. They used 83 boats and skiffs, valued from \$5 to \$10; their carrying capacity varied from one to five tons, and about 162 men were engaged in fishing during the year. Eight barrels of whitefish at \$7 per barrel, and 112,200 pounds of whitefish at about 3 cents, and 5,100 pounds of smoked at 6 cents were marketed during the year, realizing altogether \$3,167. 57,000 pounds of pike at $\frac{1}{2}$ cent, value \$285; 14,600 pounds of pickerel or doré at 1 cent, value, \$146; and 10,200 pounds of Tullibee at 1 cent, value, \$102; aggregating a value of \$3,700.

Overseer Wm. McEwen, of Dunara, transmits his annual report for the district comprising Little Saskatchewan, Reindeer Island, Swampy Island, Berens River and Doghead. The fishery laws and regulations are well kept and respected, with the exception of Indians fishing for sturgeon in Pigeon River during the close time, and keeping them in ponds until the regular season begins, and then selling them to dealers. He also recommends a change in the grounds for collection of spawn for the hatchery.

He finds that the fishing industry is rapidly increasing as he has already received applications from new men for licenses for next year, owing to his having, throughout his trips, urged the advantage of their having licenses.

Overseer J. H. Adam, of the Water Hen River, reports on the fisheries of the district comprising Lake Dauphin, the southern portion of Lake Winnipegosis, and Water Hen River and Lake.

The total catch for the year, including that for home consumption, amounted to 439,500 pounds, valued at \$6,010. The quantity sold in Canada amounted to 16 per cent, or 71,500 pounds. The larger catch, this year, is principally due to the fishery regulations having been amended during the year 1894, allowing 500 yards to fishermen and winter fishing to commence two weeks earlier. From private informations gathered carefully, he thinks that the close seasons were fairly observed. In future, with a view to get the law better respected, and, with the least possible outlay, he recommends that every net in use, for which a license has been granted, be numbered or marked so that it may be readily distinguished from the illegal ones.

Fishery Officer Chas. Wood, for Fairford district, reports the catch of whitefish this season lower than that of former years. Not so much fish was shipped as in the past, owing to the dulness of the fish market. The fishermen went hunting instead of fishing. This fall fish seemed to be plentiful, they come in early to their spawning grounds and were not molested as in former years by the large fishing companies. It being strictly prohibited to fish now at the mouth of Little Saskatchewan River and in Sturgeon Bay, so they had better chances ascending that river to spawn at Lake St. Martin and Fairford. He regrets that the Indians are still allowed to fish during the close season wherever they choose. So soon as the fish get to their spawning grounds the Indians commence to catch them, and their increase is consequently interfered with. In his opinion, the department should grant them *fishery reserves* and limit

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them therein and thus benefit the people of this district and other places. However, they acted very well this year, they now begin to understand that they are to be blamed for the shortage of our fish supply, and this fall, they respected the law and obeyed the fishery regulations. He feels confident that in the future, improvements will be noticed in our fisheries that is, if fishing in Sturgeon Bay is prohibited.

Overseer Mr. Leo Schanus, of Fort Alexander, sends the annual return of the yield of the fisheries of the district No. 3, Lake Winnipeg, east side, Brokenhead to Doghead. He visited his district twice, in January and in October. Every fisherman took out a license, only the treaty Indians refuse to do so. Close season is generally well observed. One of the best spawning grounds for whitefish is at Rice River. No two fishermen agree about Sturgeon spawning time, as they find ripe roe in them in every month of the year, they conclude that they spawn all the year round. These fish are very numerous in this district for the last years, on the other hand whitefish is decreasing. Sturgeon usually haunts the spawning grounds of whitefish. Some fishermen are of opinion that sturgeon should not be protected by close season, because they are not much fished for during winter.

The decrease in the catch of whitefish and tullibee, is attributed to the scarcity of fish. About 696,220 pounds of different kinds of fish were caught, and of this amount 342,100 pounds were sold to Canadian buyers of Selkirk, and the remainder used for home consumption. No illegal fishing is carried on and all the fishermen in this district, Canadian citizens, own their fishing gear and dispose of their catch to Canadian firms. Robinson & Co. have two mills in this district: one at Bad Throat River, and the other at Rice River; at both places the law was well observed, in regard to dumping mill refuse in the water.

Fishery Officer G. W. Thompson, of the Gemli District, says it is difficult to determine the proper spawning time for sturgeon, opinions vary so much on that point, however, it seems evident that when the close season begins under the present law, most of the fish have spawned. The best time to catch the sturgeon is just after the ice has cleared away. From what he could gather, he thinks the close season should be between May 1st and June 1st, so that those who would request leave to catch the sturgeon after June 1st should be permitted to do so on trial. Close season for pickerel should also be changed from the 20th of May to the 20th of June, for it has been fully established that the above mentioned date is the proper spawning time for that species. Less whitefish have been caught this year than previously in this district. It is difficult to tell the real cause of this scarcity, but it may be ascribed to overfishing. The Indians and half-breeds catch a good many near the east coast of the lake, during the close season. There are more spawning places on that side than on the western. It has often been ascertained that the whitefish spawn before the 20th of November, so the close season might be shortened a few days. To benefit the poor settlers, he recommends that the license fees be rated per fathoms instead of a general fee for all nets. The present fishing regulations have been well obeyed. No breach of the law, or even rumours of such came to his knowledge.

MANI

RETURN of the Number and Value of Vessels, Tugs, Boats and Fishing Material, the
Manitoba, for

Number.	DISTRICTS.	VESSELS AND BOATS EMPLOYED.						FISHING MATERIAL.				
		Vessels or Tugs.			Boats.			Gill-Nets.		Seines.		
		Number.	Tonnage.	Value.	Men.	Number.	Value.	Men.	Fathoms.	Value.	Fathoms.	Value.
				§		§			§		§	
1	Commercial fishing, Lake Winnipeg	10	1290	90840	85	23	6400	92	53000	7435	...	...
2	Lower part of Red River and Lake Winnipeg to Willow Point, west, and Brokenhead, east					48	542	68	10400	886	...	...
3	Lake Winnipeg, east of Brokenhead to Doghead					155	1850	195	48750	7402	...	...
4	Lake Winnipeg, west side Willow Point, to Doghead					143	1835	196	48700	4870	...	...
5	Upper Red River					19	190	28	600	130	231	200
6	Rock Lake, Southern Manitoba								250	76	...	...
7	South Lake, Manitoba, Long Point to Totogan					24	240	107	53500	856	99	135
8	Little Saskatchewan River and Lake St. Martin					142	504	82	22500	798	...	...
9	Lake Winnipegosis Water Hen River					60	370	100	9000	884	...	...
10	The Narrows and Ebb and Flow Lake to Sandy Bay					83	731	162	16470	1483	...	...
11	Lake Winnipeg, north of Doghead					165	1960	170	38500	3900	...	...
	Totals	10	1290	90840	85	862	14622	1200	301670	28720	330	335
	Values	§										

Marine and Fisheries—Fisheries Branch.

TOBA.

Number of Men employed, &c., with the Kinds and Quantities of Fish in the Province of the Year 1895.

KINDS OF FISH.											VALUE.		Number.
Whitefish, brls.	Whitefish, lbs.	Whitefish, smoked, lbs.	Pickarel or Doré, lbs.	Pike, lbs.	Sturgeon, lbs.	Tullibee, lbs.	Perch, lbs.	Catfish, lbs.	Mixed fish, lbs.	Home consumption, lbs.	\$	cts.	
168	2689609		16850	960							108,949	06	1
			108600	183400			23450	36300	41400		7,937	50	2
	51050		197010	61535	75800	38000		25324	247500	354120	19,244	44	3
	137880		260880	35500		230600		18100	206700	313280	24,044	40	4
	3000	1000	32000	80000					13700		1,267	00	5
											1,600	00	6
	40760		40070	185400						20070	6,741	20	7
	239520		31680						49000	244860	13,469	80	8
	171000		23500	59000			6000		170000	368000	14,165	00	9
8	112200	5100	34600	83600		10200			58400	107900	9,360	00	10
	784000		186000		28440				72000	520000	43,997	60	11
176	4229019	6100	931190	689395	104240	278800	29450	79724	858700	1928230			
880	169161	305	27936	13788	4170	5376	294	797	8587	19282	250,766	00	

RECAPITULATION

Of the Yield and Value of the Fisheries of **Manitoba**, for the Year 1895.

Kinds of Fish.	Quantity.	Price.	Value.
		\$ cts.	\$ cts.
Whitefish.....	Brls. 176	5 00	880 00
do fresh.....	Lbs. 4,229,019	0 04	169,160 76
do smoked.....	“ 6,100	0 05	305 00
Pickarel.....	“ 931,190	0 03	27,935 70
Pike.....	“ 689,395	0 02	13,787 90
Sturgeon.....	“ 104,240	0 04	4,169 60
Tullibee.....	“ 278,800	0 02	5,576 00
Perch.....	“ 29,450	0 01	294 50
Catfish.....	“ 79,724	0 01	797 24
Mixed fish.....	“ 858,700	0 01	8,587 00
Home consumption.....	“ 1,928,230	0 01	19,282 30
Total.....	9,170,048		250,776 00

STATEMENT of the Fishing Material in **Manitoba**, for the Year 1895.

Material.	Value.
	\$ cts.
6 fishing tugs, 163 tons, 60 men.....	21,690 00
4 do vessels, 1,127 tons, 25 men.....	69,150 00
862 do boats, 1,200 men.....	14,622 00
301,670 fathoms gill-nets.....	28,720 00
330 do seines.....	335 00
67 freezers and ice-houses.....	55,434 00
18 piers and wharfs.....	5,200 00
Total.....	195,151 00

APPENDIX No. 9.

NORTH-WEST TERRITORIES.

REPORT OF THE FISHERIES OF THE NORTH-WEST TERRITORIES FOR
THE YEAR 1895 BY THE INSPECTOR, F. C. GILCHRIST.

NOTE.—The following is more in the nature of a preliminary report, as Inspector Gilchrist died before completing his regular annual report. Hence the lack of information on this large and important district. The absence of the overseers' reports also rather abbreviated this appendix.

FORT QU'APPELLE, N.-W. T. 2nd January, 1896.

To the Honourable

The Minister of Marine and Fisheries.

SIR,—The yield of fish in the Territories is somewhat short of the previous years. The principal reason for this falling off is the extending of the area on which the regulations are being enforced. There are other causes of the decrease but they are more of a local nature and effects. Where the decline follows the carrying out of the regulations, it means that to the extent of the greater part of the decrease the fish have been allowed to propagate themselves unmolested for the first time perhaps in years.

PRINCE ALBERT DISTRICT.

The catch in this section is somewhat greater than last year, owing largely to the fact that a number of settlers, principally half-breeds, who had, owing to the drought, very poor or no crops, began to fish in the lakes north of Prince Albert for the market. These people are selling their fish to the representative of an eastern firm, and intend carrying on the industry most of the winter. Several prosecutions for infractions of the regulations have taken place, but, on the whole, the law has been well observed.

BATTLEFORD DISTRICT.

The catch of fish in this district shows a small increase. The law has been fairly well observed.

LAC LA BICHE DISTRICT.

A reduction is shown in the catch of this district. The close season was, considering everything, well observed at Lac la Biche, and the lakes in the neighbourhood this past fall, and if it can be kept so, the fisheries cannot fail to improve. This lake is at a critical stage, for its fish have been largely reduced in numbers, and as there are about 300 resident half-breeds there who live very largely on fish, it is a serious matter to them and to the country.

EDMONTON DISTRICT.

The catch here shows a general falling off, owing to the better enforcement of the close seasons, the only exception being at Pigeon Lake, where the catch has been steadily increasing for the last three years. This is due to the persistent carrying on of, principally, winter fishing by licensed white, half-breeds and Indian fishermen, the close seasons being strictly observed.

CALGARY AND BELLEY DISTRICTS.

These districts cover that portion of the Rocky Mountains lying within the territories between the main line of the Canadian Pacific Railway and the international boundary line, and the streams running out of them, as far east as the trout go down stream. The fish are almost entirely mountain and river trouts, caught by hook and line, except in the Kootenay, Crow's Nest Pass, and Minnewankan (Devil's) lakes, where there are lake trout, and, in the first mentioned, whitefish (*chipeiformis*) as well. The law is not so well observed here as it should be; but the district is large and the work so expensive that it is difficult to see how matters can be improved until such time as the financial state of the country admits of the expenditure of larger sums of money in the protection of the fisheries. Still, some good work has been done by guardians, both N. W. Mounted Police and civilian.

LONG LAKE DISTRICT.

There was heavier fishing done in this valuable lake during the past year than heretofore; and its fisheries are in good order.

QU'APPELLE DISTRICT.

In this district, which is more immediately under my own control, the catch shows an improvement. The guardians at Eagle Quill, Qu'Appelle and Crooked Lakes have carried out their instructions, and, in consequence, there have been very few cases of illegal fishing.

CUMBERLAND DISTRICT.

In the vicinity of Cumberland House the close season this fall was observed, but at a distance from this post it was not. This was due to sickness and death in the family of the guardian there, which prevented his leaving home for any length of time, and the natives took advantage of this by going some miles away to fish. However, the grounds that had been worked for years were given a rest, and so much at least was gained.

To one acquainted with the immensity of this country it is not easy to explain the difficulties your officers have to contend with in carrying out the law. Take the Cumberland District as an example. All arrangements for the protection of the breeding fish must be made months ahead; and, if anything should, at the last moment occur to upset these plans there is no help for it, for it requires at least two months to set things right by mail. It is the same way with Lac la Biche district. The protection of the valuable fisheries of these outlying districts is very expensive.

Marine and Fisheries—Fisheries Branch.

STATEMENT

Of the Yield of Fisheries in the North-west Territories for the Year 1895.

Kinds of Fish.	Quantity.	Value.
	Lbs.	\$ cts.
Whitefish.....	6,657,150	332,857 50
Trout.....	8,450	422 50
Pickereel.....	3,100,000	93,000 00
Pike.....	1,415,000	28,900 00
Sturgeon.....	132,000	3,960 00
Tullibee.....	40,000	800 00
Coarse and mixed fish.....	4,175,200	41,750 00
Totals.....	15,557,800	501,690 00

STATEMENT of fishing boats and nets in the North-west Territories.

260 fishing boats.....	\$2,600
20,500 fathoms gill-nets.....	4,500
Total.....	\$7,100

RECAPITULATION

Of the Yield and Value of the Fisheries of Manitoba and the North-west Territories for the Year 1895.

Kinds of Fish.	Quantity.		Value.
	Brls.	Lbs.	\$ cts.
Whitefish.....	Brls.	176	880 00
do fresh.....	Lbs.	10,886,169	502,018 26
do smoked.....	“	6,100	305 00
Pickereel.....	“	4,031,190	120,935 70
Pike.....	“	2,134,395	42,687 90
Sturgeon.....	“	236,240	8,129 60
Tullibee.....	“	318,800	6,376 00
Trout.....	“	8,450	422 50
Perch.....	“	29,450	294 50
Catfish.....	“	79,724	797 24
Coarse and mixed fish.....	“	5,033,900	50,337 00
Home consumption.....	“	1,928,230	19,282 30
Totals.....		24,684,374	752,466 00

APPENDIX No. 10.

BRITISH COLUMBIA.

ANNUAL REPORT ON THE FISHERIES OF BRITISH COLUMBIA FOR
THE YEAR 1895, BY INSPECTOR JOHN McNAB.

NEW WESTMINSTER, B.C., 2nd January, 1896.

To the Honourable
The Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit my annual report on the fisheries of British Columbia for the year 1895, together with tabulated statements of their yield and value.

The season has been the most prosperous in the history of the industry in British Columbia, and, omitting fur seal skins, the value of the products of the fisheries proper is greater than that of any former year.

Twenty million seven hundred and eighty thousand one hundred and seventy pounds of salmon were canned on the Fraser River, and *eight million sixty-six thousand nine hundred and thirty-two pounds* in the other districts of the province.

The aggregates of the value of the salmon canned for five years are as follows:—

1891.....	\$1,517,060
1892.....	1,148,860
1893.....	2,916,990
1894.....	2,362,714
1895.....	2,884,710

The catch in the traps of the United States fishermen at Point Roberts was about equal to 12 per cent of the Fraser River catch.

Forty-seven canneries were operated during the season, 31 on the Fraser, 16 on the northern coast and one on the west coast of Vancouver Island.

A great deal of activity was manifested during the summer in searching for places where canneries could be established with good prospects of a salmon supply to ensure a successful business and likely several new establishments will be opened next year,

The large increase of salmon noted in the Fraser River in late years is, in my opinion to be credited to the hatchery and to the fact that the depredations of the Indians on the spawning grounds and their destruction of young salmon when descending from the lakes, has been kept more under control than formerly.

The catch of salmon in the Skeena River was unsatisfactory. The other northern streams gave a fair average.

The experiment of shipping fresh salmon to Europe, via Australia, in cold storage has proved fairly successful, and the company engaged therein have determined to enlarge the capacity of their cold storage premises in New Westminster and make larger shipments during the season of 1896.

The grand total of salmon cured by various methods together with the shipments of fresh salmon from the province forms the immense aggregate of 31,818,593 pounds.

The export of fresh halibut during the season was larger than during the previous year by upwards of 500,000 pounds.

Marine and Fisheries—Fisheries Branch.

The capital invested in fishing plant and materials, including the fur seal fleet, &c., is for

1895.....	\$2,085,435
1894.....	1,942,978
Increase.....	\$ 142,457

PROTECTION OF FISHERIES.

The protection service was, on the whole, satisfactory during the season, and the guardians active and faithful, but as it is now necessary to keep a patrol boat employed all the year around on the Fraser River and lakes, a more suitable boat than the open launch "Claymore" is required, in order that the service—the importance of which cannot be over-estimated—may be efficiently performed.

The catch of fur seals by Canadian vessels was less than that of 1894 by 23,115 skins.

The guardians employed on the northern rivers all reported good catches of salmon, with the exception of the Skeena, where the catch was again small.

I have the honour to be, sir,
Your obedient servant,

JOHN McNAB,
Inspector of Fisheries for British Columbia.

A.—SCHEDULE of Salmon Canneries in British Columbia, Season 1895.

Owner or Agent.	Name of Cannery.	Year first operated.	No. of Boats.	Packed in 1-lb. Cans.				
				1892.	1893.	1894.	1895.	
<i>Fraser River.</i>								
Bon Accord Fishing Co.....	Sea Island.....	1890	20	384,480	2,109,600	1,216,704	960,816	
J. H. Todd & Son.....	Beaver.....	1888	20	609,000	1,573,536	1,210,560	1,287,216	
do.....	Richmond.....	1882	20					
Ewen & Co.....	Ewen's.....	1876	20	384,000	2,112,000	1,200,000	1,296,000	
British Columbia Canning Co., London..	Fraser River Cannery.....	1876	20	36,400	640,900	360,000	337,200	
	Harlock's.....	1882	20	200,064	722,640	484,368		
	Delta.....	1887	20	204,000	872,960	521,904		
Victoria Canning Co., T. E. Ladner, Agent.....	Wellington.....	1880	20	288,000	615,200	706,752	3,246,000	
	Ladlaw's.....	1878	20	192,800	610,122	286,704		
	Holly.....	1890	20	180,000	662,400	545,520		
	Wadhams.....	1887	20					
	British Columbia.....	1887	20					
Anglo-British Columbia Canning Co. (Limited), H. Bell-Irving, Agent.....	British American.....	1887	20					
	Canoe Pass.....	1888	20	1,532,208	6,296,832	4,021,200	5,743,048	
	Phenix.....	1887	20					
	Gary Point.....	1889	13					
	Anandale.....	1891	20					
	Dumfries.....	1891	20					
Terra Nova Packing Co.....	Terra Nova.....	1892	20	216,000	794,400	432,000	453,600	
Lulu Island Canning Co.....	Lulu Island.....	1893	20		1,032,000	753,600	624,000	
Pacific Coast Packing Co.....	Pacific Coast.....	1893	20		736,800	636,480	550,560	
Steveston Canning Co.....	Steveston.....	1883	20		1,056,000	837,216	768,000	
Short & Squire.....	Inperial.....	1893	20		816,000	598,320	600,000	
Canadian Pacific Canning Co.....	Canadian Pacific.....	1893	20		1,296,000	988,180	936,000	
Brunswick Canning Co.....	Brunswick.....	1893	20		816,000	792,000	601,200	
Fisherman's Canning Co.....	Fisherman's.....	1894	20			549,744	565,840	
Gulf of Georgia Canning Co.....	Gulf of Georgia.....	1894	20			884,640	816,480	
Good Murphy, Denamore & Co.....	Good Murphy.....	1894	20			425,280	460,800	
Victoria Canning Co.....	Standard.....	1890	20				338,832	
Balmoral Canning Co.....	Balmoral.....	1886	20	540,000	354,432	317,952	456,000	
Royal Canadian Packing Co.....	Royal Canadian.....	1892	20	576,000	456,000	331,200	378,834	
Cunningham & Son.....	Skeena.....	1883	20	540,000	387,120	336,000	360,000	
Anglo-British Columbia Packing Co.....	British American.....	1883	20	540,000	364,800	360,000	546,480	
do.....	North Pacific.....	1889	20	540,000	355,200	456,000	441,600	
British Columbia Canning Co. (Limited), London	Windsor.....	1878	20	540,000	321,600	445,488		
Turner, Beeton & Co.....	Inverness.....	1878	20	540,000	288,000	374,400	391,824	

Marine and Fisheries—Fisheries Branch.

Cunningham & Rood.....	Lower Inlet Cannery.....	1890	540,000	420,144	360,000	415,680
F. Bontiller & Co.....	Bontiller.....					389,000
Costello & McMoran.....	Star.....					769,921
Alliance Canning Co.....	Alliance.....					182,400
Atlas Canning Co.....	Atlas.....					192,000
Munn & Holland.....	Carlisle.....					386,000
<i>Rivers Inlet District.</i>						
British Columbia Canning Co. (Limited), London.....	Rivers Inlet Cannery.....	1882	264,000	720,000	820,800	961,872
do.....	Victoria Cannery.....	1882	230,400	500,000	524,400	495,360
R. P. Rithet & Co., Agents.....	Warrack.....	20	223,440	480,000	582,528	442,464
Alert Bay Canning Co.....	Alert Bay Cannery.....	1881	206,400	177,936		301,584
Anglo-British Columbia Co.....	Good Hope.....					912,000
Namu Cannery Co.....	Namu.....					144,000
Clayoquot Cannery Co.....	Clayoquot.....					158,400
<i>Naas River District.</i>						
Federation Canning Co.....	Federation.....	1888	540,000	360,000	960,000	936,000
do.....	Mill Way.....	1889	352,800	192,000		
	(Grand Totals.....)		11,588,592	29,169,908	23,627,140	28,847,101

B.—REPORT of Catch, &c., of British Columbia Sealing Fleet, Season, 1895.

Vessels.	Masters.	Tons.	CREWS.				CATCH.					Totals.
			Whites.	Indians.	Boats.	Canoes.	B. C. Coast.	Japan Coast.	Copper In'd Coast.	Behring Sea.		
									Males.	Females.		
Agnes McDonald...	M. F. Cutter...	107	28	14	8	7		711		593	669	1,973
Ainoko	G. Heater	75	7	26	2	13	325			479	515	1,319
Amateur	C. Jipson	16	2	14		7	65					65
Annie C. Moore...	C. Hackett	113	8	30	2	15	105			730	812	1,647
Annie E. Paint...	Annie Bissett...	82	26		8			1,121	135	191	575	2,022
Arietis	O. Scarf	86	22		7			680	426			1,106
Aurora	T. Harold	41	7	22	2	11	108			186	527	821
Beatrice, of Shanghai	D. G. Macanley...	66	5	28	1	14	230			608	838	1,676
Beatrice, of Vancouver	L. Olsen	49	18		6	2				93	109	202
Borealiss	E. Robbins	37	21		6			801	110	96	641	1,648
Brenda	C. E. Locke	100						881				881
C. D. Rand	J. J. Whiteley	51	7	16	3	8	143			182	459	784
Carlotta G. Cox...	C. J. Harris	76	26		8			920	22	176	449	1,567
Casco	C. Le Blanc	63	19		6			1,308	351			1,659
City of San Diego.	S. Pike	46	17		5			370	243			613
Diana	A. Nelson	50	19		6			872	292			1,164
Director	F. W. Gilbert	87	23		7				71	317	300	688
Dora Seward	H. F. Seward	93	7	36	2	18	503			766	813	2,082
E. B. Marvin	W. D. Byers	96	27		8			946	10	125	251	1,332
Enterprise	J. Daly	69	7	30	2	15	221			947	782	1,950
Favourite	L. McLean	80	5	36	1	18	150			927	720	1,797
Fawn	M. Keefe	59	6	28	1	14	248			460	316	1,024
Fisher Maid	C. Chipps	21	1	12		6	109					109
Florence M. Smith.	L. McGrath	99	8	41	2	20	285			564	594	1,443
Fortuna	J. Cousins	97	18		5			219				219
Geneva	W. O'Leary	92	29		9			1,137	470			1,607
Henrietta	W. D. McDougall	31	7	8	2	4				45	156	201
Kate	O. Buckholz	53	6	21	2	10	181			279	394	854
Katherine	J. Gould	81	7	21	2	11	159			288	403	850
Kilmeny	R. Southby	18	3	8		4	15					15
Labrador	J. G. Searle	25	4	11		6	51			107	152	310
Libby	F. Hackett	92	8	21	2	11	234			451	1,016	1,701
Mary Ellen	G. R. Ferey	63	10	20	5	10		854		106	356	1,316
Mary Taylor	R. O. Lavender	43	18		5		369		434			803
Mascot	E. Lorenz	40	7	16	2	8		787	168	126	223	1,304
Maud S.	R. E. McKiel	97	2	32	9	16	287			750	642	1,679
May Belle	E. Shields	53	7	28	2	13	234			437	676	1,347
Mermaid	W. H. Whitely	73	24		7			1,113	753			1,866
Minnie	V. Jacobson	46	8	18	3	9				266	303	659
Mountain Chief.	J. Nawassen	23	2	16		6	39					39
Ocean Belle	P. Martin	83	23		7			1,056	562			1,618
Oscar & Hattie...	T. Magnessen	82	9	24	3	12	147			648	519	1,314
Otto	J. McLeod	86	8	32	3	14	285		30	432	364	1,111
Pachwillis	J. Nyetan	19		14		7	66					66
Penelope	W. Heater	69	5	24	2	12				238	532	770
Pioneer	W. E. Baker	66	24		7			845	790			1,635
Rosy Olsen	A. B. Whidden	39						627				627
Sadie Turpel	J. Anderson	56	19		6			798	470			1,268
Sapphire	Wm. Cox	108	8	37	3	19	192			827	956	1,975
San Jose	M. Foley	32	5	20	2	10	147			318	251	716
Saucy Laas	D. Martin	38	6	21	1	10	257			269	432	958
Shelby	C. Claussen	16	10		4		124					124
South Bend	C. F. Dillon	21	4	10	1	4				37	111	148
Teresa	G. Meyer	63	8	17	2	9	102			335	532	969
Triumph	C. M. Cox	98	8	43	3	19	353			862	995	2,210
Umbrina	C. Campbell	99	25		7			1,187	562			1,749
Vera	W. Shields	60	19		6			853	15	177	272	1,317
Victoria	R. Balcan	63	7	25	2	12	187			601	566	1,354
Viva	M. Pike	92	23		7			601	367			968
Walter L. Riel...	S. Balcan	76	9	24	2	12	145			678	534	1,357
Wanderer	H. Paxton	25	2	10	1	5				197	159	356
Indian canoe-catch.							3,787					3,787
Totals		3,892	788	854	217	421	9,853	18,687	6,281	15,914	20,004	70,739

Total Canadian catch	70,739
Catch of "Director," off Falkland Islands	620
do American schooners landed at Victoria	2,255
Grand total	73,614

Marine and Fisheries—Fisheries Branch.

C.—RETURN showing the Number, Tonnage and Value of Vessels and Boats, and the Number of Men engaged in the Fisheries, Quantity and Value of Fishing Materials, Kinds and Quantities of Fish, &c., in the Province of **British Columbia**, for the Year 1895.

DISTRICTS.	VESSELS AND BOATS EMPLOYED.						FISHING MATERIAL.				KINDS OF FISH AND FISH PRODUCTS.						
	Vessels.		Boats.		Gill-Nets.		Seine.		Salmon, brs.	Salmon, fresh, lbs.	Salmon, smoked, lbs.	Salmon in cans.	Sturgeon, lbs.	Number.			
	Number.	Value.	Men.	Number.	Value.	Men.	Fathoms.	Value.							Fathoms.	Value.	Lines, value.
1 Fraser River District.	40	154480	130	1770	70800	8529	260000	195000	1800	2000	950	1068	1522392	8000	20780171	350000	1
2 Howe Sound to Rivers Inlet.	5	7000	15	160	6400	654	14500	10850	250	375	150	145	10000	5000	3113280	.....	2
3 Rivers Inlet to Skeena River.	10	40180	30	425	12750	2500	75500	56000	1000	1500	50	1000	150000	600	38032550	.....	3
4 Skeena River to Alaska boundary.	1	2500	3	90	3500	360	18000	13500	250	375	1000	150	8000	10000	985000	.....	4
5 East Coast of Queen Charlotte Island.	.....	.....	.....	25	3750	110	25000	25000	300	450	250	60	1500	2000	.....	.....	5
6 West Coast of Queen Charlotte Island.	.....	.....	.....	20	2000	60	12000	900	300	450	250	25	25000	5500	.....	.....	6
7 Cape Scott to Comox.	.....	.....	.....	15	1500	35	15000	1000	300	450	250	50	50000	5000	.....	.....	7
8 Comox to Victoria.	55	11000	160	60	3500	120	3000	2000	4000	6000	3000	50	50000	5000	.....	25000	8
9 Victoria to Cape Beale.	5	1500	15	20	1000	60	1500	1000	1000	1500	4000	150	25000	8000	.....	.....	9
10 Cape Beale to Cape Scott.	3	750	12	15	750	50	1500	1000	200	300	200	500	4000	2500	158400	.....	10
Totals.	119	217410	365	2600	106050	12478	379200	283750	9100	12950	9850	3145	1795892	46500	28947101	375000	

Marine and Fisheries—Fisheries Branch.

D.—RECAPITULATION

Of the Yield and Value of the Fisheries of **British Columbia**, for the Year 1895.

Kinds of Fish.	Quantity.	Price.	Value.
		\$ cts.	\$ cts.
Salmon, in cans	Lbs. 28,847,101	0 10	2,884,710 10
do fresh	" 1,795,892	0 10	179,589 20
do salted	Brls. 3,148	10 00	31,480 00
do smoked	Lbs. 46,600	0 15	6,990 00
Sturgeon, fresh, dressed	" 375,000	0 05	18,750 00
Halibut, fresh	" 2,586,700	0 05	126,835 00
Herring do	" 249,500	0 03	7,485 00
do smoked	" 27,530	0 10	2,753 00
Oulachans, fresh	" 370,700	0 05	18,500 00
do smoked	" 9,500	0 15	1,425 00
do salted	Brls. 1,070	10 00	10,700 00
Trout, fresh	Lbs. 56,350	0 10	5,635 00
Fish, assorted and mixed	" 447,900	0 05	22,395 00
Smelts, fresh	" 58,000	0 05	2,900 00
Codfish do	" 282,000	0 05	14,100 00
Skill, salted	Brls. 85	10 00	850 00
Fur seal skins	No. 71,359	10 00	713,590 00
Hair do	" 3,660	0 75	2,737 50
Sea otter	" 16	125 00	2,000 00
Oysters	Bush. 4,000	2 00	8,000 00
Clams and mussels			9,080 00
Crabs and abelonies			18,600 00
Shrimps and prawns			5,000 00
Caviar			1,500 00
Isinglass			750 00
Fish oil	Galls. 135,000	0 40	54,000 00
Fish guano	Tons. 50	20 00	1,000 00
Estimate of fish consumed in the province, not included in the above.			250,000 00
Value of seal skins landed in Victoria by United States vessels			4,401,354 80
			22,550 00
Grand total			4,423,904 80

E.—Capital invested in Fishing Plant and Material, including the Fur-seal Fleet, Boats, &c., of **British Columbia**, for the Year 1895.

Kinds of Fish.	Value.	Total.
	\$	\$
49 salmon canneries—average.....	20,000	980,000
12 oil factories.....	750	9,000
4 cold storage and freezers.....		35,000
salteries.....		4,000
119 vessels.....		217,410
2,600 boats.....		106,050
379,200 fathoms of gill-nets.....		283,750
910 do seines.....		12,350
lines, hooks, &c.....		9,850
scows and flat boats.....		6,000
		1,664,010
61 vessels employed in fur-seal fishing.....	389,200	
217 boats do do.....	21,700	
421 canoes.....	10,525	
		421,425
Grand total.....		2,085,435

Hands employed in boat fishing.....	12,478
do do vessel fishing.....	365
Sailors and hunters in sealing fleets—	
Whites.....	788
Indians.....	854
	<u>14,485</u>

Marine and Fisheries—Fisheries Branch.

APPENDIX No. 11.

REPORT ON THE FISHERIES PROTECTION SERVICE OF CANADA BY COMMANDER O. G. V. SPAIN.

OTTAWA, 15th December, 1896.

To the Honourable
The Minister of Marine and Fisheries.

SIR,—I have the honour to report on the work of the Fisheries Protection Service under my command during the past season, as follows:—

The vessels comprising the fleet are as shown in the following table :

Vessel.	Officer Commanding.	Date of Commission.	Date Paid off.
Cruiser "Acadia".....	Commander Spain.....	May 26....	Nov. 12.
do "La Canadienne".....	do Wakeham.....	May 10....	Nov. 21.
do "Stanley".....	Capt. Finlayson.....	June 20....	Sept. 11.
do "Constance".....	do May.....	March 10....	Nov. 25.
do "Curlew".....	do Pratt.....	April 15....	Dec. 4.
do "Petrel".....	do Dunn.....	April 30....	Dec. 3.
Patrol Launch "Dolphin".....	do Pearson.....	April 30....	Dec. 3.
Cruiser "Osprey".....	do McKenzie.....	Sept. 15....	Nov. 12.
do "Kingfisher".....	do Kent.....	April 1....	Dec. 15.
do "Vigilant".....	do McKenzie.....	April 20....	Sept. 15.
do "Aberdeen".....	do Knowlton.....	At my disposal for a short time during the early part of the season also for a couple of weeks when the "Stanley" paid off.	

The "Acadia" was employed in general superintendence of the work, from Cape Sable on the coast of Nova Scotia, to Cape Gaspé in Quebec.

"La Canadienne" took up her usual station on the Quebec and Labrador coasts. This vessel acts independently of the rest of the fleet, and is commanded by Dr. Wakeham, the officer in charge of the Quebec division of fisheries. She was also employed a considerable part of her time in lighthouse and buoy work.

The "Stanley" was employed in the Gulf of St. Lawrence and north shore of Prince Edward Island, cruising between east point of the island and Port Daniel in Quebec, but was paid off early on account of getting her ready for winter work, when she was replaced for a short time by the "Aberdeen."

The "Constance" was employed in revenue work in the River St. Lawrence, and round the Gaspé coast. She has made some seizures, and has done her work well, but smuggling is being carried on round our shores to an enormous extent, and one vessel is quite unable to put a stop to it. I would suggest the following for the approval of the Honourable the Controller of Customs:—let the "Constance" make her headquarters at Gaspé, and look after the Baie Chaleurs and as far up the river as possible; have a good stout steam launch with her headquarters at Rivière du Loup: let her work down to where the "Constance" stops, and have a vessel of about 160 tons, to steam about 14 knots, with headquarters at North Sydney. This, no doubt,

would entail a certain expenditure, but I am under the impression that I could guarantee to put a stop to smuggling, if my suggestions were carried out. We could seize more contraband in the season than would pay for the vessel, or we could prevent it coming at all, which would be just as good. The vessels under my command in the Fisheries Protection Fleet have altogether too much to do looking after our own and United States fishermen to allow of adequate attention to smugglers.

"Curlew."—This vessel was employed in the Bay of Fundy, and on the Nova Scotia and Cape Breton coast.

The "Petrel" was employed mainly in Lake Erie, with headquarters at Port Stanley and Amherstburg, looking after our fishermen's interests.

"Dolphin."—This patrol boat was employed in the Georgian Bay with headquarters at Owen Sound. She was carrying out the rules and regulations of the department, looking after our own fishermen.

"Osprey."—This is the new schooner built by Mr. Joseph McGill, of Shelburne. She is 120 feet over all, 100 feet water line, 25 ft. 6 in. beam, and 13 feet draught of water, and about 127 tons. Her deck planking is Oregon pine, oak planked to water line; bottom planks of birch, and masts of Oregon pine. I am of the opinion that this vessel is the fastest of her class on the continent. She spreads 2,227 square yards of canvas, and does her work most admirably. Her station has been from Canso to Sydney, with headquarters early in the season at Canso, and later on at Sydney.

"Kingfisher."—Principally employed off the east point of Prince Edward Island, and from there in the fall went to Sydney, and escorted the last of the United States fishermen off our coasts, making Shelburne her headquarters during the latter part of the season.

"Vigilant."—This vessel was engaged on the Nova Scotia and Cape Breton coasts, more especially looking after the lobster fishermen. She was too slow for any other kind of work. The "Osprey" took her place in the middle of September, and she was handed over to Mr. McGill in part payment of the new vessel.

"Aberdeen."—This vessel, under the command of Captain Knowlton did most excellent service in the spring, protecting the three-mile limit. She made the seizure of the United States schooner "Frederick Gerring, Junior."

In all my former reports I have drawn attention to the extreme desirability of retaining the services of our good men through the winter, and it was a source of gratification to me to be able to place a few good men in the "Newfield" and the "Stanley."

SEIZURES.

The only seizure of a United States fishing vessel made during the season was that of the schooner "Frederick Gerring Junior." She was seized within one and one-half miles of Gull Ledge, off the coast of Guysborough, Nova Scotia, on the 25th May, by Captain Knowlton, for bailing mackerel out of a seine inside the limits. The master pleaded that the fish were caught outside, and if she was inside at the time of seizure, she had drifted in, and that the act of fishing was finished when the fish were once inclosed in the seine. The case was tried in the Admiralty Court of Nova Scotia before the Chief Justice, and the vessel was condemned and confiscated. However, the defendants appealed to the Supreme Court at the capital. The case was heard, but judgment has been reserved.

LICENSES FOR FOREIGN FISHING VESSELS.

An Order in Council being passed sanctioning the continuance of the system of the issue of licenses commenced under the *modus vivendi* appended to the Treaty of Washington, 1888, similar licenses were again issued for 1896, and the charge of \$1.50 per ton formerly made was continued.

The following table gives a list of the vessels which took out these licenses during year 1896:

Marine and Fisheries—Fisheries Branch.

SCHEDULE of United States Fishing Vessels to which Licenses were issued under the Act entitled "An Act respecting Fishing Vessels of the United States of America," during the year 1896.

Name of Vessel.	Port of Registry.	Tonnage.	Port of Issue.	Fee.
Robin Hood	Gloucester	88	Shelburne, N.S.	132 00
Electer	do	113	Pubnico, N.S.	169 50
Alice R. Lawson	do	115	do	172 50
Monitor	do	104	Tusket, N.S.	156 00
Mystery	do	114	Pubnico, N.S.	171 00
Fernwood	do	124	do	186 00
Josie M. Calderwood	do	86	Tusket, N.S.	129 00
Annie Wesley	do	88	do	132 00
Thetis	do	91	do	136 50
Nellie Burns	Portland	64	Yarmouth, N.S.	96 00
Margaret	Salem	107	Tusket, N.S.	160 50
Madonna	Gloucester	110	do	165 00
Howard Holbrook	do	92	Liverpool, N.S.	138 00
American	do	118	Tusket, N.S.	177 00
A. E. Whyland	do	123	Yarmouth, N.S.	184 50
Enma M. Dyer	do	77	Campobello, N.B.	115 50
Judique	do	115	Port Hawkesbury, N.S.	172 50
Pinta	do	94	Canso, N.S.	141 00
Ettie	do	44	Halifax, N.S.	66 00
Mayflower	do	108	Port Hawkesbury, N.S.	162 50
Mascomomo	do	91	do	136 50
Mary E	do	64	St. Peter's, N.S.	96 00
Notice	do	63	Port Hawkesbury, N.S.	94 50
Oliver Cromwell	Provincetown	60	do	90 00
Frank G. Rich	Booth Bay	72	St. Peter's, N.S.	108 00
Willie L. Swift	Provincetown	95	do	142 50
Volunteer	Gloucester	102	Canso, N.S.	153 00
Annie G. Quiner	Bucksport	79	St. Peter's, N.S.	118 50
Winona	Gloucester	103	Liverpool, N.S.	154 50
Stranger	do	82½	Port Mulgrave, N.S.	123 76
Flora L. Nickerson	Booth Bay	63	Louisburg, N.S.	94 50
Carrier Dove	Gloucester	82	Port Hawkesbury, N.S.	123 00
Carrie E. Sayward	do	59	Port Mulgrave, N.S.	88 50
Joseph B. Maguire	do	88½	do	132 75
Carrie W. Babson	do	86	do	129 00
Gladiator	do	107	Amherst, M.I., Que.	160 75
D. A. Wilson	Salem	61	Pubnico, N.S.	91 50
Everett Pierce	Gloucester	65	Souris, P.E.I.	97 50
Marathon	do	65	Port Mulgrave, N.S.	97 50
Arbutus	do	114	Amherst, M.I., Que.	170 75
Lizzie J. Greenleaf	do	88	Port Mulgrave, N.S.	132 00
Edward Trevoiy	do	88	Liverpool, N.S.	132 00
Penobscot	do	85	Port Hawkesbury, N.S.	127 50
Davy Crockett	do	80	Canso, N.S.	120 00
Louis & Rosie	Booth Bay	49	Port Mulgrave, N.S.	73 50
Landseer	Gloucester	94	do	141 00
Addie M. Story	do	58	do	87 00
Richard Lester	do	69	Port Hawkesbury, N.S.	103 50
Florence Nightingale	do	39	do	58 50
J. E. Garland	do	76	Port Mulgrave, N.S.	114 00
Abbie M. Deering	do	96	Souris, P.E.I.	144 00
Reporter	do	79	do	118 50
Mist	do	68	Canso, N.S.	102 00
Hereward	do	85½	Lockeport, N.S.	128 40
Mattie Winship	do	73	Pubnico, N.S.	109 50
John Smith	do	62	Port Hawkesbury, N.S.	93 00
Matthew Keany	do	67	Port Mulgrave, N.S.	100 50
Lottie S. Morton	do	64	do	96 00
Noonday	do	72	do	108 00
Hattie Evelyn	do	66	Port Hawkesbury, N.S.	99 00
Dido	do	78	Port Mulgrave, N.S.	117 00
Charles H. Taylor	do	92	Canso, N.S.	138 00
Grace L. Fears	do	85	Port Mulgrave, N.S.	127 50
Geo. S. Boutwell	do	34	do	96 00
Ralph E. Eaton	do	65	Port Hawkesbury, N.S.	97 50

SCHEDULE of United States Fishing Vessels, &c.—Continued.

Name of Vessel.	Port of Registry.	Tonnage.	Port of Issue.	Fee.
Epes Tarr	Gloucester.....	66	Port Hawkesbury, N.S.	99 00
Wm. E. McDonald	do	94	Port Mulgrave, N.S.	141 00
Golden Hope	do	101	Pubnico, N.S.	151 50
Lizzie M. Stanwood	do	100	Souris, P.E.I.	150 00
David Sherman	do	67	do	100 50
Lizzie Walworth	Millbridge.....	8	Campobello, N.B.	12 00
Margaret Mather	Gloucester.....	91	Souris, P.E.I.	136 50
F. R. Walker.....	do	68	do	102 00
Meteor	do	119	Lockeport, N.S.	178 50
Pendragon	do	68	Charlottetown, P.E.I.	102 00
Joseph Rowe	do	177	Liverpool, N.S.	190 50
F. W. Homans	do	62	Amherst, M.I., Que.	92 75
Total		6,390 ⁰⁰		9,585 65

SUMMARY.

Total number of vessels	77
Total tonnage	6390-60
Total amount received in fees	\$ 9583 65

In connection with these licenses it is highly gratifying to notice that the condition *re* sale or transfer of supplies by licensed United Vessels to unlicensed inserted in the licenses for last year has been of some considerable effect.

In former years, as pointed out in my last report, it apparently was the custom for one United States vessel to purchase a license, and then supply five or six others. In fact, a United States schooner was detained by me in North Sydney, being caught at this very offence. To prevent cases of this description as much as possible for the future, a clause was inserted in the *modus vivendi* licenses issued to the United States fishing vessels, warning them that if provisions, &c., are sold by a vessel with a license to a vessel without one, the immediate cancellation of the license will ensue, and no license will be granted to the same vessel again.

In consequence of this extra paragraph, instead of only 47 licenses being issued as last season, 77 were issued this year.

I gave a short history of these *modus vivendi* licenses in my last report. The following is a statement of the number of these licenses issued each season since 1888 :—

1888	36
1889	78
1890	119
1891	98
1892	108
1893	71
1894	53
1895	47
1896	77

It will be noticed that there were more licenses issued last year than any year since 1892. There has been and still is a large demand in the United States for fresh fish. Their own shore fisheries cannot supply this, and consequently their fishermen have to get larger vessels, and come off our shores, and we find them all about the different banks off the Canadian coast. While carrying on this fishery it is absolutely necessary for them to have bait, ice, provisions, etc., and to enable them to procure these privileges they have to take out licenses. In my opinion the payment of \$1.50 per ton in no sense

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represents the enormous value in return, still it, in a great measure, does away with the friction which the Treaty of 1818 would inevitably entail if uniformly carried out.

Canadian fishermen vary in reference to this license system. Many of the deep sea fishermen contend that the licensed United States fishermen compete with them for what has recently been a limited bait supply, whereas on the other hand, shore fishermen say they get better prices for their bait, and of course the merchants are benefited to a large extent in all our seaport towns. The opinion is often expressed by United States fishermen that they could get on just as well without the use of our ports at all. To show how fallacious this is, a glance at the long list of United States vessels that do make use of our harbours will suffice, more especially at the town of Liverpool, Nova Scotia. See Annex B to this report.

The returns from Canso, Nova Scotia, form Annex C to this report.

The returns from Sand Point, Shelburne County, form Annex D to this report.

The returns from Souris, Prince Edward Island, form Annex E to this report.

The returns from Sydney, Nova Scotia, form Annex F to this report.

THE MACKEREL FISHERY.

As usual the mackerel appeared off our shores about the 23rd of May, and big hauls were made outside Sambro, Nova Scotia, on that day. There were between 40 and 50 United States fishing schooners there. The mackerel schooling both in and outside the limits in enormous quantities. On the following day two United States schooners took 300 barrels about 4 miles off Prospect and 4 other about 800 barrels a short distance to the eastward. The market price in Boston was \$13 per barrel salted. The Dominion cruisers "Aberdeen," "Kingfisher" and "Curlew" were watching these vessels, and it was a case of untiring vigilance to keep track of them thoroughly up and down the coast.

The mackerel followed the shore very closely. Inside the limits our fishermen were very fortunate, doing better than any outside, but if the swarm of United States seiners had been allowed to come up against our shores, and throw their seines, the fish would have been scattered, and our shore fishermen would have done nothing.

On the 2nd of June two United States fishing schooners, the "Ethel B. Jacobs," and the "Yosemite" arrived at Boston from the cape shore with 380 and 350 barrels respectively, the "Jacobs" taking her last fish about 4 miles off Canso on the 30th of May. She stocked \$5,700 on this trip alone. On the 3rd of June the estimated catch, from my reports, of the United States mackerel fleet off our coast was 6,000 barrels.

A rather curious coincidence about the sudden disappearance of the mackerel in the middle of the summer this year was, that they were reported in very large quantities at Indian Island on the Canadian Labrador. These mackerel were of large size. It is probable that they went far north after entering the gulf in the spring.

Two more devices for catching mackerel were invented and tested the past season. The first consists of two long poles attached to the vessel's side, a mass of netting and bait thrown broadcast upon the water.

From a point abreast fore rigging a boom 20 feet long is swung out at right angles with the hull, while at the same time a smaller pole is swung just forward of the main shrouds, rings to which are fastened the ends of a square cut bag net play loosely on these poles. The distance between poles is approximately about 40 feet, the length of the net on its inner edge. By means of outhaulers the net is hauled out to boom ends. The forward boom is suspended near horizontally, but the after end is lowered till its outer end and most of the netting are below the surface. Freshly ground bait is thrown out over the hidden bag, the mackerel rush for it, and if they swarm thickly, the net is hoisted until the rim is above water, when the fish are bailed on board. This latest scheme saves wear and tear, and is easily handled.

The second device is entirely different to the above, and is nothing less than an electrical engine designed to allure the mackerel to a certain spot where their capture is supposed to be almost sure.

The boat is equipped with a dynamo, to which is attached a long wire from which depends some four incandescent lights. This can be let down to a depth of 1,200 feet if necessary, or to a depth a little below the surface, the current is then let on, the mackerel are supposed to gather round it, and the seine is placed around everything.

If this contrivance is what it is claimed to be, it will revolutionize the fishery, but I sincerely trust that the engine will never be allowed in our waters. The law prohibits the purse seine, and this contrivance would be much worse in every way, in regard to the destruction of the fish.

Last fall a few purse seiners did fairly well off Sydney and the Cape Breton coast. In Canada we have a law absolutely prohibiting purse seining in territorial waters, both by our fishermen, and of course by foreigners, but the mackerel at the present time are pursued right up to the limits, and made wild and scattered. The purse seine is a most destructive engine, and if some international agreement could be arrived at for doing away with it altogether, it would be of immense benefit to the fishery.

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LIST of United States Fishing Vessels, boarded by Dominion Government Cruisers, in Canadian waters, on the Atlantic coast and in the Gulf of St. Lawrence, during the season of 1896; showing Port of Registry of each vessel, tonnage and number of men on board, &c.

No.	Name of Vessel.	Port of Registry.	No. of Tons.	No. of Men.	License or no License.	Date, Left Home.
1	Alice	Provincetown	86	17	No.	8th May, 1896.
2	Annie Wesley.	Gloucester	88	18	Yes.	27th March, 1896.
3	Agnes E. Downs.	do	80	16	No.	20th April, 1896.
4	Abbie M. Deering	do	96	17	Yes.	10th May, 1896.
5	Andrew Burnham	do	86	17	No.	12th do 1896.
6	Albert Geiger.	do	53	15	No.	12th do 1896.
7	Augusta E. Herrick.	Boston.	95	18	No.	12th do 1896.
8	Annie Greenlow	Gloucester	102	17	No.	12th do 1896.
9	Alice M. Parsons.	do	72	17	No.	12th do 1896.
10	Annie C. Hall.	do	84	16	No.	10th do 1896.
11	Alice C. Jordan	do	82	17	No.	20th do 1896.
12	Ada K. Damon	Provincetown	90	14	No.	20th do 1896.
13	Annie W. Hodgdon.	Gloucester	24	5	No.	25th do 1896.
14	Alice F. Morris.	do	77	11	No.	7th Aug., 1896.
15	Argo	do	109	17	No.	20th do 1896.
16	Addie M. Story.	do	58	12	Yes.	25th June, 1896.
17	Arbutus.					
18	Annie R. Lawson.					
19	American	Gloucester	118			
20	A. E.					
21	Annie G. Quiver.					
22	Blue Jacket	Gloucester.	110	18	No.	20th March, 1896.
23	Braganza	do	91	17	No.	10th May, 1896.
24	Bessie M. Wells	do	93	17	No.	18th do 1896.
25	Commonwealth.	do	81	18	No.	10th do 1896.
26	Centennial	do	110	17	No.	12th do 1896.
27	Carrie E. Phillips.	Provincetown	110	28	No.	20th do 1896.
28	Carrie W. Babson	Gloucester.	85	16	Yes.	15th June, 1896.
29	Carrie E. Sayward.	do	59	16	Yes.	18th do 1896.
30	Charles H. Taylor.	do	92	18	Yes.	8th July, 1896.
31	Canopus	do	68	16	No.	8th do 1896.
32	Carrie & Annie.	do	90	16	No.	20th June, 1896.
33	Cecil H. Low.	do	75	11	No.	12th Aug., 1896.
34	Carrier Dove	do	82	16	Yes.	30th June, 1896.
35	Carleton Belle.	Booth Bay, Me.	132	20	No.	1st May, 1896.
36	Davy Crockett.	Gloucester.	81	15	Yes.	12th do 1896.
37	David Sherman.	do	68	17	Yes.	12th do 1896.
38	Dido	do	78	15	Yes.	8th July, 1896.
39	D. A. Wilson.	Beverley	87	15	Yes.	30th do 1896.
40	Emma M. Dyer.	Gloucester.	77	15	Yes.	24th April, 1896.
41	Eva M. Martin	Ellsworth.	11	3	Yes.	1st May, 1896.
42	Emma E. Wetherall	Boston.	109	17	No.	10th do 1896.
43	Emma	Portland	77	16	No.	12th do 1896.
44	Edith S. Whalen	Gloucester	79	17	No.	12th do 1896.
45	Emerald.	do	40	14	No.	15th do 1896.
46	Eliza H. Parkhurst.	do	115	17	No.	15th do 1896.
47	Eddie Davidson	do	77	17	No.	20th do 1896.
48	Edward Trevo.	do	89	16	Yes.	15th June, 1896.
49	Epes Tarr	do	67	14	Yes.	15th July, 1896.
50	Everett Pierce.	do	65	14	Yes.	1st do 1896.
51	Ella M. Doughty.	Portland	71	17	Yes.	1st do 1896.
52	Edward A. Rich	Gloucester	79	16	No.	20th Aug., 1896.
53	E. C. Hussey.	Salem, Mass.	81	17	No.	29th do 1896.
54	Ethel	Gloucester	68	11	No.	10th Sept., 1896.
55	Ettie	do	44	6	Yes.	28th June, 1896.
56	Eleazar Boynton.	do	85	15	No.	1st Oct., 1896.
57	Electer	do	113	18	Yes.	12th Aug., 1896.
58	Ethel B. Jacobs	do	125	18	No.	15th Oct., 1896.
59	F. W. Homans	do	63	16	Yes.	10th May, 1896.
60	Fredonia	do	109	17	No.	12th do 1896.
61	Frederick Geering	do	67	16	No.	12th do 1896.
62	Flora L. Nickerson	Booth Bay, Me.	99	17	Yes.	18th do 1896.
63	Frank Butler.	New London.	71	17	No.	20th do 1896.

LIST of United States Fishing Vessels, boarded by Dominion Government Cruisers, in Canadian waters, &c.—Continued.

No.	Name of Vessel.	Port of Registry.	No. of Tons.	No. of Men.	License or no License.	Date, Left Home.
64	Florence Nightingale.....	Gloucester.....	39	6	Yes..	20th June, 1896.
65	F. R. Walker.....	do.....	68	11	Yes..	25th July, 1896.
66	Florence.....	do.....	63	13	No..	3rd Sept., 1896.
67	Fannie S. Orne.....	do.....	81	13	No..	14th do 1896.
68	Fernwood.....	.....	.....	.....	.....	.....
69	Frank G. Rich.....	.....	.....	.....	.....	.....
70	Gatherer.....	Gloucester.....	91	17	No..	5th May, 1896.
71	George W. Pierce.....	Portland.....	59	17	No..	12th do 1896.
72	Grayling.....	Gloucester.....	115	19	No..	12th do 1896.
73	George F. Edmunds.....	do.....	142	18	No..	22nd do 1896.
74	Geneva Mertis.....	do.....	42	16	No..	20th do 1896.
75	Gertie Evelyn.....	do.....	81	17	No..	20th do 1896.
76	George S. Boutwell.....	do.....	64	15	Yes..	15th July, 1896.
77	Grace L. Fears.....	do.....	85	16	Yes..	20th do 1896.
78	George Campbell.....	do.....	106	17	No..	16th Sept., 1896.
79	General Cogswell.....	do.....	130	17	No..	3rd Oct., 1896.
80	Gladiator.....	.....	.....	.....	.....	.....
81	Golden Hope.....	.....	.....	.....	.....	.....
82	Hiram Lowell.....	Gloucester.....	120	18	No..	20th April, 1896.
83	Hattie Maud.....	Portland.....	86	16	No..	1st May, 1896.
84	Hattie & Lottie.....	Dennis.....	96	16	No..	10th do 1896.
85	Hustler.....	Gloucester.....	92	17	No..	12th do 1896.
86	Henrietta Frances.....	Portland.....	73	16	No..	10th do 1896.
87	Harry G. French.....	Gloucester.....	95	17	No..	12th do 1896.
88	Herald of the Morning.....	do.....	68	17	No..	12th do 1896.
89	Harry L. Belden.....	Boston.....	117	18	No..	12th do 1896.
90	Hattie M. Graham.....	Gloucester.....	133	19	No..	10th do 1896.
91	Henry Morganthan.....	Portland.....	85	18	No..	12th do 1896.
92	Hattie A. Heckman.....	Gloucester.....	105	18	No..	12th do 1896.
93	Harvard.....	do.....	106	17	No..	12th do 1896.
94	Hattie E. Worcester.....	do.....	112	18	No..	20th do 1896.
95	Hattie Evelyn.....	do.....	66	16	Yes..	10th July, 1896.
96	Hereward.....	do.....	86	16	Yes..	12th do 1896.
97	Horace Albert.....	do.....	66	16	No..	12th do 1896.
98	Henry W. Longfellow.....	do.....	78	17	No..	30th June, 1896.
99	Henry M. Stanley.....	do.....	110	18	No..	4th Nov., 1896.
100	Howard Holbrook.....	.....	.....	.....	.....	.....
101	Iolanthe.....	Gloucester.....	71	16	No..	1st May, 1896.
102	Josie M. Calderwood.....	do.....	86	16	Yes..	1st April, 1896.
103	John S. Presson.....	do.....	89	17	No..	10th May, 1896.
104	Jennie P. Phillips.....	Swampscott.....	53	14	No..	10th do 1896.
105	James Dyer.....	Portland.....	81	17	No..	12th do 1896.
106	James G. Blaine.....	Gloucester.....	98	16	No..	12th do 1896.
107	John M. Plummer.....	Portland.....	96	17	No..	12th do 1896.
108	J. W. Collins.....	Gloucester.....	74	16	No..	8th July, 1896.
109	J. J. Clarke.....	do.....	66	10	No..	15th May, 1896.
110	J. E. Garland.....	do.....	76	17	Yes..	20th June, 1896.
111	Joseph B. McGuire.....	do.....	86	15	Yes..	1st July, 1896.
112	John Smith.....	do.....	62	14	Yes..	1st do 1896.
113	Judique.....	do.....	115	17	Yes..	20th Oct., 1896.
114	Joseph Rowe.....	.....	.....	.....	.....	.....
115	Kenneth Frances.....	Portland.....	73	16	No..	8th May, 1896.
116	Kearsage.....	Gloucester.....	101	17	No..	20th do 1896.
117	Lizzie Smith.....	Provincetown.....	73	17	No..	8th do 1896.
118	Lizzie J. Greenleaf.....	Gloucester.....	88	16	Yes..	10th do 1896.
119	Lucile.....	do.....	99	18	No..	12th do 1896.
120	Lottie Gardner.....	do.....	111	18	No..	12th do 1896.
121	Latona.....	do.....	103	18	No..	12th do 1896.
122	Louisa Polleys.....	do.....	69	15	No..	20th do 1896.
123	Lucy W. Dyer.....	Portland.....	78	17	No..	10th do 1896.
124	Louis & Rosie.....	Booth Bay, Me.....	74	17	Yes..	15th July, 1896.
125	Lizzie M. Stanwood.....	Gloucester.....	100	17	Yes..	15th do 1896.
126	Lottie S. Morton.....	do.....	64	16	Yes..	1st do 1896.
127	Landseer.....	do.....	94	18	Yes..	1st do 1896.
128	Lizzie M. Centre.....	do.....	70	17	No..	18th Oct., 1896.
129	Lizzie Walmouth.....

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List of United States Fishing Vessels, boarded by Dominion Government Cruisers, in Canadian waters, &c.—*Concluded.*

No.	Name of Vessel.	Port of Registry.	No. of Tons.	No. of Men.	License or no License.	Date, Left Home.
130	Mystery.....	Gloucester.....	114	18	Yes...	1st April, 1896.
131	Monitor.....	do.....	104	18	Yes...	1st May, 1896.
132	Madonna.....	do.....	104	18	Yes...	23th March, 1896.
133	Miranda.....	do.....	103	17	No...	12th May, 1896.
134	Miritis H. Perry.....	Boston.....	58	14	No...	12th do, 1896.
135	M. S. Ayer.....	Gloucester.....	76	17	No...	12th do, 1896.
136	Margaret Mather.....	do.....	91	14	Yes...	12th do, 1896.
137	Maud D. Wetherall.....	Portland.....	103	17	No...	12th do, 1896.
138	Mariner.....	Gloucester.....	107	17	No...	12th do, 1896.
139	Mist.....	do.....	69	15	Yes...	25th June, 1896.
140	Marathon.....	do.....	65	15	Yes...	8th do, 1896.
141	Matthew Keany.....	do.....	67	16	Yes...	20th do, 1896.
142	Marsala.....	do.....	76	15	No...	1st July, 1896.
143	Mary E.....	do.....	64	15	Yes...	20th Aug., 1896.
144	Mattie Winship.....	do.....	73	16	Yes...	10th July, 1896.
145	Margaret.....					
146	Mayflower.....					
147	Masconoma.....					
148	Meteor.....					
149	Nereid.....	Gloucester.....	92	18	No...	12th May, 1896.
150	Norman Fisher.....	do.....	76	18	No...	12th do, 1896.
151	Norumbega.....	do.....	120	18	No...	15th do, 1896.
152	Notice.....	do.....	63	10	Yes...	15th do, 1896.
153	Noonday.....	do.....	71	15	Yes...	10th July, 1896.
154	Nellie Burns.....					
155	Oesa.....	Gloucester.....	82	16	No...	3th May, 1896.
156	Oliver Cromwell.....	Provincetown.....	60	8	Yes...	15th do, 1896.
157	Orient.....	Gloucester.....	84	16	No...	15th do, 1896.
158	Oliver Eldridge.....	do.....	68	15	No...	25th June, 1896.
159	Pendragon.....	do.....	58	16	Yes...	12th May, 1896.
160	Pinta.....	do.....	94	18	Yes...	27th do, 1896.
161	Procyon.....	do.....	108	17	No...	22nd July, 1896.
162	Pathfinder.....	do.....	63	13	No...	30th do, 1896.
163	Penobscott.....	do.....	85	18	Yes...	30th June, 1896.
164	Robin Hood.....	do.....	88	14	Yes...	30th April, 1896.
165	Ralph E. Eaton.....	do.....	68	16	Yes...	12th May, 1896.
166	Reporter.....	do.....	78	16	Yes...	12th do, 1896.
167	Ralph Hodgdon.....	do.....	86	17	Yes...	20th June, 1896.
168	Richard Lester.....	do.....	69	15	Yes...	
169	Stowell Sherman.....	Provincetown.....	87	17	No...	1st May, 1896.
170	Speculator.....	Gloucester.....	104	18	No...	10th do, 1896.
171	Sarah Lee.....	do.....	98	16	No...	1st do, 1896.
172	S. F. Maker.....	do.....	104	17	No...	12th do, 1896.
173	S. R. Lane.....	do.....	68	18	No...	15th July, 1896.
174	Stranger.....	do.....	82	16	Yes...	20th June, 1896.
175	Thetis.....	do.....	91	18	Yes...	10th April, 1896.
176	Talisman.....	do.....	118	17	No...	12th May, 1896.
177	Volunteer.....	do.....	102	18	Yes...	20th July, 1896.
178	Winona.....	do.....	104	14	Yes...	1st June, 1896.
179	William E. McDonald.....	do.....	93	18	Yes...	1st July, 1896.
180	William H. Oakes.....	do.....	68	11	No...	20th do, 1896.
181	Willie L. Swift.....					
182	Yosemite.....	Gloucester.....	115	17	No...	15th May, 1896.
	Total.....					

MEMO.— 6 vessels left home before the 15th April.

11	do	between 15th April and 1st May.
19	do	do 1st May and 10th May.
48	do	do 10th May and 15th May.
14	do	do 15th May and 25th May.

List of United States and Nova Scotia Mackerel "Hookers" in Bay, 1896.

Name of Vessel.	Home Port.	Master's Name.	Catch.
Annie W. Hodgson	Gloucester (netter)	Forrestall	55
Abbie M. Deering	do	McLean	
Addie M. Story	do	Sweet	
Addie F. Cole	Provincetown	McIntyre	
Aroostook	Liverpool	Smith	25
Ben Hurr	Port Hawkesbury		89
Carrier Dove	Gloucester	Wright	30
Carrie E. Sayward	do	Moody	
Carrie W. Babson	do	Lawson	
Carrie and Annie	Boston	Gayton	
Canopus	Gloucester	McPhil	
Davy Crockett	do	Critchett	
D. A. Wilson	Beverley	Kenney	
Dido	Gloucester	Cuddy	
Dove	Port Hawkesbury	Renolds	
Edith Annie	St. John's, Nfd.	Power	None.
Ettie	Gloucester	Martin	Netter.
Everatt Pierce	do	Brown	
Edward Trovey	do	Treyoy	
Ella M. Doughty	Portland	Doughty	
Epes Tarr	Gloucester		
Florence Nightingale	do (netter)	Cogill	190
F. W. Homans	do	Wharf	
Geo. S. Boutwell	do	Parsons	
Grace L. Fears	do	McPhee	
Gertie Evelyn	do	McShane	
Hattie Evelyn	do	Bradford	
Hereward	do	Leaman	
Henry W. Longfellow	do		
Horace Albert	do	McKinnon	
Hustler	do	Keen, senior	
J/J. Clark	do	Hudder	130
Joseph B. Maguire	do	Irwin	
J. E. Garland	do	Beaton	
John Smith	do	Stewart	
J. W. Collins	do	Fewers	
Lizzie J. Greenleaf	do	Latham	
Landseer	do	Osier	
Lizzie M. Stanwood	do		30
Lottie S. Morton	do	Crawford	
Louis and Rosie	Booth Bay	Maguire	
Marathon	Gloucester	Collins	
Mist	do	McDonald	
Marsals	do	McKay	
Matthew Keany	do	Gould	
Mattie Winship	do	Roberts	
Margaret Mather	do	Eaton	
Margaret	St. Andrews (netter)		
Mary E	Gloucester	Hamilton	
Maritime	Lunenburg	Himelman	
Notice	Gloucester	Jackman	203
Noonday	do	Harty	
Norman Fisher	do (seiner)	Anderson	
Nereid	do do	McLean	
Oliver Cromwell	Provincetown	Freeman (netter)	150
Oldridge	Gloucester	Noonan	
Orient	do	Turner	
Oriole	Lockeport	McGinn	
Penobscot	Gloucester	McDonald	
Pendragon	do	Johnson (seiner)	
Rialto	Shelburne	Thorborn (netter)	60
Richard Lester	Gloucester	Horton	
Reporter	do	Steele	
Ralph F. Hodgdon	do	Greenleaf	
Ralph E. Eaton	do	McDonald	
Stranger	do	Purdy	
S. R. Lanes	do		
Venus	St. Andrews	Holmes	55
Vesta	Chester, N.S.	Evans	15
Wm. E. McDonald	Gloucester	Osier	

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LIST of United States Mackerel Seiners that fished on Cape S core, year 1896.

Name of Vessels.	Home Port.	Master's Name.	Catch.
Alice M. Parsons	Gloucester	Maymer	250
Alice C. Jordan	do	Warren	330
Albert Geiger	do	Mailman	150
Annie Greenlaw	do	Greenlaw	140
Annie C. Hall	do	Pitts	140
Abbie M. Deering	do	McLean	110
Augusta E. Herrick	Boston	Ellis	120
Andrew Burnham	do	Blake	100
Alice	Provincetown	Chase	110
Actress	Gloucester	No report.	
Bragzanda	do	Corkhum	210
Centennial	do	Nausland	221
Charles Levi Woodbury	do	Miller	350
Commonwealth	do	Grants	110
Carrie E. Phillips	do		52
David Sherman	do	Melonsen	162
Davy Crockett	do	Critchett	80
Ethel B. Jacobs (stocked \$5,700 this trip)	do	Jacobs	520
Eddie Davidson	do	Cromwell	169
Elsie M. Smith	do	Hall	425
Edith S. Walen	do	Kimball	30
Emma E. Wetherell	do	Rowe	425
Emerald	do	Wilson	200
Eliza H. Parkhurst	do		80
Emma	Portland	No report.	
Frederick Gerring, jr.	Gloucester		180
F. W. Homans	do	Carrigan	275
Fredona	do	Morgan	270
Flora Nickerson	Booth Bay	Eben Lewis	600
Frank Butler	Provincetown	Rich	50
George W. Pierce	Portland		150
Gertie Evelyn	Gloucester	Hall	110
George F. Edmunds	do	Corkhum	317
Grayling	do		180
Gatherer	do	McGray	370
Geneva Mertis	do	McLeod	160
Herald of the Morning	do	McLean	140
Harvard	do	Swim	396
Hattie E. Worcester	do	Maguire	220
Hustler	do	Keen	370
Harry L. Beldon	do	Whalen	161
Hattie M. Graham	do	Graham	420
Harry G. French	do	Gore	220
Hattie A. Heckman	do	Heckman	225
Hattie and Lottie	Dennis Port	Ab. Nickerson	195
Hattie Maud	Portland		150
Henrietta Francis	do	Edwards	220
Henry Morganthan	do	No report.	
Iolanthe	Gloucester	John White	140
James G. Blaine	do	McDonald	240
John S. Presson	do	Williams	180
James A. Garfield	do	Pitts	300
James Dyer	Portland	Dyer	71
John M. Plummer	do	Pool	35
Kearsarge	Gloucester	Mills	420
Latona	do	Croucher	180
Lizzie J. Greenleaf	do	O'Brien	325
Lottie Gardner	do	Parris	240
Lizzie M. Centre	do	Smith	470
Lucille	do	Welsh	140
Louise Polleys	do	Cavanagh	60
Lizzie Maud	Portland	Spurling	
Lilla S. Fernald	do	No report.	
Lizzie Smith	do	Chase	107
Miranda	Gloucester	Cluett	120
Margaret Mather	do	Eaton	100
Marguerite Haskins	do	Harty	375
Margie Smith	do	Smith	
Mariner	do	Swim	250

LIST of United States Mackerel Seiners that fished off Cape Shore, &c.—*Concluded.*

Name of Vessels.	Home Port.	Master's Name.	Catch.
M. S. Ayers.....	Gloucester.....	Cole.....	75
Mertis H. Perry.....	Boston.....	.....	150
Maud S.....	Booth Bay.....	Seavy.....	300
Maud B. Wetherell.....	Portland.....	McKay.....	286
Norumbega.....	Gloucester.....	McKinnon.....	400
Nereid.....	do.....	McLean.....	169
Norman Fisher.....	do.....	Anderson.....	240
Orient.....	do.....	Turner.....	50
Pendragon.....	do.....	Johnson.....	.....
Polar Wave.....	do.....	Carroll.....	70
Reporter.....	do.....	Leaming.....	260
Ralph E. Eaton.....	do.....	McDonald.....	296
Sarah E. Lee.....	do.....	White.....	130
Speculator.....	do.....	McDonald.....	290
S. F. Maker.....	do.....	Payson.....	200
Stowell Sherman.....	Provincetown.....	Hatch.....	120
Talisman.....	Gloucester.....	McKay.....	190
Yosemite.....	do.....	McFarlane.....	550
Total catch.....			Brls. 17,447

Towards the end of the season one of the island journals had the following remarks to make about the mackerel fishery, with which I cordially agree:—

“The fishermen of Prince Edward Island, on the north side at least, should give more attention to cod fishing. There is always sale for this fish, and usually at fairly good prices, and if, instead of idling away week after week waiting for mackerel to strike in, the fishermen would take to catching cod, of which they can secure any amount, they would make good wages, and a failure in the mackerel would not leave them in a bad way financially. True, cod fishing is much harder work than mackerel fishing, in which there is always the hope of making a lucky catch or two, which means good returns for weeks of waiting, and it is perhaps not so romantic and fascinating an occupation, but there is very little romance about bread winning in any occupation of life nowadays, and our fishermen are making a mistake in not taking advantage of the cod fishery to a greater extent than they do.”

LOBSTERS.

During the past season a great proportion of my time was taken up in enforcing the lobster regulations. The most persistent law breakers were the fishermen in Northumberland Straits, and on the south-east coast of Nova Scotia, and we had a considerable amount of trouble with them, in fact, at one place in Nova Scotia one of my men was shot at. My instructions were to put a stop to illegal fishing, and in carrying out these orders it was necessary to destroy a large quantity of valuable gear, such as traps, back lines, &c. The canning was not carried on in the factories at all, but at small shanties in the woods, which were particularly difficult to find. Whenever we did come across them, I immediately pulled the whole place down, and destroyed the boilers, &c. In most cases it was quite impossible to find out the guilty parties, because people would not report about their neighbours. In connection with this work I found it necessary to hire a tug in Charlottetown, as the draught of the vessels under my command was too great to allow them to get in close to the shore. This tug was manned from the “Acadia,” and did most effective work.

Mr. W. C. Hobkirk, Fishery Overseer for Queen's, Prince Edward Island, and Mr. Milne, 2nd officer of the “Acadia” were of the greatest assistance to me in endeavour-

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ing to put a stop to this illegal fishing. We also had the steam launch belonging to the "Acadia" cruising up and down the coast between Richibucto and Cape George on one side of the Straits, and West Point and Cape Bear on the other.

I append extracts from the annual report and from *Captains Dunn, Pearson, Kent and Pratt*. Also a report from Captain Walbran of the Dominion cruiser "Quadra" in reference to British Columbia waters.

ANNEX A.

EXTRACTS OF REPORTS FROM CRUISERS' OFFICERS.

CAPT. E. DUNN, *Commander of the D. G. S. "Petrel,"* reports that the Fisheries Protection Cruiser "Petrel" was fitted out, and departure taken from Owen Sound on the 29th April. Nothing of importance occurred until the 1st May, when a seizure was made of thirteen (13) American gill-nets, in the vicinity of the "Hen and Chickens" to the westward of Pelee Island. These were disposed of by sale and the proceeds deposited to the credit of the Receiver General.

On the 6th May, off Mohawk Island, two tugs were observed fishing, but upon my approach they made off towards Erie. I found two net buoys near where they had left. The weather being too hazy to determine their exact position, "I logged the distance into Mohawk Point, and found that the buoys were close to the boundary with the nets leading south. I concluded not to lift, although the nets were found to belong to the Tug "Grace," a former seizure.

From this until the 20th June, the "Petrel" was employed patrolling along the boundary line from end to end of Lake Erie. The effectiveness of this patrol was clearly apparent, as no Americans were seen by either the "Petrel" or any Canadian fishermen, poaching in our waters.

From the 1st June to about the middle of July, large quantities of dead fish were met with in all parts of the lake, but more especially at the west end. They were more or less well matured fish, chiefly herring, pickerel and bass.

On the 20th June, having received instructions to proceed to Lake Huron to investigate report of illegal fishing which ultimately proved to be an act of poaching or stealing in a small boat from pound nets. As this was done close inshore and also close to the boundary line, the work of capture could not be done by the "Petrel." I advised the local officer to attend to this matter in a small boat. While on this cruise, I was fortunately in the vicinity of Cabots Head Lighthouse, and aided with boats crews in suppressing the fire which would have utterly destroyed it. On the 26th June I recommenced the patrol of Lake Erie.

On the 17th I was engaged in investigating the irregularities reported by Officer Quick. The pound-nets having been "shingled" by unknown parties at Point Pelee. This case was further investigated at different times when opportunity offered, but no clue to the perpetrator was obtained.

On the 29th August, I received instructions to make a strict inspection of all light stations and fog alarms, when sailing in their vicinity. This I did from time to time, and I am pleased to say that this inspection had a good effect. Most of the lights appearing to better advantage on the second visit.

Later in the season I made an attempt to blow up the sunken "Wissahickow," but owing to heavy seas, the wires from the battery were broken, and I was compelled to desist. On the 5th I made another attempt, and was successful in blowing up the wreck. The location was swept to a depth of 20 feet, and no obstruction was found. On the 6th Capt. Jarmin, who had been in charge of the dynamite, left the ship.

On the 14th October I was successful in making a seizure of 106 American gill-nets, nearly new. This seizure was made to the south of the west (cut) lighthouse on Long Point, about seven miles north of the boundary line. On the 28th I again made a seizure of 14 sturgeon and 8 herring gill-nets, in the vicinity of Wind Mill Point, near Buffalo. On the 6th, having received instructions to proceed to Ottawa, for the purpose of assisting the Customs Department in the matter of the seizure of the tug "Grace Ruelle" and consort for garbage dumping in the Detroit River. I was absent until the 10th. On the 17th, on account of the threatening and stormy weather, and this being a favourable day, I concluded to take up the middle ground gas buoy, which was successfully done, a spar buoy being left in its place. This gas buoy was also towed to Amherstburg. Both of them were placed on the bank, the valves were encased, and the lanterns and cages were placed in charge of Lightkeeper Hackett.

On the 20th November I seized 62 American gill-nets, to the eastward of Pelee Island, between four and five miles from the boundary line, and containing about half a ton of fish, chiefly herring. On the 29th I departed for Owen Sound for winter quarters, where I arrived on the 3rd December. The catch in this lake (Lake Erie) has been very light on both sides by the pound-net fishermen, but generally good by gill-net fishing. This I attribute to the unusual stormy nature of the summer months, which kept the water near the shore in a very unsettled and muddy condition. The fish naturally taking towards the centre of the lake for the clearer waters. The gill-net fishermen have been exceedingly fortunate in their catch during the months of October and November, when large catches have been reported to me by Canadian fishermen, who were fishing these nets.

As will be noticed, from the 1st May to 14th October, no seizures of nets were made. The effectiveness of the patrol, which was continually made from end to end of the lake, was proven by the fact that large numbers of American tugs were frequently observed at work, but always in their own waters, as many as 15 tugs being seen in a single day. Inquiries made from lightkeepers and our own fishermen further prove the effect of this system of patrol. The total amount of miles logged during the season was 15,992.

CAPTAIN GEO. W. PEARSON, of the *Patrol Cruiser "Dolphin."*—According to instructions the "Dolphin" was placed in commission on the 28th April. After adjusting compass on the ranges in Owen Sound, I proceed to the north shore of Georgian Bay where I cruised until the 22nd of May. I then cruised on the south shore until the 30th of May, returning to the north shore, cruising there until the 12th of June, I then made continuous cruises from Owen Sound to Penetanguishene and along coast towards Killarney, with an occasional cruise toward Tobermory and adjacent islands. On the 1st August I left for the North Channel, arriving at Sault Ste. Marie, proceeding on to Lake Superior, and investigating report of alleged fishing by Americans in the vicinity of Parisian Island, finally leaving for Lake Huron and Georgian Bay on the 12th August, where I cruised until the 21st August. I then received instructions to proceed to Lake Superior and attend to fisheries duties there. I remained there until the 7th September, again returning to Georgian Bay, where I resumed cruising until the 6th October, when I was ordered to the Duck Islands to investigate the grievance of the gill-net fishermen against the practice of pound-net fishermen using an "apron" in the pots of their nets thereby catching large quantities of small immature fish. The result of the investigation was reported to the department on the 10th October. From this date I resumed cruising on Georgian Bay until ordered to take "Dolphin" out of commission. During the whole of my season's work I have much pleasure in stating that the regular gill-net fishermen were law-abiding in every respect and gave me no trouble.

I found, however, that extensive poaching was being done by means of trap-nets and seines, especially on the north shore from Parry Sound to Little Current, and in the vicinity of Tobermory, I was successful in seizing and destroying 41 trap-nets of an estimated value of \$3,300, four hoop-nets value \$100, six seines, value \$600 and 39 gill-nets value about \$150. I also seized the tug "H. Gauthier" owned by S. E. Oldfield, and operated by H. & S. Oldfield, in trap-net fishing.

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CAPTAIN J. H. PRATT, *in charge of the Government Cruiser "Curlew"* states that while this steamer was in winter quarters at St. John, a thorough overhauling was given to the ship's machinery, etc., and on the 15th of April, our pennant was hoisted. On the 16th April we steamed down the bay, cruising among the islands in Passamaquoddy Bay, and on the international boundary line, between New Brunswick and state of Maine, I found that the season's fishing operations were just beginning, and several American bankers had already been to Eastport to procure herring for bait. Cruising continually on the New Brunswick shore of the Bay of Fundy, with occasional cruises to the Nova Scotia coast, as far south as Cape Sable, and calling at the several ports on that coast, was continued till 13th May, when orders were received to immediately proceed to the eastward of Cape Sable, and cruise between that point and Sambro. A large fleet of United States mackerel seiners were just arriving on that coast, following the numerous schools of mackerel, which were then beginning to show between Cape Sable and Sambro. Nearly one hundred schooners were found within a distance of thirty miles along the coast, the crews thereof burning with anxiety to secure a fare, in as short a time as possible, and probably not with much anxiety as to which side of the three-mile limit they succeeded in capturing their fish, providing they escaped detection by the cruisers. Slowly following the schools of mackerel, as they pursued their course to the eastward, a number of the seiners got fairly good hauls and sailed for home. Others met with very poor success, and returned to their home ports, disheartened and in debt. The mackerel were large and of very good quality. Accompanying the fleet we arrived at North Sydney on June 2nd, and found quite a large fleet of foreign seiners, anchored and here for shelter and seeking mackerel off the Cape Breton coast. We cruised with the fishing fleet on that coast till June the 13th and found the most of the seining captains desirous of obeying the Canadian fishing and customs regulations, experience having taught them that those laws could not be violated with impunity. June 13th we steamed to the westward again, looking sharply along the coast, anchoring in Sheet Harbour that night. Only a few scattering seiners were seen on our run that day, and those were sailing homewards with light fares. We arrived at Lunenburg on Sunday the 14th, finding no seiners there, and mackerel very scarce. On the 16th we arrived in the Bay of Fundy, anchoring in St. Andrews harbour on June 17th, and found fishing matters in the district in a prosperous condition, especially the herring fishery. The catching of small herring for sardine canning purposes had been stopped already, previous to my return, several times, by strikes among the employees of the canning factories on the United States side, and the weir owners were suffering from loss of employment. Cruising in the Bay of Fundy to Cape Sable and on the New Brunswick side, principally on the international boundary lines, was continued during the summer season. Fogs prevailed almost incessantly during this time, interfering with our cruising operations very much.

On October 28th, telegraphic orders were received from you, to immediately cruise between Canso and Sydney, and steaming to the eastward anchoring in Canso harbour on the evening of the 29th October. There, orders were received from you to proceed to Ecum Secum, and Marie Joseph, and stop illegal lobster fishing.

We anchored in Marie Joseph harbour on the 30th, and cruised among the islands there till November 4th, searching for lobster traps, and finding nearly 300 of them, which were destroyed. These traps were nearly all set on trawls, without any watch buoys to denote their location, and grapnels were used to drag the bottom. However, owing to the handy working of the "Curlew" the several fishing grounds were quickly and easily examined by the ship and boats, and the traps seized and destroyed.

On November 13th, the weather having moderated, steamed along shore to Isaac's Harbour where several American mackerel hookers were found seeking shelter.

Marie Joseph was reached on the 16th, and searching for lobster traps among the islands there was resumed until the 18th, but only a few were found. The fishermen seemed to have learned a lesson evidently, by the action taken by us on our previous visit. On the 18th, we again steamed along shore to the westward, and anchored in Lunenburg that night, no American vessels were found here, and fishermen were only taking a few mackerel in their nets. We called into all the small ports, on our cruise to the westward being resumed, finding several foreign fishing vessels seeking shelter in

a few of the ports, and all abiding by the customs and fisheries regulations which govern their conduct when in our ports. On November 26th, we arrived in the Bay of Fundy, and found matters had been going on quietly during our absence, with the exception of several lobster fishermen, who had set their traps at the Wolves Islands, and along shore between Latete and Lepreaux. However, the day after our arrival, the weather being favourable, I took the Coffil's Ledge patrol men and their boat, and visited the suspected districts. We destroyed all traps and cars numbering several hundreds. I steamed to St. John on December 4th, discharged the crew, placed the ship out of commission that evening.

During the season I have called into innumerable ports on the Nova Scotia and New Brunswick coasts, and have invariably found the inhabitants well pleased at having the "Curlew" in their harbours, even if her presence there was necessary in consequence of fisheries violations by residents of the place.

Some complaints of poaching by United States fishing vessels were reported to me at several ports, which I found on investigation to be groundless. The bounty flag which is used by Canadian fishing vessels, I find to be of great service in denoting the vessel's nationality, although this regulation is not as strictly enforced by the fishery officers as they should be. The small herring fishing for cauning as sardines, was hampered very much during the season, by the low price of the manufactured article, and the incessant strikes in the canneries at Eastport and Lubec, Maine. Consequently the price for small herring remained very low nearly all the season, with a very uncertain demand, although the schools were very numerous. Large herring were also very plentiful in the Bay of Fundy, with very low prices. In Grand Manan during the fall months, herring of a large size were more plentiful than they have been for a great many years, and very large hauls were made by the weirs and netters, at the south part of the island.

CAPT. W. H. KENT, of the *Cruiser "Kingfisher,"* reports that she was put in commission on 1st April, cruising on the south shore of Nova Scotia, my station extending from Cape Sable to Lunenburg, with headquarters at Shelburne. I made one visit as far west as Pubnico, my time being taken up looking after the spring fleet of bankers from the United States calling at different ports on my station. On May 11th the first American seiners came along, by the 26th they would number about ninety sail. I patrolled the coast from Shelburne to Cape LaHave till 24th. The first school of mackerel was seen by us on the 20th off Port Medway, only a few hundred yards outside the limit. The Americans were there, but too far away to notice them. Large school of mackerel were seen off Cape LaHave on the 24th, only three seiners then remaining. They did not take any fish, as they were rather close to run the risk. On the 29th I again proceeded east, when off Egg Island I saw several seiners about there, who had made good hauls that day. In the afternoon the wind came on from the east with fog and rain, I put into Sheet Harbour in company with the American seiner "Jas. A. Garfield," which had taken 235 barrels the day before. We lay there in the fog till 2nd of June, when we came out and spoke to "Maud S." off Beaver with 370 barrels, bound home, which reported getting his fish off Guyon Island. I then proceeded on, following the latter part of the fleet. When off Guyon Island I fell in with the main part of the fleet, that had been up off Sydney and found nothing, they reported loosing all trace of the fish after leaving Guyon Island. I continued to cruise off Louisbourg with the fleet. On the 7th June they moved to the westward, bound home. I followed them to Cape Canso. I then proceeded to Arichat, later we cruised to the westward, following up the last remaining part of the fleet, calling at different ports as far as Cape Sable. I returned east in the latter part of June, cruising for a few days about Chedabucto Bay. On 16th July I left the straits for North Bay, arriving on my station off East Point, P.E.I., on 17th July, where I remained cruising till 4th November. Whilst here I was presented by Capt. Chas. Purdy of the American fishing schooner "Stranger" with two lobsters $\frac{5}{8}$ inch long, they were taken by him off East Point, P.E.I., about four miles. He informed me they were schooling in large quantities, time of capture being the last week in June. I have forwarded them to Prof. Prince of the Fisheries Department, Ottawa. About sixty sail of

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hookers remained on this station the chief part of the year. The Magdalen Islands proved a failure, thus causing the fleet to keep to the Prince Edward Island coast. The catch was very small, fares ranging from 20 to 110 barrels. After October came in, the vessels began to gradually drop out and go home. On 4th November I left the gulf in company with the last remaining American hooker, proceeding to Sydney, where but six seiners remained. On 10th November they also left for home; I followed on 13th. The catch at Sydney was fair, ranging from 120 barrels to 180, one vessel of the fleet never got a fish. After leaving Sydney the weather became very bad. I worked along looking after the lobster fishing, to see if the law was observed. Owing to the boisterous weather it was hard to do much; as far as I could ascertain the law was very well observed. I called at Whitehead, Liscomb, Marie-Joseph, Ecum, Secum, Jegogan, Sheet Harbour, and on to Lunenburg and Shelburne, arriving at Sand Point on 2nd December, when I found a number of American fishermen fitted for the haddock fishery, also several vessels bound to Newfoundland for frozen sturgeon. I cruised about there till the 10th, when I docked the ship, paying off on 12th December. During this season the "Kingfisher" sailed 7,117½ miles, 1,761¾ hours at sea, and made 416 boardings.

CAPTAIN WALBRAN, *D. G. S. "Quadra," Victoria, B.C.*, reports:

During the winter months of November, December and January, on account of the rough weather, the United States fishing vessels are not usually engaged in fishing in British Columbia waters for halibut. The months when this fishing chiefly takes place are March, April and May, and in the autumn months of September and October. In the months of March and April, I am told, the halibut are in their prime; in winter these fish go out into deep water, returning in the spring. To catch them in the winter, the vessels have to keep well off shore.

In the spring months United States fishing vessels have been frequently seen at work within the 3-mile limit of the Scott Islands, making Bull Harbour, their headquarters for shelter. The New England Fishing Company have their fishing station for halibut six miles west of Refuge Bay on the south shore of Edye Passage. From this place the fish is taken for shipment east by the company's chartered steamers "Coquitlam," "Capilano," and "Thistle." Many United States vessels have been seen fishing off this station, taking their catches to Seattle, Washington. I understand these fishermen use only the best part of the fish, the remainder being thrown away. The New England company pack their fish in ice and ship them whole. Smuggling and illegal trading is apparently carried on all along the coast, every settlement having its tale of small vessels engaged in this work during the summer months. Winter is too rough for these vessels, as they are only small and could not withstand the prevailing gales of that season.

In Shushartie Bay, not so long ago, an American schooner laden with potatoes, and ostensibly bound for Alaska, called there, and tried to sell some of her cargo.

At Port Simpson I was assured that illegal trading during the summer months was constantly carried on at the north end of Queen Charlotte Islands, and that the information sent down to Victoria of the crews of United States vessels landing and breaking into Indian houses, the owners being away, was perfectly correct. All kinds of provisions are sold by these vessels, flour, bacon, biscuits, &c., to the great detriment of Canadian traders. These vessels made Virago Harbour their headquarters.

Some Indians gave me the same information, but said there had not been a vessel there for one moon. I asked them if the vessels came there in winter, and their reply was "halo" (no).

It is impossible for the "Quadra" to put a stop to any of this reported illegal trading by a flying visit now and again up north. To do any permanent good, the vessel should be stationed there for at least two months at a time in the summer, when this work is carried on, making her principal cruising ground between the Queen Charlotte Islands and Port Simpson.

CAPTAIN C. T. KNOWLTON reports: The work done by Dominion Government cruiser "Aberdeen" while employed as fishery protective service cruiser has included the under-mentioned.

On 16th May we proceeded and cruised between Sambro and Lunenburg.

On 21st fell in with a large fleet of United States seiners and cruised with the fleet between Sambro and Liscomb.

On 25th May fell in with United States seiner "Frederick Gerring" of Gloucester, 1½ miles from Gull Ledge, dipping mackerel from her seine. We took her in tow, went to Liscomb for the night.

On 26th proceeded, and on 27th handed the schooner over to yourself at Halifax. We then proceeded eastward, doing some marine work in connection with our other work. On 1st June while at Sydney was informed that "Aberdeen" was no longer required in the fishery protective service. We then took up marine until 23rd August, when we left Quebec with instructions to take up fishery protective work at Magdalen Islands. We continued the work until 19th September in Nova Scotia and Prince Edward Island waters.

FISHERIES INTELLIGENCE BUREAU.

This bureau has again proved of great benefit to our fishermen. Information as to the movements of the fish is obtained daily from fifty-five reporting stations, and reported in the morning and evening papers.

Mr. Hutchins, the clerk, was appointed permanently in charge of this branch of the fisheries protection service last year, and has performed his work in a very creditable manner. He reports on the movements of the fish during the season.

Appended is a list of the reporters.

The whole most respectfully submitted.

O. G. V. SPAIN.

Commander of the Fisheries Protection Service.

Marine and Fisheries—Fisheries Branch.

LIST of Fisheries Bureau Reporters who are Government Officials.

Residence.	Name.	Allowance.
		\$ cts.
Alberton, P.E.I.	J. P. Brennan	15 00
Arichat, C.B.	Rémi Benoit	15 00
do (West), C.B.	C. P. LeLacheur	15 00
Bayfield, N.S.	E. G. Randall	15 00
Campobello, N.S.	A. J. Clarke	15 00
Canso, N.S.	Thos. C. Cooke	15 00
Cheticamp, C.B.	S. Aucoin	15 00
Digby, N.S.	J. M. Viets	15 00
Gabarus, C.B.	R. McLean	15 00
Georgetown, P.E.I.	Chas. Owen	15 00
Grand Manan	E. A. Calder	15 00
Hawkesbury, C.B.	J. C. Bourinot	15 00
Liverpool, N.S.	J. H. Dunlop	15 00
Lockeport, N.S.	J. R. Ruggles	15 00
Louisbourg, C.B.	P. O'Toole	15 00
Mabou, C.B.	Louis McKeen	15 00
Malpeque, P. E. I.	J. M. McNutt	15 00
Margaree, C.B.	M. A. Dunn	15 00
Musquodoboit Harbour, N.S.	George Rowlings	15 00
North Sydney, C.B.	A. G. Hamilton	15 00
Petit de Grat, C.B.	P. T. Fougère	15 00
Port Hood, C.B.	E. D. Tremaine	15 00
Port La Tour, N.S.	J. W. Taylor	15 00
Port Medway, N.S.	E. E. Letson	15 00
Port Mulgrave, N.S.	David Murray	15 00
Pubnico, N.S.	J. A. D'Entremont	15 00
Sand Point, N.S.	R. H. Bolman	15 00
Spry Bay, N.S.	W. C. Henley	15 00
St. Ann's, C.B.	D. McAulay	15 00
St. Peter's, C.B.	D. Urquhart	15 00
Total		450 00

ANNEX B.

MEMO: United States Fishing Vessels and other United States Vessels arriving at the
Port of Liverpool, N.S., for the year ending December, 1896.

	Number.	Tonnage.	Crew.
Vessels from Gloucester (for shelter).....	116	11,141	1,912
do do (under license for shelter).....	7	638	69
do do (do supplies).....	1	127	18
do do (do bait).....	1	103	18
do do (do ice).....	1	92	18
do fishing (for shelter).....	23	1,886	355
do do (for repairs).....	6	637	98
do do (for water).....	4	313	52
do do (for medical aid).....	3	231	45
do Provincetown (for shelter).....	4	346	71
do do (for repairs).....	1	77	15
do Portland (for shelter).....	9	661	126
do do (for lobsters, fresh).....	26	983	75
Total Fishing Vessels from United States.....	202	17,235	2,872
Other United States Vessels (for freight).....	4	775	22
Grand totals United States Vessels.....	206	18,010	2,894

ANNEX C.

LIST of United States Fishing Vessels which reported at the Customs Office, Port of *Canso*, during the Year 1896.

Date.	Name of Vessel.	Port of Registry.	Tons.		Whence arrived.	Licensed or Unlicensed.	What in Port for.
			Tons.	Men.			
1896.							
Jan. 4	Gertie Evelyn	Gloucester	81	16	Banks	U	Shelter and repairs.
do 16	Orient	do	89	7	Gloucester	U	do
do 22	American	do	118	8	do	U	do
April 15	Nourmahal	do	109	18	do	U	A man sick.
do 15	Senator Frye	do	85	18	do	U	do
do 27	Mabel R. Bennett	Salem	116	6	Boston	U	Shelter.
May 4	Pinta	Gloucester	99	18	Gloucester	L	Bait, ice and license.
do 4	Orpheus	do	105	16	do	U	Shelter and water.
do 4	Robin Hood	do	88	14	do	L	do
do 19	F. Nightingale	do	39	6	do	U	do
do 27	David Sherman	do	60	17	Off shore	U	do
do 27	H. C. Worcester	do	112	18	do	U	do
do 27	Norumbega	do	120	18	do	U	do
do 27	Reporter	do	79	16	do	U	do
do 27	Speculator	do	104	18	do	U	do
do 27	Alice M. Parsons	do	72	17	do	U	do
do 27	Talisman	do	119	17	do	U	do
do 27	Harry G. French	do	95	17	do	U	do
do 27	Abbie F. Deering	do	96	17	do	U	do
do 27	Elsie M. Smith	do	106	17	do	U	do
do 27	Lizzie Maud	do	95	18	do	U	do
do 27	Kearsage	do	101	19	do	U	do
do 27	Pendragon	do	68	16	do	U	do
do 27	Alice C. Jordan	do	81	17	do	U	do
do 27	Briganza	do	91	17	do	U	do
do 27	Miranda	do	103	17	do	U	do
do 29	Marguerite Haskins	do	96	17	do	U	do
do 29	Stowell Sherman	Provincetown.	87	17	do	U	do
do 29	Lizzie Greenleaf	Gloucester	88	17	do	U	do
do 29	Ralph E. Eaton	do	65	16	do	U	do
do 30	Sarah E. Lee	do	98	16	do	U	do
do 30	Hattie A. Heckman	do	105	17	do	U	do
do 30	Eddie Davidson	do	78	17	do	U	do
do 30	Hustler	do	92	17	do	U	do
do 30	Louise Polleys	do	69	15	do	U	do
do 30	Annie C. Hall	do	84	17	do	U	do
June 2	Volunteer	do	102	16	Gloucester	L	do and license.
do 18	Electer	do	113	18	Banks	L	Ice, bait, &c.
do 18	Arthur D. Story	do	98	17	Gloucester	U	Shelter and water.
do 30	David Crockett	do	80	16	do	L	License do
July 1	Carrie and Annie	do	90	16	do	U	Shelter, repairs.
do 2	D. A. Wilson	do	61	16	do	L	Water, bait, &c.
do 3	Winona	do	103	16	Banks	L	Ship fish and refit.
do 6	Pinta	do	99	18	Gloucester	L	Ice, bait, water.
do 6	Mist	do	68	14	do	L	License, water.
do 6	Marsala	do	76	15	do	U	Shelter and water.
do 8	John Smith	do	62	14	do	U	do
do 11	M. Kearny	do	66	16	do	U	do
do 13	Chas. H. Taylor	do	92	18	do	L	Ice, bait and license.
do 18	Grace L. Fears	do	84	16	do	U	Shelter and water.
do 20	Thetis	do	91	18	Banks	L	Log, water, &c.
do 21	Volunteer	do	102	16	Gloucester	L	Ice, bait, water.
Aug. 14	Emma M. Dyer	do	77	16	do	L	do
do 19	Pinta	do	99	18	Halifax	L	do

Marine and Fisheries—Fisheries Branch.

List of United States Vessels which reported at the Customs Office, Port of *Canso*,
&c.—*Concluded*.

Date.	Name of Vessel.	Port of Registry.			Whence arrived.	Licensed L. Unlicensed U.	What in Port for.
			Tons.	Men.			
1896.							
Aug. 2	Mary E	Gloucester	64	18	Gloucester	U	Shelter, water.
do 28	Annie W. Hodgson	do	24	5	Bay St. Lawr.	U	do
do 31	Chas. H. Taylor	do	92	18	Gloucester	L	Ice, bait, water.
Sept. 15	Carrier Dove	do	82	16	Bay St. Lawr.	L	Shelter, water.
do 15	Marguerite	do	103	17	Banks	U	do
do 15	Winona	do	103	17	Gloucester	L	Ice, bait, water.
do 28	Ettie	do	44	6	Bay St. Lawr.	L	Shelter do
do 28	L. M. Stanwood	do	100	16	Boston	L	Men, water.
do 28	Nightingale	do	39	6	Bay St. Lawr.	L	Shelter, water.
do 28	Gladiator	do	100	17	Banks	L	Ice, bait, water.
Oct. 9	Eleazer Boynton	do	84	14	Gloucester	U	Shelter do
do 10	Elector	do	119	18	Banks	L	Bait, shelter, ice.
do 12	Mystery	do	114	18	do	U	do
do 26	Matthew Kenny	do	67	16	Bay St. Lawr.	L	do
do 26	Everett Pierce	do	64	16	do	L	do
do 26	Wm. E. McDonald	do	94	16	do	L	do
do 26	Thetis	do	91	18	Banks	L	do
do 26	Richard Lester	do	69	14	Bay St. Lawr.	L	do
do 26	D. A. Willson	do	66	16	do	L	do
do 26	Margaret	St. Andrews	49	12	do	U	do
do 26	Wm. Collins	Gloucester	74	16	do	L	do
do 26	David Crockett	do	80	16	do	L	do
do 26	J. B. McGuire	do	88	14	do	L	do
do 27	Canopus	do	68	14	do	U	do
do 30	G. E. Boutwell	do	64	14	do	L	do
do 30	Lottie S. Martin	do	64	14	do	L	do
do 30	Hattie Evelyn	do	66	16	do	L	do
do 30	Lois & Rosie	Booth Bay	49	14	do	L	do
Nov. 2	Abbie M. Deering	Gloucester	96	17	do	L	do
do 4	L. M. Stanwood	do	100	18	Gloucester	L	do ship men.
do 4	Mary E	do	64	14	Bay St. Lawr.	U	do
do 5	Edward Trevo	do	88	6	Gloucester	U	do repairs.
do 5	Edward F. Eseleth	do	84	14	Banks	U	Man sick and do
do 9	G. F. Edwards	do	141	17	Off shore	U	Shelter, water.
do 9	Carrie E. Sawyer	do	59	14	Bay St. Lawr.	L	do
do 9	Norma	do	104	18	Gloucester	U	do and repairs.
do 9	Stranger	do	82	16	Bay St. Lawr.	L	do
do 9	Horace Albert	do	65	16	do	U	do
do 13	Ethel B. Jacobs	do	125	16	Off shore	U	do
do 13	Kearsage	do	101	17	do	U	do
do 21	Edgar S. Foster	Bucksport	94	5	Boston	U	do
Dec. 1	Annie G. Quiner	do	79	6	do	U	do
do 1	Masconoma	Gloucester	91	18	Gloucester	L	Bait, water.
do 1	Thetis	do	91	7	do	U	Shelter, water.
do 5	J. Collins	do	74	13	Banks	U	do
do 14	Hattie E. Worcester	do	112	18	Gloucester	U	do repairs.

United States Fishing Vessels calling at the Port of *Souris*, during season 1896.

Name of Vessel.	Tonnage.	Number of men.	Port of Registry.	Licensed or not Licensed.	Remarks.
Ettie	44	6	Gloucester	L.	Supplies.
Notice	63	10	do	do	do
Carrier Dove	82	14	do	do	do
Joseph B. Maguire	88	15	do	do	do
Everett Pierce	65	12	do	do	Purchase license.
Carrie E. Sayward	59	16	do	do	Supplies.
Marathon	65	14	do	do	do
Abbie M. Deering	96	13	do	do	License and supplies.
Reporter	79	14	do	do	do do
Mist	68	15	do	do	Supplies.
Stranger	82	16	do	do	do
Richard Lester	69	15	do	do	do
Lottie S. Morton	64	15	do	do	do
D. A. Wilson	61	15	Salem	do	do
J. E. Garland	76	17	Gloucester	do	do
Nooday	72	15	do	do	do
Florence Nightingale	39	6	do	do	Bait and supplies.
Lois and Rosie	49	16	Booth Bay	do	Supplies.
Hereward	85	16	Gloucester	do	do
Penobscot	85	18	do	do	do
Hattie Evelyn	66	14	do	do	do
George F. Boutwell	64	14	do	do	do
Epps Tarr	66	13	do	do	Ship a man and supplies.
Carrie W. Babson	96	18	do	do	Supplies.
Ralph F. Hodgdon	85	17	do	N.	Temporary repairs.
Horace Albert	65	14	do	do	do do
Carrie and Annie	90	16	do	do	do do
J. W. Collins	74	16	do	do	do do
Marsala	76	15	do	do	do do
David Crockett	80	15	do	L.	Supplies and repairs.
Lizzie M. Greenleaf	88	17	do	do	Supplies.
Orient	89	16	do	N.	Shelter and repairs.
Oliver Eldridge	68	15	do	do	do do
Matthew Keany	67	16	do	L.	Supplies.
David Sherman	67	15	do	do	License and supplies.
Lizzie M. Stanwood	100	17	do	do	do do
Margaret Mat. er.	91	16	do	do	License and supplies, to land a sick seaman.
Dido	78	14	do	do	Supplies.
F. R. Walker	68	11	do	do	License and supplies.
Landseer	94	19	do	do	Supplies.
Addie M. Storey	68	14	do	do	do
Henry W. Longfellow	78	17	do	N.	Temporary repairs.
Ralph E. Eaton	65	15	do	L.	Supplies.
Wm. E. McDonald	93	18	do	do	do
Grace L. Fears	85	15	do	do	do
Edward Trevo	88	17	do	do	do
Mattie Winship	73	16	do	do	do
L. W. Homans	63	15	do	N.	Land a sick man.
Pendragon	68	15	do	L.	License and supplies.
John Smith	62	14	do	do	Supplies.
Mary E.	64	15	do	do	do
Canopus	68	14	do	N.	Temporary repairs.
Gertie Evelyn	81	15	do	do	do
Morman Fisher	76	14	do	do	For shelter.
Nereid	92	15	do	do	do
S. R. Lane	68	14	do	do	do
Ella M. Doughty	52	14	do	L.	do
Annie W. Hodgdon	24	5	do	N.	do

Marine and Fisheries—Fisheries Branch.

United States Fishing Vessels calling at *N. Sydney* in 1896.

Number.	Names.	Tonnage.	Number of men.	Port of Registry.	License.	Remarks.
1	Maggie & May.....	115	18	Gloucester.....	L	In for shelter.
2	Marguerite.....	107	18	Salem.....	L	water.
3	Harvester.....	101	16	Gloucester.....		harbour.
4	J. M. Calderwood.....	86	16	do.....	L	land sick man.
5	Howard Holbrook.....	92	18	do.....	L	bait and water.
6	do.....	92	18	do.....	L	water.
7	America.....	118	19	do.....	L	shelter.
8	Maggie & May.....	115	18	do.....		do
9	Speculator.....	104	18	do.....		do
10	J. M. Calderwood.....	86	16	do.....	L	do
11	Thetis.....	91	18	do.....	L	repairs.
12	James G. Blain.....	98	17	do.....		shelter.
13	Lucy W. Dyer.....	78	17	Portland.....		water.
14	Elsie M. Smita.....	106	17	Gloucester.....		shelter.
15	Abbie M. Deering.....	96	17	do.....		water.
16	Harry G. French.....	95	17	do.....		do
17	Norumbega.....	120	18	do.....		shelter.
18	Latonia.....	103	18	do.....		water.
19	James Dyer.....	81	17	Portland.....		repairs.
20	Iolanthe.....	70	17	Gloucester.....		do
21	Orient.....	89	16	do.....		water.
22	Pendragon.....	68	16	do.....		shelter.
23	Geo. F. Edmunds.....	142	18	do.....		do
24	Louis Pollys.....	69	15	do.....		do
25	Alice M. Parsons.....	72	17	do.....		water.
26	Hattie E. Worcester.....	112	18	do.....		do
27	Commonwealth.....	81	17	do.....		shelter.
28	Eliza H. Parkhurst.....	115	17	do.....		do
29	Sarah E. Lee.....	98	16	do.....		In to see doctor.
30	Orient.....	89	16	do.....		In for repairs.
31	Carrie E. Philips.....	109	18	do.....		shelter.
32	David Sherman.....	69	17	do.....		water.
33	Fredonia.....	109	17	do.....		shelter.
34	Hattie E. Worcester.....	112	18	do.....		do
35	Pendragon.....	68	16	do.....		do
36	Louis Pollys.....	69	15	do.....		do
37	Hattie E. Heckman.....	105	17	do.....		harbour.
38	Harry L. Beldon.....	117	19	Boston.....		water.
39	Louis Pollys.....	69	15	Gloucester.....		do
40	James G. Blain.....	98	17	do.....		harbour.
41	James B. McGuire.....	88	14	do.....	L	do
42	Carrie W. Babson.....	85	14	do.....	L	do
43	James B. McGuire.....	88	14	do.....	L	repairs.
44	Marathon.....	65	12	do.....	L	harbour.
45	Norman Fisher.....	76	16	do.....		do
46	Hustler.....	92	16	do.....		do
47	Margaret Mather.....	91	16	do.....	L	do
48	Nereid.....	92	16	do.....		do
49	Hattie E. Worcester.....	112	17	do.....		do
50	do.....	112	17	do.....		repairs.
51	Kearsage.....	101	17	do.....		harbour.
52	Norman Fisher.....	76	16	do.....		do
53	Margaret Mather.....	91	17	do.....	L	do
54	Nereid.....	92	16	do.....		do
55	Hustler.....	92	16	do.....		do
56	Hattie E. Worcester.....	112	17	do.....		do
57	Geo. F. Edmunds.....	141	17	do.....		shelter.
58	Norman Fisher.....	76	16	do.....		do
59	Hattie E. Worcester.....	112	17	do.....		do
60	Hustler.....	92	16	do.....		do
61	Geo. F. Edmunds.....	141	17	do.....		do
62	Kearsage.....	101	17	do.....		do
63	Ethel B. Jacobs.....	125	16	do.....		harbour.
64	do.....	125	16	do.....		do

United States Fishing vessels calling at *N. Sydney*—Con.

Number.	Names.	Tonnage.	Number of men.	Port of Registry.	License.	Remarks.
65	Norman Fisher.....	76	16	do		In harbour.
66	Lizzie M. Centre.....	77	17	do		do
67	Kearsage.....	101	17	do		do
68	Hattie E. Worcester.....	112	17	do		do
69	Hustler.....	92	16	do		do
70	Nereid.....	92	16	do		do
71	Geo. F. Edmunds.....	141	17	do		do
72	Ethel B. Jacobs.....	125	16	do		shelter.
73	Norman Fisher.....	76	16	do		do
74	Hattie E. Worcester.....	112	17	do		do
75	Kearsage.....	101	17	do		do
76	Hustler.....	92	16	do		do
77	Valkyrie.....	132	8	do		do
	Total.....	7,521	1,272			

To further demonstrate the importance of our ports to the United States fishing vessels, it is sufficient to state that no less than 212 such vessels called at Sand Point, Shelburne County, during the season of 1896, mostly for shelter and repairs. More than 50 per cent of these calls are during the months of November, December and January.

Marine and Fisheries—Fisheries Branch.

ANNEX D.

DETAILED REPORT OF THE FISHERIES INTELLIGENCE BUREAU.

HALIFAX, N.S., 29th December, 1896.

Commander O. G. V. SPAIN,
In charge Fisheries Protection Service,
Ottawa.

SIR,—I have the honour to submit the annual report of the Fisheries Intelligence Bureau for the season, 1st May to 15th October, 1896.

NOVA SCOTIA.

BAYFIELD.

Codfish and haddock were first reported in light and fair quantities, respectively, on 1st July.

Herring appeared about 27th April in fair quantities, but on 6th May they became plentiful, and excellent catches were made until the 15th. Thence until 3rd June the catches were light, owing chiefly to high winds which prevailed. With the exception of a good catch on 2nd July they were not afterwards reported.

Lobster fishery commenced about three weeks earlier this season, traps having been set about 4th May. From the 6th to 16th light catches were made each day, but on the 17th they were reported very good, and the average catch until 30th June was fair. From 4th to 24th June light catches were regularly reported, after which the fishery was fair until the season closed on 15th July. The total catch is reported above the average.

Mackerel struck in on 7th June, but with the exception of some fair hauls having been made during the last week in June and the third week of July they were light until 7th August, as they would neither mesh nor take hooks. On 8th August they commenced to take hooks, and fair fishing was afterward reported until 9th September, when the average catch was good until the 20th, when mackerel were reported to be slackening off owing to the stormy weather. Total catch estimated above the average.

Salmon first appeared on 13th June in light quantity, and the catches remained light until the 16th, from which date they were fairly good until the 22nd. After a week's poor fishing they became plentiful, and excellent catches were made until 6th July, but a slight falling off was noticeable. During the following week the catches were good each day until the 16th, after which they were scarce until 6th August, when this fishery closed. The total catch is said to have been in excess of that of 1895.

CANSO.

Codfish were first reported on 13th May, but the catches were light until the 15th, owing to the limited number engaged in this fishery. From the 16th to 20th very fair supplies were landed each day, but from the 20th to 4th June the catches were again light. During the remainder of June the average catch was good, and with the exception of a few light catches during the first week of July, the remainder of the month proved very satisfactory, as good fishing was reported. Throughout August the weather was stormy and bait scarce, and consequently the catches were light; but as the weather throughout September was not so stormy, fishermen made on an average very fair catches. Although the inshore catch has not been large, it is reported that it has been an improvement on the previous year.

Haddock were reported on 10th June, and the catches until 2nd July varied from good to fair. From 2nd July to 31st although a good many catches were light, some very good were made during the third week, and the average catch for the month was fair. Throughout August and September this fishery met with the same reverses as the cod fishery, and the catches until the close of the season were almost identical. The remarks of Messrs. A. N. Whitman & Son regarding the development of another branch of this very important fishery, which will be found in the appended report, are interesting.

Herring were first reported on 14th May, but the catches throughout the season were light. Although the September run of this fish is closely watched, it proved this year a complete failure, and is mainly attributed to the discouragingly low prices obtained last season.

Lobster fishery commenced on 4th May, from which date light but regular catches were reported each day. The total catch of this fish is considered about half that of 1895, and is probably owing to the rough weather which prevailed during most of the lobster season. It is reported that there is a gradual diminution of the supply and size of lobsters, but that the increased outfit and price obtained help to maintain the total quantity and value, approximately, up to that of previous years.

Mackerel appeared in light quantities on 26th May, and the catches were light during the remainder of the month. On the 30th, however, they struck in fairly plentifully in Chedabucto Bay, and they were reported schooling on the coast on the 3rd. From 8th June to 6th July the catches were light but regular, and the total yield of summer mackerel is considered the smallest known. Nothing was afterwards reported until 8th October, when they were schooling in Chedabucto Bay and light hauls made; fish having been reported to be fat and of good quality. It is further reported that the June run in Chedabucto Bay, the past season, has been an unusually good one as regards number and size.

Salmon were taken in light but regular quantities from 19th May to 14th July, and although the catch was greater on some parts of the coast, the total amount taken at this station was smaller than usual.

Squid were first reported on 22nd June, and fair catches were made the following week. During the first week of July, the catches were light, but for the remainder of the month was a good average. From 1st August to 10th this fish was very scarce, but on the 11th a fair supply was taken, and throughout the following week light catches were made each day. After this they were very irregular, but a few hauls were made. Notwithstanding that a few excellent catches were taken in the second week of September, the catch throughout the month only averaged fair. During the past season the greater number of the Lunenburg fleet obtained their supplies of bait on the Newfoundland bank, and as a result the income to fishermen of this locality for bait was very small.

DIGBY.

Codfish appeared in good quantities on 1st May, and until 15th June this fishery was good, there having been some excellent catches reported during the second and fourth weeks of May. About 16th June the catches became somewhat lighter, but fair and regular fishing was reported each day until 3rd July, from which date they were mostly light until the close of the season. Dogfish were not reported to have been destructive as in the past seasons, and no scarcity of bait is reported to have prevailed. Manifests received at the Digby custom-house from the outports of Sandy Cove and Tiverton show that nearly 2,000 qtls., were shipped during the fourth week of August to St. John, Yarmouth and Halifax. The total yield is estimated at 380,000 lbs., but as a part of the Digby fleet sold their catches at Yarmouth and St. John, it would probably equal or be in excess of the total catch of 1895.

Haddock appeared in fair quantities on 1st May, but on the 4th became scarce, and only light catches were made until about 9th July, from which date they were fair until the last of August, after which, although some poor captures were made during the

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month of September, the average was only fair until the close of the season. Total is estimated at 589,000 lbs.

Hake were taken in fair quantities from 16th June to the last of the month, after which they became more plentiful and good catches were reported each day until 14th September, when this fishery became very good, and continued so until the season closed. Report from Weymouth about 7th August states that hake were scarce, but it is probably judged by the light catches, which were owing to the prevalence of dogfish. The total catch is estimated at 607,000 lbs.

Halibut were first reported on 1st May, and the catches were fair and regular until 10th July. Nothing was afterwards reported. Total catch this season is estimated at 3,200 lbs.

Herring struck in in good quantity on 4th May, and very fair catches were taken until the 9th, when they became scarce and remained so until the 26th of May. They were not again reported until about 6th August, when some fair catches were made for a few days. Throughout September none were reported, but during the first three days of October light catches were made each day.

Lobster fishing commenced 1st May, and the catches until the 26th were fair. On the following day an improvement was reported, and the catches until the last of June were good. Fair catches were made during the first ten days of July, but nothing afterwards. This season the total catch is estimated at 1,247 brls., which shows an increase in comparison with 1895, and which is possibly attributed to the new fields operated upon as mentioned in the report of 1895.

Mackerel struck in on 19th May in fair quantities, and the takes during the remainder of that month varied from fair to poor. Throughout June no catches were reported, but on 9th July small mackerel were reported to have struck in St. Mary's Bay, below Sea Wall, and light catches were made each day for about a week. On 6th and 7th August they were reported schooling in the Bay of Fundy, but no takes were made. About the 15th they were in fair supply in St. Mary's Bay, and altogether a fair catch was made on that date. The takes during the remainder of that month were light, and they were not afterwards reported.

Salmon were first reported on 10th June, but the catches altogether fair only lasted a few days. With the exception of a good catch on the 27th, they were not afterwards mentioned.

Shad were reported first on 7th July, and light catches were taken pretty regularly until 5th August. On the 6th this fishery became good in St. Mary's Bay, and large quantities were taken. Reports state that from Brier Island to the head of the bay the fishermen reaped a harvest, as the shad were large and very fat. About this time the Trout Cove boats averaged 5 brls., which varied in price from \$12 to \$15 per brl. Encouraged by these good catches it was reported that a number of vessels fitted out for this fishery in the Bay of Fundy; but, as far as reported, the catches were light until 1st September, after which date none were reported.

In addition to the above branches reported upon, the following information will no doubt be of interest:

Total quantity of pollack taken is estimated at	60,100 lbs.
do sounds	do 2,800 lbs.
do cod oil	do 3,004 galls.

HALIFAX.

During the past season the following quantities of lobsters were exported to the United States:—

March quarter,	1,337	crates,	valued at		\$ 7,771
June	“	3,320	“	“	17,285
Sept.	“	311	“	“	1,558
Dec.	“	Nil.			
Total . . .				4,968	\$26,614

ISAAC'S HARBOUR.

Codfish were reported irregular throughout the season, but fair catches seem to have been made when weather permitted. About 8th August boats were reported to have averaged ten quintals. Throughout September the weather was unfavourable and boats could only get on fishing grounds one or two days a week, and the fish caught could not be satisfactorily dried for the market. During the following month weather proved stormy also, but when boats were successful in getting on fishing grounds cod appeared to be plentiful, especially in the latter part of October, and boats varied from four to five quintals, which will greatly aid the fishermen in preparing for the winter as it is feared that quite a number will have to seek aid from the lobster packers by an advance.

Herring.—The catch of fat herring the past season has been small but well cured, and the result is that they have all been marketable, whereas last season, owing no doubt to the large quantity, they became more or less tainted and depreciated in value very much.

Lobsters were first reported on 7th May, but the catches appear to have been light throughout the season, and the total catch is considered 25 per cent short of last season. It is reported that last winter the lobster fishery was actively prosecuted, and all lobsters of the required size taken were shipped to Boston. This business, however, proved a great injury, and the result is that during the approaching winter this fishery will be dispensed with.

Mackerel were very scarce the past season, and it is estimated that the total catch between New Harbour and Fishermen's Harbour will not exceed twenty-five barrels.

LIVERPOOL.

Alewives appeared on 4th May and the catches throughout the month were light but regular.

Codfish were first reported on 8th May as usual, and until the 14th the catches were light, although on the 12th the fishery was reported good ten miles off shore. On 14th May this fishery greatly improved and good catches were always reported except when stormy weather interfered, until 4th July when this fishery began to decline and only light catches were made until 14th July, after which very few were taken owing to the great scarcity of bait. Total catch estimated very much below an average catch.

Haddock were only reported during the second week of May and the catches were very light.

Halibut were taken in light quantities during the third week of May.

Herring were first reported on 14th May when they were schooling about six miles off-shore and during the following week they became plentiful and were striking inshore. No takes were reported until the 22nd when some good hauls were made during that week. A few light hauls were made during the first week of June, but nothing was reported afterwards until 26th September when some very good catches were made for a few days, boats having as high as 5 brls. Total catch estimated at one-tenth of last season's.

Lobsters appeared in good quantities on 4th May, and although the catches became poor for a very short period during the latter part of the second week of May, the catches as a whole have been a good average until 22nd June, from which date they were poor until 8th July, after which none were reported. Total catch considered a good average. It is estimated that the total number of cases canned is 4,000, and of lobsters exported alive 160,000.

Mackerel were reported schooling 5 miles off Little Hope on 16th May, but no catches were made until 26th June when a light haul was secured. Nothing was afterwards reported until 28th September, when boats varied from 2 to 15 fish of good quality. Total catch estimated at not over 10 brls.

Salmon appeared on 8th May in light quantities, but on the 15th they became good but slightly fell off about the 18th, from which date the catches were fair until the

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28th. From latter date until 22nd June, good catches were very regularly reported but nothing was reported afterwards. The season's catch has been very large and it is estimated that more salmon were caught the past season than in any of the past 15 years.

Squid appeared first in light quantities on 26th June, but on the following day a very good supply was taken; but with the exception of a few light hauls during the first week of July, nothing further was reported. It is said that this fish was very destructive, destroying what few mackerel were taken in nets.

LOCKEPORT.

Alewives were reported in good quantities on 2nd May, and although some good catches were made during that week they were not afterwards reported until the 16th and were then only taken in light catches when the fishery closed.

Codfish.—About 4th May the offshore boats were reported to be fitting out and on the 9th the best offshore boat obtained 40 quintals of fine cod. These catches, with very few intermissions, continued until about the 22nd, when there was a slight decrease until about 5th June when bankers were reported doing well and the offshore fishery greatly improved; one boat with four men having taken 50 quintals in one week. The offshore catches continued excellent until 3rd July, when the squid, which succeeded the herring as bait, failed, and the catches were lighter until about the 12th. During the following eight days excellent catches were again made, but rough weather setting in, coupled with scarcity of bait, only light catches were made until 14th August, although fish were reported plentiful on grounds. In the third week of August when squid bait was obtainable good catches were reported, and on the 19th the boats which obtained supplies proceeded to the grounds. About this time dogfish became very troublesome and with the return of the above mentioned drawbacks the catches were light until 2nd September. The day following they were reported very plentiful, but as the dogfish were close inshore and bait scarce the catches were light. During the remainder of the month the average catch was good and some very good catches were made during the first ten days of October, when codfish were reported to have been very plentiful off shore. In comparison with last season there seems to have been a slight shortage as will be seen in the statement of total catches.

Clams.—During the past season, 758 barrels were taken for bait.

Haddock.—Although it is not doubted that this fish was on the grounds during the greater part of the season, yet the only catches reported were from 8th June to 20th, inclusive, when light fares were made each day. In comparison with the season of 1895 there appears to have been a large decrease as will be noticed in the statement.

Hake were not reported this season, but the general yield is estimated much below that of 1895.

Halibut appeared in good quantities on 9th May and some very good fishing was accomplished up to about the 16th, from which date they were scarce to 20th June. They were not afterwards reported. This branch shows a very marked decrease as the catch the past season is estimated at 3,000 pounds as against 14,000 pounds during the season of 1895.

Herring were not reported this season until 22nd May, when they appeared plentifully off shore, but no catches were reported until the 30th, when excellent catches for bait were made by the nets or outside grounds. From 1st June to 24th July no fishing was reported inshore although on the grounds herring was always obtainable for bait until about 4th July when squid took the place of herring for bait and but very few were reported until 22nd September when two barrels were taken in one net at Western Head and for the following few days fair hauls were made. During the last week of September the herring were kept outside by dogfish, but about 2nd October they struck in plentifully and the average catch was good while offshore boats had seven barrels per boat. The total catch is estimated at 2,000 brls., which is not quite half of last season's catch. These only include that portion which was salted.

Lobsters were first reported on 2nd May, and were taken in light and regular catches each day until the close of the season.

Number of live lobsters taken for export, 141,000.

do canned, 580 cases, or 27,840 lbs.

Mackerel were reported first on 29th May in light quantities, but nothing was afterwards reported until the last week of September, when light takes were made, and were also taken in light quantities at Ram Island. During the first ten days of October light catches were made each day at the Headlands. Total catch is estimated at 35 brls. or 7,000 lbs., which is a slight decrease in comparison with 1895.

Salmon were reported plentiful at Jordan River on 24th May, and six fish were taken by one netter at Western Head. From that date until about 16th June light catches were pretty regularly made at Jordan River and Western Head.

Squid were very scarce until 12th August, when they were taken in more regular quantities, and boats were enabled to bait and proceed to grounds. About the 28th they became plentiful and continued so until about 17th September, when they again became very scarce and were not afterwards reported.

TOTALS.

6 Large vessels.....	2,358,000 lbs.
23 Shore vessels.....	1,301,800 "
Shore boats.....	758,050 "
Total.....	4,417,850 lbs. or 25,987 qtls.
Total cod.....	4,307,350 lbs.
" haddock.....	68,000 "
" hake.....	4,250 "
" pollack.....	38,250 "
Total.....	4,417,850 lbs. or 25,987 qtls.

LUNENBURG.

Codfish were first reported on 16th May, and fair catches were made each day until about 27th June, when they became plentiful on shore soundings and excellent catches were made until 10th July. During the following week the catches varied from good to fair but were afterwards light, owing principally to the bad weather and scarcity of bait until 4th August, from which date fair fishing was reported each day until the 20th. On 18th August, fish and bait were plentiful on Grand Banks and about the 22nd bankers arrived with good fares. From the 20th to 27th the inshore catches were good, but on latter date they became scarce and very good fishing was reported to be continuing on Grand Banks. On 31st August a number of bankers arrived from Quero Bank with good fares and reported fishing very good. During this period or from 27th August to 30th September the inshore catches were light, but from 1st October to 30th November were very good. On the whole the inshore catch was an average one, shore soundings good, Middle Bank and Bank Quero good, North Bay good and Labrador poor. It is said that a few of the Grand Bank fleet found excellent fishing on the western side of that bank and returned with full fares. The following return will show to what extent this branch is prosecuted.

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LIST of the Banking Fleet.

Number of Vessels.	Port.	Catch.
		Lbs.
54	Lunenburg	15,380,750
4	do North Bay.....	612,000
6	do Labrador	569,500
34	La Have.....	11,860,800
22	do North Bay.....	2,676,700
15	do Labrador.....	1,600,520
11	Mahone Bay	3,565,000
8	do Labrador.....	1,020,000

Haddock were taken in fair catches from 8th June to 14th July on which date they became poor, and but few were taken until 12th August. On 13th August they again became more plentiful and remained in fair supply until the 22nd. On the following day there was another falling off which continued until 15th October, but from that date they were fairly good until 12th November, and the season's catch is considered an average one.

Herring were first taken this year on May 19th and one boat is reported to have taken seven barrels bank herring. From 21st May to 5th June boats averaged one barrel, and the catches were reported as fair. On the 6th the boats averaged 5 barrels, but afterwards gradually decreased until the 20th, when the average was only one barrel. Nothing was afterwards reported until 24th September, which case has not been known for years, although on the 10th they were said to have been plentiful at Tan-cook, and fair from 18th to 21st inclusive, but no hauls were reported. On the 22nd boats were reported to have averaged seven barrels and until 2nd October excellent catches were made regularly. Although the fall herring are reported to have been very plentiful until 10th November light hauls were only made from 2nd to 10th October inclusive.

Lobster fishery commenced 1st January and the catches taken from this date until 8th May were light and were all shipped alive to the United States, On 9th May an improvement was noticeable, and until about 6th June the catches were fair. After this but very few light captures were reported.

Mackerel were first reported on 19th May when one boat caught one large fish ; but from that date until about 20th June the catches were light and boats only varied from 30 to 150 fish. Outside of a light catch about 10th August in St. Margaret's Bay nothing was reported until 15th September when a few hundred 12-inch mackerel were in traps. It is reported that the catch of fall mackerel was the poorest for years, and that not over 2 barrels were taken in traps during the season. The total catch is below the average.

Squid were reported plentiful at Chester and Blue Rocks during the last week of June but no supplies were taken inshore until about 11th August when catches varying from poor to fair were reported until the 28th. During the third week of August they were plentiful on Grand Banks and fair supplies were reported on Middle Ground and Bank Quero.

PORT LA TOUR.

Alewives were taken in light but regular quantities from 8th May to 26th June, after which date none were reported. On 13th May a good run was reported in Barrington River.

Codfish.—Notwithstanding the fact that fishermen were reported on 11th May to be getting 100 cod per man, the fishery was not prosecuted owing to the low

prices. On 14th May they were reported scarce, but gradually improved and were fairly plentiful until the 26th, after which they slackened off and were scarce until 1st June. Throughout June the catches varied from fair to poor, but bait was very scarce. On 10th June, good catches of cod were made wide offshore. The week ending 22nd June was a very successful one for the fishermen, as a school of squid kept the cod on the grounds and enabled the boats to do well. Later, when the squid commenced to move off, a good school of herring appeared and the prospects were very encouraging. This school, however, did not last, and the result was a poor week for the inshore fishermen, although shallows did well on the outside grounds. During the former part of July the weather was very bad and bait scarce, and fishermen did very little; but about the 15th light catches were made quite regularly for about a week. The remainder of the month was stormy, and great scarcity of bait prevailed, and it is reported to have been one of the worst weeks ever known at this station. The catches during the remainder of the season were light, although fish were reported at different periods in good quantities on the grounds, owing principally to the great scarcity of bait. On the whole the cod fishery, though poor, will equal last year's catch—say about 2,000 quintals.

Haddock were first reported on 1st May, but the catches were not regular until about 31st July, from which date they were taken regularly in small quantities until 18th September. Total catch estimated not to exceed 400 cwt.

Herring were reported in good quantities well offshore on 10th June, but no catches were made inshore until 18th August, when light hauls were made each day for about a week. On 15th September, light schools of herring were reported on the eastern side of Blanche, and from the 25th to end of month fair catches were made each day inshore. Total catch to 19th October is estimated to equal that of previous year, there having been between 400 and 500 barrels exported.

Lobsters were taken in light but regular quantities from 1st May to 15th July. During the past season there was quite an addition to the plant worked, as the fishery proved remunerative last season. Total catch is estimated to be about equal to last year's, but as there was less destruction to gear, the fishermen will be better remunerated.

Mackerel fishery proved a total failure this season.

Squid were reported in good quantities on the ground about 22nd June, but did not remain long. From 19th August to 24th, fair catches were reported each day, and with the exception of a light catch on 9th September were not afterwards reported.

PUBLICO.

Codfish were reported in fair quantities from 25th May to 29th June, when there was a slight increase in the catches until bait became scarce during the second week of July. From 11th July to 26th no catches were reported, but cod and bait were reported plentiful on Brown's Bank about the 20th. On the 27th although bait was scarce inshore it was plentiful outside, and while supplies could be obtained, good catches of cod were made inshore. Throughout the month of August cod and squid bait were plentiful on Brown's Bank and boats deserted the inshore fishery and proceeded to the bank where they obtained good fares. On 26th and 27th August, good catches of cod were made at Abbott's Harbour, but with this exception of a few fair catches during third week of September, little was done, as the cod were reported to have struck off about the 6th. It is considered that the past season's operations have been very successful, the catch being between 400 and 500 quintals in excess of last season.

Haddock were fairly plentiful up to 30th June, when they greatly improved and the fishery was reported very good until 6th September, when they appeared to have struck offshore.

Herring were first reported on 22nd May in small quantities, but the catch is almost a total failure, as they did not appear in large numbers. On 26th and 27th August, fair catches were made at Abbott's Harbour.

Lobsters. Previous to 15th May, the catches were reported very good, after which they became fair, remaining so until about 7th June, from which date until the close of the season they were light but regular. Total catch for season considered an average one.

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Mackerel were first reported on 14th May, when about thirteen fish were taken in Bluff Head traps. During the succeeding two days light catches were also made in Pubnico Point trap, and on the 18th became very plentiful, 30 barrels having been taken in Bluff Head trap and 75 barrels in Pubnico Point trap, and remained so until about 7th June, when about 400 barrels were shipped to Boston in ice during the week ending that date. During the following week some fair hauls were made, but afterwards became scarce and remained so until 2nd July, after which date none were reported. On 31st July and August 1st, mackerel were reported schooling in Lobster Bay.

Squid were scarce inshore during the season, but were reported plentiful on Brown's Bank from about 20th July to 29th August.

SAND POINT.

Alewives were first reported on 5th May in small quantities, but on the following day they became more plentiful and the catch each day was very fair until 13th July, after which date none were reported. Total catch as compared with previous years is a fair average.

Codfish were taken this year about a week earlier, viz., on 5th May, when a good catch was reported. During the following eight days good catches were made inshore as well as on LaHave Bank; but on latter grounds dogfish were quite plentiful and very destructive. From 14th May to 6th June the catches varied from fair to poor, although during the last week of May some good catches were made by shallops from 18 to 20 miles south-east of Shelburne lighthouse. On 1st June, bankers arriving reported good fishing on offshore soundings, which continued until about the 10th, when for a few days fishing operations were suspended owing to bad weather. On 13th June they again appeared fairly plentiful, and on the day following good schools appeared; but as they would neither take alewife or clam bait, the catches were only fair until 11th July. On 20th June, the average catch per man on grounds 18 to 20 miles south-east of Shelburne lighthouse was $1\frac{1}{2}$ quintal, and a good supply of herring bait being obtainable on grounds. During the last week of June as squid began to appear, good catches were made by shallops 18 to 20 miles south of Cape Negro. On 4th July, fish were reported scarce on LaHave Bank, and about the 11th became scarce inshore. From 18th July to 11th August, the codfishery was almost entirely given up, as the bait fish left the shores and none was obtainable.

During the second week of August some good catches were made in the Gully between soundings and Roseway Bank, while fair fishing was reported on the bank. On the 12th, as squid again struck in, the daily catch of cod to the 22nd was very fair. About the latter date dogfish began to appear, and as they proved very troublesome, the catches each day were light until 12th September. On 23rd August, fair fishing was reported on Brown's Bank, and on 4th September bankers reported good takes 18 miles south-east of Shelburne lighthouse. On 12th September, fair fishing was reported 7 to 10 miles offshore and 11 miles south of Cape Negro, while good fishing was found 18 miles south-east of Shelburne lighthouse. On 17th September, cod struck in close to headlands and for a few days some good catches were made; but as bad weather began to set in and the boats were compelled to return early, the catches were consequently light, although they were reported to be in good quantities on offshore soundings. During the last week of September good schools of cod were on shore, and when weather permitted the catches varied from $1\frac{1}{4}$ to $1\frac{1}{2}$ quintal per man and were made from 3 to 4 miles offshore. About this time also bankers reported good fishing on offshore soundings, LaHave and Roseway Banks. On 1st October bad weather set in and during the first ten days the catches varied from fair to poor, but afterwards none were taken. On the whole the past season's operations are considered very poor, there having been only 175 quintals taken on inshore grounds by small boats as compared with 300 quintals during the previous year.

Haddock were reported this year about two weeks earlier than last year and were taken in good supplies from 5th to 13th May inclusive, and were also in good numbers on LaHave Bank. From latter date until June 6th the catches varied from fair to poor

notwithstanding the fact that haddock was striking in about 31st May. On 13th June good schools were reported on shore, and until 10th July the average catch each day was very fair, but afterwards very poor, as the bait fish left the shores. Nothing was afterwards reported, owing to unfavourable weather until 12th August when for about 11 days fair catches were made, but afterwards became scarcer and remained so until about 12th September. As a good school of this fish struck in shore about the 16th, the catches although somewhat irregular varied from good to fair, but were poor for the remainder of the season. The total catch for the past season is estimated at 150 quintals which is a large decrease on the total catch of 1895, but which is almost wholly attributed to the prevalence of dogfish, which were very plentiful and destructive and kept this fish from coming inshore.

Hake, although as usual not reported directly to the bureau, were reported by American fishing vessels to have been very plentiful in the gully off this shore the whole season.

Halibut as far as reported, were scarce the whole season, but were reported fairly plentiful 30 miles south-east of Shelburne lighthouse on 20th July.

Herring, although good on offshore grounds during the first week of June, were not reported inshore until the 22nd, when light catches were made each day for about a week. Light catches were again reported from 13th to 18th July, but bad weather setting in and dogfish appearing, resulted in very light catches being made. On 8th September they were reported plentiful on offshore grounds, but as dogfish were plentiful in shore it resulted in keeping the herring off. On 30th September they struck in plentifully and until the 10th October excellent catches were made each day. The herring were of large size, running one-half No. 1's but not very fat, and on 26th October 3,000 brls. were reported to be in fishermen's stages, and all were being salted for export. In comparison with last year this is a marked increase.

Lobster fishery opened about 10th February, and was a very fair catch up to 1st June when they slackened off. The large and small lobsters were both shipped to the United States up to 1st April. The factory here opened about 10th April taking all small lobsters, and during the season packed about 460 cases. On 23rd May lobsters showed quite an improvement over the catch to date the previous year, but from 2nd June to the close of the season, the catches, although regular, were light. About 13th and 15th June fishermen lost about two-thirds of their traps by a heavy storm. On the whole the past season's operations seem to have been very successful, as in addition to 460 cases packed there were 860 crates of live lobsters shipped to the United States, where they met ready sale at good prices.

Mackerel were reported schooling at Shelburne lighthouse on 27th May, and some very good catches were made, but none were afterwards reported until 27th October when catches, varying from 18 to 20 per fleet of nets, were made at Shelburne lighthouse and were sold at 10 cents apiece for home consumption.

Salmon were first taken this season on 21st May in light catches, but increased somewhat the following day and until 6th June were taken in fair quantities each day. From 6th June to 27th the catches were light, although at Jordan River on 30th May the average was 50 per man, and were plentiful on 13th June, good to 18th and plentiful again on the 27th.

Squid of large size appeared first on June 23rd in fair quantities, but soon became plentiful and remained so until July 2nd, when the catches somewhat fell off, although they were reported plentiful, but would not jig and finally struck off about the 17th. They again struck in on 11th August and good supplies were obtained until about 15th September after which the catches gradually became less. On 12th August they appeared plentiful on Bank Quero and on 8th September were plentiful on offshore grounds. Good supplies were obtained during August and September on La Have, Brown's and Roseway Banks.

WHITEHEAD.

Alewives were taken in light but regular catches from 28th May to 6th June, and the total quantity is estimated at 50 barrels or about equal to last year's catch.

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Codfish appeared some four days earlier this season, but the catches were, with the exception of some fair hauls during the third week of August, poor the entire season. During the last two and a half months stormy weather prevented operations which to a great extent accounts for the light catch of 800 quintals or a shortage of about 400 qtls. in comparison with last season.

Haddock appeared on 28th May, but the catches were light although somewhat irregular until 24th August after which date none were reported. Total catch estimated at 350 quintals, or a shortage of about 50 quintals in comparison with last year.

Hake were taken in light quantities during the first week of June but were not afterwards reported.

Herring were reported on 28th May from which date until August 11th the catches were poor and irregular. Nothing afterwards reported. Total catch estimated at 600 brls. which is about 900 brls. short of last season's catch.

Lobster fishery commenced on 5th May and the quantities taken each day until close of season were light but regular, and the total catch is estimated at 4,400 cases.

Mackerel appeared first on 28th May, and on the following day were schooling and light takes were made each day during the remainder of the month. From 1st to 8th June catches varying from 15 mackerel per boat to 4 brls. per trap were made each day. Total catch is estimated at 140 brls.

Squid were taken in light quantities each day during the third week of August.

YARMOUTH.

Alewives were first reported in light quantities on 1st May, but on the following day they became more plentiful, and fair fishing was afterwards reported until about 4th June, from which date until 1st July the catches were light. The total catch is considered about the same as last year and was mostly sold fresh for bait.

Codfish were first reported on 8th May in fair quantities, but on the following day it was reported too windy for inshore fishing and the Digby fleet then in that vicinity left for LaHave Bank. On the 5th good fishing was found, but on the 7th the catches slightly diminished and were fair until 9th June, when bad weather prevented fishing operations being carried on and vessels were hauling up owing to low prices. About the 18th they again appeared in good quantities and some good fishing was done until the 25th, when they became scarce and very few were reported after the 7th of July.

Haddock appeared this year in light quantities on 1st May, and the catches continued light until the 13th when they became more plentiful and fair fishing was reported until the 26th. On this date they again became scarce, but on 1st June they were in good supply for a few days, and from the 5th to the end of the month the catches were fair. During the first week of July the catches were light and the only other report noted was a fair catch on August 6th.

Halibut were taken in fair catches each day from 1st to 15th May, after which they were scarce until about 18th June, when fair catches were again made for a few days but were afterwards scarce. The finer quality found a ready market in Boston and New York, while the inferior quality was kept for home consumption.

Herring were reported to have struck in on 13th May, but no catches were made until the 15th, from which date the hauls were light until 18th June. During the next few days very fair catches were made, but afterwards they were reported irregularly and they appeared to be generally scarce. The fall run was better than the average and about medium size. Large quantities have been saved for lobster bait in the spring while the balance were sold.

Lobsters were first reported on 1st May, and fair quantities were taken each day until the 13th, when there was a slight falling off noticeable and they remained rather scarce until 18th June. From 18th until the 22nd June the catches were again fair, but during the remainder of the season, as far as reported, the catches were light. During the past season the following quantities of live lobsters were shipped to the United States :—

RETURN of live lobsters shipped to Boston, season of 1896.

Date.	No. of Crates.	Value.
January	3,382	\$ 33,999
February	2,395	28,330
March	1,802	23,587
April	10,669	70,594
May	6,979	53,983
June	4,341	34,693
July	989	8,766
	30,557	\$253,952

Mackerel were first reported this season on 11th May when 100 large fish were taken in Burn's Point trap. On the 13th several barrels were taken by traps. About the 15th they became more regular and from that date to the 22nd traps varied from 60 to 130 barrels. On the 23rd it was reported that they were more plentiful and traps were taking all they could handle which were all exported with the exception of a few which were kept for local consumption. On the 29th fishing was prevented by stormy weather and the catches became light. On 1st June traps averaged 12 barrels of large fish and slightly increased until about the 5th when they began to disappear and the catches became light. During the 2nd week of June traps did but very little but from the 18th to 25th fair hauls were reported each day. During the remainder of the season very few were reported.

Salmon were taken in light catches from 1st to 19th May when they became more plentiful and on the 21st the catch per day was estimated at 200 pounds. From the 24th to 30th inclusive they were very plentiful and excellent catches were reported in the mackerel traps, but during the remainder of the season the catch was a fair average. The catches were mostly exported at the time they were caught and very few were kept for local use as the prices ruled too high. The home demand was afterwards supplied by deep water and trap salmon.

Shad were first reported on 1st May and the catches from that date to 22nd June were light and fairly regular.

CAPE BRETON.

ARICHAT.

Codfish appeared on 11th May and the catches were fair until about 9th July when for about 8 days the fishing was reported poor. About the 18th, however, it again was reported fairly good and the average catch was very fair until the last of September, although a little irregular. Throughout the former part of October the catches were light. This fishery is considered the best and the most remunerative because it is the least precarious and most continuous of all the branches presented in this locality.

Haddock appeared plentifully on 4th May and the catches until about the 13th were good. After that date they began to decline and during the remainder of that month varied from fair to poor. During the greater part of June the average catch was very fair, but nothing was afterwards reported until September 9th from which date the catches were fair until the last of the month. Although this fishery is reported to have been fairly good, it is said that they were not as plentiful as in former years but that a larger quantity could be taken in the spring if the fishermen were fitted out with nets. The experience of the few who have used nets proved this.

Herring struck in in fair quantities on 5th May but they did not remain fair, for from the 7th to 14th June the catches were light. After this they were again plentiful and remained so until the last of July, although the catches were somewhat irregular during the former part of that month. Throughout August the catches were poor but

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during the month of September the average catch was fair. Beyond a few light catches during the first week of October very little was afterwards reported. It is reported that the total catch has been below fair and the July catch poor.

Lobster fishing industry which opened about the same time as the previous year and gave such encouraging prospects, was on the whole not successful. Owing to the prevalence of rough weather and heavy seas a large quantity of gear were destroyed at different periods during the season, which greatly hampered the fishermen. The first catch reported was on 4th May and the average catch until the last of June was fair. Throughout July they were reported irregularly, the catches during the first week having been poor and during the third week fair. It is estimated that the total quantity put up was considerably less than that of the previous year.

Mackerel appeared as usual on 22nd May but the catches were light until 13th June after which none were reported. Up to 20th November no schools were reported to have appeared and the season's catch is considered a failure.

Squid were first reported on 20th July and fair catches were made during the remainder of the month and were on an average fair until 13th August.

Alewives were taken in light supplies each day during the last week of May. Nothing afterwards reported.

Codfish was first reported on 6th June and catches varying from fair to poor were made about 6th July when bait became scarce, and until 24th July the catches were light but regular. From latter date the fishermen made fairly good hauls, notwithstanding that bait was very hard to obtain, until 3rd September but during the remainder of the month the catches were light. Throughout October nothing was done as fishermen took up their gear, the weather being too rough for codfishing and even if favourable it was impossible to get bait. On the whole the past season's operations has been somewhat better than in 1895, the fish having kept well on the ground during June, July and August. It is reported that the fish taken the past season were of a larger size than usual.

Haddock fishery commenced on 28th May, and with the exception of some fair catches during the third week of June and first and last weeks of July, the catches were light and regular until 27th September when all fishing was suspended by bad weather. Although the total catch is not large it compares favourably with last year's.

Herring did not appear this year until 8th June from which date until 10th July the catches varied from fair to poor. About 27th June the approach of a good run of herring was reported, but they failed to appear, and from 10th July to the remainder of the season the catches were light. During September some thirty or forty vessels were reported fishing in the bay, but returned empty as the herring did not strike inshore as usual. In comparison with last season's exceptionally large catch this year has fallen about two-thirds short and will be sorely felt by the fishermen, many of whom are but poorly prepared to meet the long winter now approaching.

Lobster fishery commenced about 15th April, and the fishermen encouraged by the early departure of the drift ice set their traps, and during the first week fairly good catches were made each day, boats averaging over 200 lobsters. Encouraged by this hopeful beginning, about 50 per cent increase of traps was added and quite a number of new men engaged in the business. About 1st May, however, the catches began to decrease owing to bad weather and to heavy swell from north-east winds, and on 16th May it was reported that the catch to that date was the smallest ever known in the bay. During the remainder of the season bad weather continued, and the catches were consequently light, the daily average having been scarcely 50 lobsters per boat. The total for the season is considered the smallest ever known, and as a result many of the fishermen will barely clear expenses. It is the general opinion among the fishermen of this district that the extension of time granted by the department is of no benefit whatever as the fishery becomes unprofitable before 15th July, and is seldom continued after that date. From close observations made during the past 15 or 16 years our efficient correspondent of the bureau finds that nearly one-half of the lobsters captured during July and August are spawn fish, and are usually found close inshore among the rocks and sea reefs where they evidently crawl to spawn. The packers report that the fish taken during this period do not contain nearly as much meat as those caught earlier in

the season. It is generally admitted that the three best months for fishing in this bay and around the Strait of Canso shore, where the fishery is similar, are May, June and September—July and August being the close season—and it is felt that unless the stringent regulations, now being carried out under Commander Spain's supervision, are not better observed, that in a few years this valuable fishery will become extinct.

Mackerel appeared on 25th May, but the catches although regular were light until 6th July, after which date none were reported. Quite a large body of this fish was reported schooling in the bay early in June, but a strong easterly wind set in which drove the fish to the westerly shore and Guysborough Bay, where some very good hauls were made. On the whole this fishery has again proved a failure the past season, there having been only between thirty and forty barrels taken.

CHETICAMP.

Codfish appeared this season as early as 7th May, when one boat was reported to have obtained one quintal. About the 12th they fell off considerably and the catches were light but regular until about 24th June, when fair fishing was again reported for about a week. After this the catches were light but regular until about 19th July, when they were about due, and from this date to the last of September, the catches were fair and regular.

Herring, as far as reported, were only taken in light hauls during the second week of May.

Lobsters appeared in fair quantities on 18th May, when fair catches were taken until the 23rd, when there was a falling off reported, and with the exception of a few fair catches at occasional periods during the following month the catches were light.

Mackerel did not appear the past season, until 25th August, and with the exception of a couple of fair hauls during the second week of September, the catches were light until 29th September, and nothing was afterwards taken owing to stormy weather.

Salmon were first reported on 6th June, and the average catch until 9th July, was fair, but during the following 10 days was light.

Squid struck in plentifully on 3rd July, and excellent supplies were taken until about 6th August, when they fell to fair and remained so until the 18th. After this the catches were light and irregular, until the last of the month. Throughout September, with very few exceptions, the catches were fair.

D'ESCOUSSE.

Codfish were first reported on 25th May, from which date the catches were light but regular until 25th July, when fishing closed after an exceptionally dull season. The North Bay fleet, consisting of about fifteen sails, returned about 20th October, with an average of about 500 quintals,—a very low catch. They report cod plentiful in North Bay during August, and had it not been that they devoted a great portion of their time to the mackerel fishery, full fares could easily have been obtained.

Hake fishing commenced about 14th May, and light catches were made quite regularly each day until 25th July.

Herring were first reported on 11th May, and fair catches were made until about the 19th, when they became scarce and remained so during the entire season. On 18th July it was reported that the usual run of herring during that month did not appear in any quantity and boats did not even average one barrel, which was unprecedented in this section.

Lobsters were taken in fair quantities about 11th May, but during that week became somewhat scarcer owing to the very cold weather. With the exception of an occasional fair catch throughout the months of May and June the catches were usually light the whole season, but in size were fairly good. Only one factory was in operation during the past season and the pack is estimated at 600 cases.

Mackerel appeared this year about 28th May, and with the exception of a few fair hauls the catches were comparatively light; and the season's catch is considered about the same as last year—a comparative failure.

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GABARUS.

Codfish were not reported this season until about 8th June, when a light catch was made and improved on the following day, and until about the 24th the fishery was fairly good. From 25th June to 14th August, the catches, with the exception of an occasional fair one, were very light owing to unfavourable weather and scarcity of bait. From 15th August to 30th September, the catches were very fair, notwithstanding the unsettled state of the weather and prevalence of dogfish, and the catch in general was reported good.

Haddock were taken in light catches about the middle of July, but were not regularly reported.

Herring were first reported on 10th June, and the catches were, with very few exceptions, poor the whole season. On 10th July, herring were reported schooling in the bay, but could not be captured with nets and the total catch was reported very small.

Lobsters were reported on 1st May to have been taken in light catches which was undoubtedly owing to the bad weather which prevented fishermen from setting their traps to any extent. About the 14th of May, however, the fishery somewhat improved and fair catches were made each day for about a week. Rough weather then set in and the catches became again light and fishermen became discouraged as many of their cages were broken about the 31st and were continually being wrecked during the second week of June. Throughout June and July the catches were very regular but light; and the total catch is estimated to be about half of last season.

Mackerel fishery commenced this year on 28th May, and boats varied from two to six barrels. On 1st June they became more plentiful and fair hauls were reported each day until the 8th, when they left the bay and but few were afterwards taken. Fishermen are reported to have done well with mackerel during the short season, and the catch is estimated at 500 barrels principally caught in the bay. Fish were of large size and have been well cured.

Squid were only taken in very light supplies during the months of June and July, but were reported plentiful about 18th August and continued so until the last of September, which accounts in a great measure of the good catch of cod.

Lobsters were first reported on 13th May and fair catches were made daily for about a week at Strait of Canso, Port Malcolm and Judique. Fair catches were again reported during the second week of June at Strait of Canso, Port Malcolm and Creignish and it is generally reported that the season has been fairly successful.

Mackerel fishery, comparatively speaking, was a total failure to the 16th of October, and as the outlook after that date was not very promising the fishermen were very much discouraged.

INGONISH.

Codfish were not reported this year until 16th May from which date the catches, with few exceptions, were light until about 14th September when squid appeared fairly plentiful and during the rest of that month fair catches were made each day. During the second week of June trawlers did fairly well in deep water and some fair catches were also reported in the first and last weeks of July and August. About the last of September large bodies of dogfish swarmed the coast which made it very difficult for hand-liners, but this was not experienced to such an extent in deep water, as dogfish did not seem to affect it materially. Total catch considered about two-thirds of an average season's catch.

Haddock appeared about 25th May and with the exception of some fairly good catches during the first and second weeks of June and August and last week of July, were scarce until the close of the season and irregular throughout September and October owing largely to stormy weather.

Herring appeared about 11th May in fair quantities and remained so until the 17th when they became scarce, remaining so until 4th June after which date none were reported. It is reported that the summer school which usually strike in did not appear this year.

Lobster fishery commenced about 10th May and up to the middle of June there was a fairly good catch owing to the fact that more than double of last year's outfit was in operation, as two new canneries were started in the spring. From the middle of June until the close of the season lobsters were not taken in such large quantities. The result of this increased plant is that neither factory or fishermen did as well as in previous year although a large catch was taken.

Mackerel were first reported on 26th May, but the catches were light until about 8th June, highest boat having about 60 fish. From 8th to 14th June fair but irregular takes were reported, after which but few were taken up to 8th July, from which date none were reported until 2nd August, when light catches were made regularly each day during the following three weeks. It is estimated that the catch will not average one barrel per boat.

Salmon were about a week later in appearing this year, and only light quantities were taken from 4th to 16th June, after which the fishery became fairly good, and continued so until the last of the month. From 1st to 16th July light but regular catches were reported each day, and the total catch is considered a shade above the average; but owing to the declining prices the past season, the average receipts were below those of previous years.

Squid were not reported this year until 17th July, when some fair catches were made. They became plentiful on the following day, but would not jig, and during the following week but few were taken. Some good catches, however, were made from the 28th to 31st inclusive, which assisted the cod fishermen greatly. Throughout August, with the exception of some fairly good supplies having been taken during the first and third weeks, the catches were usually light. During the first week of September bad weather prevented fishing, but on the 8th light supplies of squid were obtained and about the 15th they became more plentiful, and good catches were reported for about ten days; but afterwards became scarce, and remained so until the last of the month.

L'ARDOISE.

Haddock appeared on 28th May, and during the following three days were taken in good numbers, but on the 30th they began to gradually fall off in quantity and throughout the following month the catches varied from fair to poor. During the remainder of the season the catches were reported light and were particularly irregular from the 11th to 27th July. The total catch is estimated below the average of former years.

Herring was first reported on June 6th, and the catches throughout the season have been very light and somewhat irregular and the season's catch is considered a failure, there having been scarcely sufficient taken for home consumption.

Lobster fishery commenced this season on 6th May, but the catches were light which is probably the result of the increased number of men engaged in this fishery over previous years. About the 22nd an improvement in the catches was noticeable and until 1st June fair catches were made each day. During the remainder of the season, the catches with the exception of some fair ones during the second and third weeks of June, were poor. There have been four factories in operation here during the past season and the catch is reported to be below the average; but as prices ruled higher—\$2 per hundred, the results have proved equally remunerative for the fishermen.

Mackerel first appeared this season on 21st May, but the catches were light and boats only varied from twenty to thirty fish. About the 28th, however, they became more plentiful, boats having from two to three barrels, which were reported to be large and of fine quality. On 1st June they were schooling and although fair hauls had been taken each day for a week the average catch on June 2nd was reported to have been below that of 1895. About 10th June, catches became lighter and but light and irregular takes were made until 3rd July, after which none were reported. It is noticeable in this district that this fish keeps off the shore more and more each season which renders it more difficult to obtain good catches. As those caught this season were all large and fat they were all salted for export, none having been sold fresh for bait or home consumption.

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LOUISBOURG.

Codfish were first reported on 7th May, but the catches until 8th June were light owing chiefly to the scarcity of bait. Throughout the remainder of the month of June the catches varied from fair to poor, although it is thought that had bait been obtainable to any degree the catches would have been much larger. From 1st July to 20th August the weather was very rough and bait scarce and consequently the catches of cod were light although very regular. On 6th August when squid were in fair supply it was reported by fishermen that cod were on the ground, but the fishery was not properly prosecuted. This, no doubt, is accountable for a short catch. As soon as bait became good about 21st August, the catches of cod increased and the average until bad weather prevented fishing during October was very fair.

Haddock appeared on 1st June, but the catches with the exception of some good hauls during the last week of August, were light but regular the entire season.

Herring were reported as early as 1st May, the past season, but the catches were very light and irregular until 9th June, from which date until the close of the season the catches were, with very few exceptions, poor. In previous years good catches of fat herring were always made in July, but this year the catch is almost nil and the total catch is considered one-third short.

Lobster fishing commenced, as usual, on 1st May, but the catches until about the 10th, were light although very good catches were made on the 4th and 5th. From 11th May to June 26th, the average catch was very fair although a great many lobster traps were destroyed by heavy seas about the 28th of May and first week of June. From 27th June until the season closed the catches were light and the total catch is reported short.

Mackerel were first reported in light quantities on 28th May, but on the following day boats averaged two barrels and continued to be taken in fair hauls until the 9th, although boats on the 5th averaged fifteen barrels. The only catches afterwards reported were during the last week of July, when light takes were made each day. It is reported that the spring run of mackerel were so large in size that the nets used with $3\frac{1}{2}$ inch mesh did not capture more than two-thirds.

Salmon appeared in fair quantities on 17th May, and with the exception of fair catches on 17th, 18th, 29th and 30th May, they were light but regular until the season closed on 26th June.

Squid appeared in light quantities on 12th June, but on the 27th increased to good but gradually slackened off about 1st August; fair catches having been reported to the 13th, and poor to the 20th, when they were again taken in good supplies until 2nd October, when bad weather set in and prevented all fishing operations.

MARGAREE.

Alewives were reported to have been taken regularly in light quantities each day from 12th May to 20th June.

Codfish were first reported on 14th May, and the catches were light throughout the month, and were taken on trawls. During the first week of June some fair catches were made, but for the remainder of the month, and up to 17th July they were light, although fair quantities of cod were reported on the grounds, but scarcity of bait prevented good catches. About the 18th July squid were reported on the coast, and from that date until 12th October the average catch was good.

Haddock were not reported the past season until 22nd June, and the catches were light until 28th July, when an improvement was noted and some good fishing was done each day until 10th August, after which the catches were somewhat lighter during the remainder of the season.

Hake appeared the same time as haddock, and the catches as far as reported were almost identical. It is said that the catch of these three fishes has been a good average and the highest boats—23 in all with three men to a boat—took about 120 quintals dried, while the lowest boat took about 60 quintals.

Herring were taken on the 5th May for first of season, but were not regularly reported until the 12th, from which date light and regular catches were made. Those taken in the last weeks of June and July are said to have been of large size. Throughout August and September they were more plentiful, and on 5th September a large catch was reported towards Grand Etang. On the following week dogfish became troublesome, but they do not appear to have affected the fishery to any extent; for it is reported that about the 20th the fall school struck in and good catches were made for about a week.

Lobster fishing commenced on 12th May, but the catches were light until the 20th, when an improvement occurred and until about 7th June the catch was very fair. From 8th June until the close of the season on 31st July the catches were light which is attributed to the blustry weather during that month. It is estimated that the total catch will be below the average.

Mackerel of very large size were first reported on 25th July in light quantities and throughout the season the catches continued light and somewhat irregular. On 4th August, fair fishing was reported at Grand Etang. As far as reported the catches made were taken with jigs, and this fishery is reported to have proved a total failure. A large school was reported to have struck the coast towards the last of September, but it is said they would not take the hook, therefore the catches were consequently light.

Salmon were taken in light but regular catches from 5th June to 17th, but then became more plentiful, and fair fishing was reported until 1st July, when high winds prevented good fishing. With few exceptions the catches during that month continued light and during the first eleven days of August the catches varied from fair to poor. It is said that the average catch of salmon has been good and much better than last season. The estimated catch is reported at 1,200 lbs. as against 700 lbs. last year.

Squid appeared plentifully on 27th July and some excellent supplies were taken for a few days. Throughout the months of August and September the catches varied from very good to poor, but were reported very irregularly.

MEAT COVE.

Codfish. Although catches were not reported inshore until the 29th of May, good fishing was reported north of St. Paul's Island on the 23rd. From the 29th of May until 30th June the catches were light with the exception of a period from the 16th to the 23rd when fair catches were made each day. Throughout July the weather was very stormy and prevented fishing and the catches were light except when boats could get to the grounds where fair hauls were frequently obtained. It is reported that the prices offered for cod during the past season were so small that unless the fish were plentiful it did not pay fishermen to fish for them.

Herring appeared on 20th May, from which date light catches were made each day except during the latter part of May when they were taken somewhat irregularly. In comparison with last season the total catch is considerably less, no schools having been reported striking in, and scarcely sufficient were taken for home consumption.

Lobsters. Although the coast was reported clear of ice on 4th May, the fishery was not prosecuted owing to the people being busily engaged in their farming pursuits. About 15th May, however, a small number of traps were put out and during that week light catches were made each day. On the 23rd the fishery became much better and fair supplies were obtained each day until 27th June, from which date until the close of the season light but regular catches were reported. There is one objection which can be raised in regard to this important fishery, and that is the lack of judgment displayed in the setting of so many traps in such close proximity to each other, as was done at Bay St. Lawrence the past season; when the factories fished on the same ground and which will in a very short time cause an extinction of this fish on these grounds. It is reported that during the past season more attention was given the lobster and mackerel fisheries than any other and consequently the fishermen did very well and the lobsters were of good size.

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Mackerel fishery commenced a week earlier this season, but the catches were light until about 11th August notwithstanding that they were schooling on 16th and 26th July. On 11th August they became more plentiful and fair catches were made quite regularly until 29th September, and were reported schooling also on 31st August and 1st September and 17th, but would not take hooks on later date. After 29th September but few were taken, as the stormy weather in October prevented all fishing operations. It is reported that during the months of August and September the fishermen reaped a rich harvest in this line between White Point and Cape St. Lawrence, and as very good prices ruled, the result has been more satisfactory than for years past. It is also reported that during the season the coast swarmed with small fish from two to three inches long, presumably young herring, on which the mackerel fed and which is the reason assigned for their having remained on the coast longer this than in previous years.

Salmon appeared about the same time as last year and the catches were light from 4th to 26th May, from which date until 7th July, some very fair catches were made. After latter date they were again scarce and the fishery closed on the 15th.

Squid.—The only catches reported were during the last week of June, when very good catches were made each day during the week.

PETIT DE GRAT.

Codfish were not reported the past season until about 23rd May, when light catches were made, and from which date until the close of the season, with the exception of an occasional fair catch during the month of June, the catches were light although regular. During the first week of September fair catches were reported on Canso Bank. This fishery the past season was prosecuted to the full extent, and although the catch is considered about equal to that of 1895, it is claimed that the fishermen will not be amply repaid for their exertions, owing to the decline in price of about \$1 per quintal.

Haddock appeared much earlier than cod this season, and on 8th May three boats were reported to have caught 400 fish, which was considered a fair catch for the first. After that the catches were light, although fish were reported plentiful about the 23rd, but would not bite. From 1st to 5th of June fair fishing was reported, but during the remainder of the month the catches were light. Light and irregular catches were made also from 1st to 12th July, but afterwards were not reported until October, throughout which month the catches were light, owing principally to the rough weather which prevented fishermen attending to this branch in open boats. It is reported that this fishery the past season has been better than 1895, and the total catch which is estimated at 700 quintals is 100 quintals in excess of the previous year; but as prices ruled low, the net proceeds will be about the same to the fishermen as in 1895.

Hake were not taken as usual during the past season, and it is reported to be attributable to the fact that the bottom does not afford good feeding grounds, as these fish are generally taken on a muddy bottom, which is not to be found on the north-eastern side of Chedabucto Bay.

Herring are reported to have appeared about 28th April, but the catches were poor until 28th June, when fair catches were made for about three days, but afterwards became and remained scarce until the close of the season. Throughout July, August and September—the best months for this fish—the catches were particularly small, and this branch has almost been a failure, as the catch of about 370 brls. is a large decrease in comparison with 1895, and is sorely felt by the fishermen, who are reported to have worked hard for them. It is computed that the loss to nets by dogfish during the season will amount to \$500.

Lobster fishing commenced as usual early in April, and were taken in fair quantities until about 6th of May, when the gear was much broken up by heavy seas, and the catches were light for about a week. On the 13th they became more plentiful, and about the 16th were reported to be moving into shallow water, and fair catches were made each day until the 27th. About the 30th an easterly gale destroyed many traps which greatly crippled the fishermen, as the fish were fairly plentiful, but the gear

insufficient. About 13th of June another easterly gale destroyed the gear, and during the remainder of the season the catches were light. Notwithstanding the great drawbacks by loss of gear, it is estimated that the total catch will be about 300 cases in excess of 1895.

Mackerel were first reported in this district on 26th May and fairly good catches were made until 1st June when they became scarce and the catches were afterwards light until 12th July. The fall fishery was again looked forward to with much interest and about 2,000 nets were set; but it again proved a failure, as only about 4,500 fish were taken which realized 9c. a piece. The total catch is estimated at about 275 brls. Of these 250 brls. were of the spring run, and 25 brls. of the fall run. The latter realized, salted, \$12.50 per brl.

Salmon were taken regularly in light catches from 8th June until about 12th July, and the fishery has proved fairly successful. Of the total quantity taken there were only about 10 barrels salted for the American market, as fishermen found a ready market at Sydney for all the fresh fish they could catch and for which they realized good prices.

Squid struck in in good quantities on 18th July, and good supplies were obtained each day until 2nd August, when a slight falling off occurred and the catches were light until about the 12th. After this they again appeared more plentiful and until 10th September good supplies were reported each day. During the remainder of the month of September they were very plentiful and fishermen complained that they were very destructive to the mackerel which were in the nets. During the season one licensed American and nine Nova Scotia vessels baited at this station.

PORT HOOD.

Codfish were taken about ten days earlier this season than last and fair catches were made from the 15th of May quite regularly each day until about 9th June when a slight falling off was noticeable. This continued until about the 25th, when they began to appear in greater numbers, and from that date until the close of the season the catches, with the exception of the month of August when the fishery was poor, varied from fair to poor. Dogfish appeared as usual in the latter part of September, but this year did not materially affect this fishery. Total catch for season considered slightly better than last year's.

Haddock were not reported this year until 1st June, during which month the catches were poor, although during the second and third weeks a few fair catches were reported. During the remainder of the season the catches were about the same as cod, except that the August catch was a shade better. This fishery is also reported to show a slight increase.

Hake were about a fortnight later in appearing this spring, and from 25th June until 29th July the catches varied from fair to poor, but during the remainder of the season proved a fairly successful one.

Halibut were taken in light quantities during the second week of June but none were reported afterwards.

Herring. The spring run of this fish struck in about 21st April, and good catches were reported at Little Judique until about the middle of May. From 6th to 27th May, very fair catches were made at this station, but on the 28th they began to decrease in quantity and with the exception of some fair hauls from 8th to 16th July inclusive, the catches were poor and irregular during the remainder of the season. The summer school appears to have been very light as only a few barrels were taken, but the fall school was somewhat better and the fish are reported to be of good quality.

Lobsters were first taken on 18th April, and were taken in fair quantities until about 4th May, when a heavy gale destroyed much of the gear and crippled this fishery until repairs were effected. From 5th to 27th May, they were reported in good quantities on the grounds, but on the 28th began to slacken off and were scarce until the season closed on 25th July.

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Mackerel appeared about 26th June, and the catches from that date varied from fair to poor until about 25th July, after which they were scarce and irregular until 15th October. It is reported that only a few barrels were taken during the entire season.

Squid were reported in light quantities on 17th July, but about the 30th they became plentiful and catches varying from very good to fair were made until about 17th August, after which they were scarce until 1st September, when they again became plentiful and remained so until about the 15th. After this none were taken except about the former part of October, when good catches were frequently reported.

Codfish were first reported on 30th May; the catches from that date having been fair until 9th June, after which they became scarce and none were reported after 21st July.

Hake were fairly plentiful from about 22nd September until reports ceased on 15th October; and when weather permitted some good hauls were frequently made.

Herring struck in in light quantity on 1st May, but on the following and each succeeding day increased, and from the 9th to the 19th were very plentiful. After this they gradually decreased and the catches were light until 21st July, after which none were reported.

Lobsters were not reported this season.

Mackerel did not strike in this season as formerly, and the only catches reported were very light ones during the last weeks of July and August.

Salmon fishermen were reported to be getting out nets on 20th June, and from the 2nd to 21st July, light but regular catches were made each day.

Squid were taken in light quantities from 11th to 27th July, they having also been reported plentiful on the 21st; but as the demand was not great they were not fished for to any extent.

PRINCE EDWARD ISLAND.

ALBERTON.

Codfish were first reported this season on 30th May, and light catches were made until 1st of June, when the fishery became good throughout this district, but fishermen, as usual, did not exert themselves, and only fair catches were made throughout the month. Throughout July and August the catches were reported light, but about 2nd of September they were taken in fairer quantities, and about the 19th some excellent catches were reported. It is stated that this fish was never so plentiful on this shore, and although the fishermen again neglected this branch for the uncertain mackerel, it is said that about 150 boats and small vessels from Caraquet and Shippegan, N.B., fished off this station during August and September and reported that when weather permitted they could get all they desired, and that they never saw the equal of it. As it is at present the fishermen of this locality will feel the winter keenly, as they did very poorly, and are almost unprovided for the winter.

Hake were first reported on 10th July, and were taken in light catches until the 17th August, when they became more plentiful, and fair fishing was afterwards reported until 18th September. On the 19th an excellent catch was made, but nothing was reported later. This fish is reported to have been fully as plentiful as cod throughout the season.

Herring arrived in small quantities on 1st May, but until the 12th the catches were light. On the latter date fishing became fairly good, and during the third week some excellent catches were made, and the average catch until 2nd June was good. After this the catches were light until 23rd July, nothing having been reported afterwards. It is said that during the month of May large schools of this fish could have been taken with little difficulty at North Cape and Sea Cow Pond. All the fishermen were amply supplied, although on the western coast they are said not to have been so plentiful.

Lobster fishery opened on the western shore about 25th April, and after two or three days they struck in at North Cape, coming southerly from North Cape about 5th

May. About 1st May, just as the ice was leaving, it was reported that considerable damage was done to traps and gear along the shores of Frog Pond, North Cape and Tignish. From the 5th May until about 25th June, the average catch was fair, but throughout July the catches were light at this station, but from North Cape to the south of this harbour they were reported to have become more plentiful. On the whole the season's catch has been small, and closed on the western shore about 20th June.

Mackerel appeared about 4th June, but the catches were mostly light until about 18th July, when an improvement was reported in all sections, and boats were averaging 100. During the remainder of July and throughout August, during which month they were very irregular, the catches only varied from fair to poor, and for the rest of the season were very light, although somewhat more regular. It is asserted that the past season's catch has been the greatest failure known here, and our correspondent is strongly of the opinion that the large number of traps and nets, which are constantly in the water, will have a very great tendency in keeping the mackerel from the shores. It is further asserted that if the fishermen of this district wish to succeed that they will have to provide themselves with a larger class of boats or vessels, and devote more of their time to the codfishery and less to the uncertain mackerel.

GEORGETOWN.

Codfish made their appearance about 23rd May, and very fair catches were reported from the 27th to 24th June. During the first week of June, fair fishing was reported from Cape Bear to Grand River and on 15th June codfish of large size were reported plentiful on the banks about ten miles off shore, and fishermen engaged trawling made fair catches while the fish inshore were small and were taken with hand lines. About 25th June they became scarce and the catches until 24th July were light although regular. On 25th July an increase in cod was reported inshore and also on Grand River bank and bankers from Cape George reported good takes. From this date the catches varied from fair to good and particularly throughout September and October, when good catches were constantly made. On 8th August, good cod fishing was reported ten miles offshore and on the 15th were reported plentiful on banks south-east of Boughton Island. About 29th September codfish were reported plentiful offshore, and on 5th October were plentiful from Boughton Island to Fishermen's Bank. As reports from these stations were discontinued for the season on 15th October it is difficult to report how accurately this fish remained on the coast; but it is presumed that good fishing was found right along, as on 9th November good catches were reported off Souris.

Hake were reported plentiful off Cape George on 31st July, but no catches were made inshore until 1st August, from which date until 15th October the catches were good when weather permitted. On 8th August, good fishing was reported ten miles offshore and on the 15th was very good on banks south-east of Boughton Island.

Herring were taken this season as early as 13th April, the catch varying from one-half to three-quarters barrel per net. On the following two days nets were not set owing to east winds and running ice. On the 16th nets averaged one-half barrel per net, but from the 17th to the 25th there having been no demand for bait, few nets were set. On the 28th, however, eight Canadian bankers arrived and two were baited and sailed for Cape North, but it is doubtful if they proceeded very far as there were heavy north-east winds and drift ice. With the exception of the last five days of May very good catches were regularly made each day, and on the 9th sixteen bankers were reported to have baited in addition to thirteen others between the 9th and the 13th, as herring were plentiful in Cardigan Bay. Although a school was reported to have struck in on 1st June the catches were light during the remainder of the season as they moved off into deep water. On 24th July, schools of herring were sighted but are supposed to have been small. About 10th October they struck in off Grand River and nets averaged about three barrels. During the season when bait was in demand supplies could always be obtained on banks some little distance offshore.

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Lobster fishermen commenced putting out the gear about 29th April, but as the weather was stormy none were taken until 1st May, when a light catch was reported. From 2nd to 26th May they were fair and regular, but on the 27th, they were reported and continued scarce until 20th July, after which they became more plentiful and varied from good to fair—boats on the 25th having from eight hundred to twelve hundred lobsters—until the close season set in. It is reported that some packers consider the past season the poorest they have had for the past ten years.

Mackerel were first taken this season on 10th June, but they were scarce and difficult to catch all through the season, and very few barrels have been secured in comparison with other years. The same complaint is made by masters of vessels fishing in all parts of the gulf, who say that few large schools were seen by them. Vessels sailed for miles about the gulf and for ten days not a fish was caught. Occasionally pods would be met with and immediately disappear when approached. About 22nd August they were reported plentiful but refused taking hooks and the catches were consequently light. On the 31st two or three vessels were reported to have taken from eighteen to twenty-five barrels off East Point and Fishermen's Bank. About 11th October a body of this fish was struck ten miles north-east of Cape George and on the 13th were reported taking hooks freely at Cape George, and catches varied from two to twenty-five barrels, which is claimed to have been the only active hooking the past season. On 13th October the ss. "St. Olaf" reported having passed through a large body of mackerel between Magdalen Islands and East Point, P. E. Island, and if the weather moderated it was thought they would probably be met with about Cheticamp. On 9th November it was reported that the American fleet, with the exception of three or four vessels, had left this district, but the masters of those remaining were of the opinion that a body of mackerel was yet to the northward and based their opinions on the little change in the temperature of the water in the gulf and to the non-appearance of schools.

Squid appeared plentifully on 31st July, and the catches were very good until about 10th August from which date they were fair until the end of the month. From 1st September to 12th October, good catches were regularly made. It is reported that this fish was very plentiful on the banks during the past season and no scarcity of bait was complained of; in fact mackerel fishermen stated that squid and dogfish were so numerous that they interfered greatly with their mackerel fishery.

MALPEQUE.

Codfish appeared in fair quantities as usual on 28th May, and the catches varied from fair to poor until about 11th June, after which they were very fair until 23rd July, when they improved and the catches were reported good until about 18th August. From this latter date the reports were somewhat irregular, but on an average fishing was very fair until 30th September, after which none were reported. During the season the prices ruled low as there was only a local market; consequently this fishery has not been very remunerative to the fishermen.

Halibut were taken in light and fairly regular quantities from 16th May to 23rd July.

Herring were first reported on 25th May, and fair catches were made until the 28th, from which date until 27th June they were light. None afterwards reported. Total catch reported ample to supply the wants of the district.

Lobsters did not appear quite as early as last season, the first catch having been reported on 12th May. From this date until the 30th, the catches were very fair, but as rough weather afterwards set in they became scarce and were of small size and remained so until the season closed about 22nd July. It is reported that the total number of cases shipped from this station was about two thousand, which is equal to that of 1894, or about two hundred cases short of last season's which was an exceptionally good one.

Mackerel first appeared on 15th June, the catches from that date having been light until 23rd July, when fair catches were made for about five days. After this they again

became scarce and were very irregular throughout August, although reported schooling in deep water on the 13th. During the second week of September, light takes were made regularly but were reported to be not taking the hook. The past season's hook and line fishery is considered a failure, but about seventy-five barrels mackerel were taken by nets and shipped to the United States.

Oysters. It is reported that this is gradually becoming scarcer and smaller, and that some different regulations will have to be enforced or else this fishery which is a source of large revenue to the island will be a thing of the past as far as Richmond Bay is concerned.

MIMINEGASH.

Codfish appeared in good quantities on 9th June, but the catches were only fair until the 19th, after which they became poor, and remained so until about 14th July. Nothing was afterwards reported until about 25th September, when fair catches were made each day until 5th October.

Haddock and Hake were reported plentiful during the season, but as a rule the fishermen do not follow them while there is a probability of catching mackerel. Light takes of hake were, however, taken on trawls from 20th to 22nd July, and from 5th to 18th August inclusive; fair from 19th August to 9th September, and light until the 18th.

Herring. Although herring appeared plentiful on 13th May, few were taken owing to the heavy loss to nets the latter part of April. During the third week of May the catches were light, but improved greatly the last week, although not afterwards reported.

Lobsters. As the ice left early the past season, the prospects were encouraging until a heavy north-east storm about 28th April, which lasted three days, destroyed a great deal of gear and crippled fishermen until about 9th May. The first catch of this fish was reported on 3rd May, and light catches were made until about the 12th, when they were reported more plentiful, and for the following week were taken in fair quantities. From 19th May to 19th June the catch was again light, and it is reported that owing to this great scarcity that many of the factories shut down in May. It is further reported that from West Point lighthouse to Gage Cape—a distance of about twenty-five miles—there are about fourteen factories, and the total catch the past season is estimated at about fifteen hundred cases of 48 x 1-lb. cans to the case.

Mackerel, which is the principal fishery on this part of the coast, has been a comparative failure, and it is estimated that not over twenty barrels were taken with hook and line between West Point and Gage Cape. While the catches by hook and line have been light, fair takes are reported to have been made by nets. Fishermen contend that the mackerel are afraid of the nets, and consequently will not, although plentiful, be taken by hook and line.

TIGNISH.

Codfish appeared in good numbers on 1st June, and good fishing was reported for about three days when they somewhat decreased and throughout the rest of the month were fair. During the month of July the catches, as far as reported, were light but nothing was afterwards reported.

Hake were taken in light catches from 10th to 21st inclusive.

Herring appeared in light quantities on 1st May, but the only hauls reported were on the 5th and 6th, when fair supplies were taken, and on the 15th and 16th when excellent fishing was reported. In June very few catches were reported outside of the first week when they varied from fair to poor. From 10th to 21st light and regular hauls were made each day.

Lobsters were not reported until 15th May when fair catches were made for a couple of days. Nothing was reported in June, but from 4th to 21st July the daily catch was light.

Mackerel struck on 6th June, and the catches were regular but light until 17th June, when they became a little more plentiful, and fair hauls were made until the 21st, after which none were reported.

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NEW BRUNSWICK.

BEAVER HARBOUR.

Codfish were reported about a month earlier the past season and from 14th May to 12th October light catches were regularly made, and although on 9th June a good school was reported to have struck on-shore the catches did not materially change. During the third week of August when squid were plentiful good catches were made for about five days but afterwards became poor. It is said that the total catch will be much in excess of that of 1895.

Haddock appeared at the same time as cod and the catches throughout the greater part of the season were almost identical. From 8th to 21st September inclusive, good fishing was reported each day and from the 29th to 12th October varied from fair to poor.

Hake appeared on 13th June in light quantities, but very few were taken during that month, although some good catches were reported at Wolf Islands from the 23rd to the 25th inclusive from 7th to 31st July, good catches were reported daily; particularly during the last week when some excellent hauls were reported. The catches continued good for the first two weeks of August. It was reported that the inshore catch had somewhat decreased but that the offshore catches continued good. From the 13th to 31st September very good fishing was reported and good catches were regularly made. During the third week of September boats varied from 1,800 to 2,000 lbs. hake at a setting, but from 1st to 12th October the average catch was only fair.

Herring did not strike in last season until about 21st July, on which date they were reported plentiful and weirs were being put in operation. Until about 11th August, small herring continued plentiful and weirs did well, but prices ruled low. On 10th August, large herring were reported to have struck in at Wolf Islands but about the 13th, the catches of small herring diminished in quantity, but about the 22nd became plentiful and sold for sardine herring at about \$2 per hhd. They continued plentiful afterwards until 30th September, when they began falling off and gradually decreased until 12th October, when they were reported very scarce. About 13th August, fair catches of large herring were made but with the exception of a few good hauls until the 17th, they were only taken in light quantities until 14th September. In comparison with 1895 it is said that sardine herring were just as plentiful, but the same quantity was not taken owing to the low prices prevailing.

Lobsters were reported on 1st May in light quantities, but until the 30th the catch was a fair average, after which it was light until 25th June, when this fishery closed. It is estimated that the catch is slightly in advance of 1895, and as prices ruled higher it has been more satisfactory to fishermen.

Squid were reported plentiful from 13th to 24th August inclusive but were not reported afterwards.

CAMPOBELLO.

Codfish appeared on 6th May, and the catches as far as reported were light throughout the season. During the second week of June, bankers were reported to have obtained good takes at Welchpool.

Haddock fishery commenced on 13th May, and light catches were made pretty regularly each day until 28th July, when some good catches were made until the last of the month; after which they again became scarce nothing having been reported after 13th August.

Hake were not reported the past season until 11th June, when light catches were made until the 20th. On this date they grew more plentiful and some very good fishing was reported until the last of August, there having been some excellent catches made at different periods.

Herring struck in in light quantities on 6th May, and the catches were light but very irregularly reported.

Lobsters were first reported on 6th May and light catches were made pretty regularly throughout that month. Very few were afterwards reported.

Sardines were first taken on 29th May in light quantities, but during the third week of June were taken in fair catches. From 25th June to 8th July the catches were again light, but during the remainder of the month were fair, and throughout August were very good.

CARAQUET.

Codfish were reported about a week earlier this season and good catches were regularly reported from 21st May to 16th June. On the 17th there was a slight decrease, but on the 19th they again appeared more plentiful, and although somewhat irregular, owing to stormy weather, the fishery was good until about 20th July. On 27th June bankers reported codfish fairly plentiful on the banks. On 21st July they were again reported fair, and during the remainder of the season, although irregular, owing to scarcity of bait and stormy weather, the average catch was good. On 23rd September, as the fishery had become poor at this station, it was reported that the boats had left for P.E.I. where fish were plentiful. Notwithstanding that good catches were made during the greater part of the season it is estimated that the total catch is below that of 1895.

Herring did not strike in this year until about 7th May, from which date good catches were made each day until the 14th, boats on the 12th having varied from 25 to 30 barrels. On the 20th and 21st some excellent hauls were made, but nothing was afterwards reported until 20th August, although bankers reported herring in good quantities on 7th June. On 20th and 21st August, very good catches were again made but during the remainder of the season or until 21st September the catches were irregular and varied from fair to poor.

Lobster fishery opened on 7th May, but the catches were light until the 14th when they became fair and increased to good on the 21st. From that date good catches were made each day when a falling off was reported, and on 3rd June they became scarce, remaining so until the 18th. From the 19th to 26th June the catches were again good, but stormy weather setting in the catches were consequently light until about 8th July, from which date the average catch was fairly good until fishing closed on the 29th. This fishery has again been very successful the past season, the catch having been about the same as last year.

Mackerel struck this district about 11th July, and good catches were made each day for about a week. On the 18th they became scarce but were regularly taken until the last of the month. From 1st to 29th August light but very regular takes were reported.

Salmon were reported plentiful on 21st May and excellent catches were made until the 28th when they gradually decreased and until 11th July the average catch was fair.

Squid were reported to have been plentiful in this district during the past season.

GRAND MANAN.

Codfish were first reported on 9th May, and fair catches were made each day until the 19th. During this period fair fishing was also reported on Gravelley Bottom, Bulk Head and Grand Manan Bank. From 19th May to end of month the catches were light inshore as well as at Dark Harbour, Bradford's Cove, Long Island Bay, and Seal Cove Sound, but boats from Grand Manan Bank reported good catches. During the first eleven days of June the fishery was reported good, and good catches were taken at Bulk Head, Gravelley Bottom, and Wolf's Bank, as well as inshore; but for the remainder of the month they were somewhat fairer at these stations, and also in North Channel. From 1st to 27th July the fishery was poor, but on latter date good catches were made at Bulk Head, and the inshore catches improved very much, and on the 31st bankers from Grand Manan Bank were arriving with very good fares. Throughout the

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first three weeks of August this fishery was good inshore, and at the following places : Long Island, 5th August, Southern Head, from 8th to 10th inclusive, Ingoll's and Grand Manan Bank, 14th, and Flag's Bank on the 19th. From 21st August to 16th September the catches inshore and at the various islands and bays in vicinity were fair, and the fishery as a whole is reported to have been more successful than for years past. The catch the past season is estimated to be 1,000 quintals in advance of that of 1895.

Haddock were first taken this season in light catches at Bradford's Cove and Long Pond Bay on 21st May. Throughout June the catches were fair inshore, and at Bulk Head, Gravelley Bottom, and at North Channel ; but during the first three weeks of July they were light. About the 22nd there was a slight improvement which continued until August 4th when this fishery became good and continued so until the 21st, after which it was fair until the end of the month and again good the first five days of September. The total catch estimated to be about equal to that of 1895.

Hake fishery commenced 1st June, and the catches were fair until the 25th, when they very much improved and some good fishing was done until about 5th July. For the next nine days the catches were light but afterwards improved steadily, and some very good fishing was done until 11th August, the catch on the 9th having been exceptionally large ; some boats having obtained 60 qtls. with two men. During the following week they were again reported scarce, but from 19th August to 30th September the average catch was good. Total catch estimated at 1,500 qtls., which is quite an increase over the catch of 1895, and which may be due to better feed in the bay, but more especially, to the scarcity of dogfish as compared with last season ; giving to trawlers a better chance to fish. As there was no increase in men or plant, no better reason can be assigned.

Halibut were first reported on 9th May in fair quantities on Muir's Ledge and fair catches were made each day until the 27th, when good fishing was reported on Gravelley Bottom. Throughout June and July the catches were light and somewhat irregular, but during the second week of August were again taken in quantities. The season's catch is considered light.

Herring were first taken in Dark Harbour Pond this season on 6th May in fair quantities and the fishery continued fair for about a week, when there was a slight decrease in the catch, particularly at Bradford's Cove and Long Pond Bay. On 1st June this fishery became good at Dark Harbour, and from the 3rd to end of month the catches were fair and regular. Throughout the greater part of July the catches were light and irregular, but on the 28th they were reported plentiful at Dark Harbour and excellent catches were made at this place, North Head and White Head until 5th August. During the remainder of the month the average catch was good at all the points in this district, but was reported particularly large the first week of August. Throughout September this fishery was very good each day and the fish were reported large and excellent for barrelling purposes, and for bloaters. It is reported that this fishery the past season exceeded all previous records, as the following quantities taken will show :—

Total of smoked fish	2,300,000 boxes.
“ fresh fish	12,400,000 lbs.
“ pickled fish	10,000 brls.

The fresh portion of this catch was exported to the United States.

Lobster were first reported on 6th May and good catches were made throughout the month at the various points about the island. On 1st June they commenced to slacken off and during the remainder of the season very few reported. Notwithstanding that the catches were light the last few months of the open season ; this fishery shows an increase of about 100 tons, which is no doubt due to a cannery having been in operation here this season, which induced more men to pursue this branch ; and owing to keen foreign competition our fishermen realized almost fabulous prices, and has therefore proved one of the best seasons ever known.

QUEBEC.

CARIBOU ISLANDS.

Codfish were reported first in light quantities on 29th July and light catches were also made at English Point. From 29th July to 18th August the catches were reported light, but on the 19th they became good; but as they were irregularly reported, it is not known whether or not they continued in good quantities. During the first two weeks of September, fair fishing was reported; but on the 15th it began to decline and the takes became small.

Launce appeared plentifully on 3rd August and were taken in large supplies for about three days. They were not afterwards reported until 13th September when a good catch was made.

ESQUIMAUX POINT.

Caplin were reported in good quantities from 8th to 19th June inclusive.

Codfish were first reported on 5th June and the catches varied from fair to good until about the 19th when very good catches were made, but nothing was afterwards reported until 1st July, during the first week of which month the catches were light. About the 6th, however, they became very plentiful, and some excellent catches were made each day for about a week; but from the 13th to about 6th August the average was very fair. From this latter date until the last of September good fishing was reported each day and during the second week of October was fair.

Launce were not reported this year until 27th July when a fair supply was taken. Nothing was reported afterwards until the 27th, after which the fishery was fair until the last of the month. A very good catch was also reported about 12th October.

Salmon appeared on 15th June and the catches were good for about a week. During the second week of July the catch was very fair and regular.

GASPÉ.

Codfish were not reported this year until 28th May and the catches were light and irregular until about 29th June, when they were reported fairly good and the catches, although slightly irregular, were on an average fair until 29th August. During the second week of July boats averaged $2\frac{1}{2}$ draughts on banks off mouth of bay and on the following week very fair fishing was reported at the mouth of the bay. About the second week of August good fishing was found on the banks, but during September the catches, although fair, were very few. On the whole this fishery is considered considerably ahead of 1895.

Herring fishery is reported to have been poor during the summer and fall and the catches have been very light.

Mackerel were exceptionally light the past season, and it is estimated that the total catch will not exceed three or four dozens.

Salmon appeared in good quantity on 16th May and during the remainder of the month were taken in very fair catches. During the first week of June the catches were somewhat better, but on the 8th they began to decrease and on the 19th were reported scarce and the catches were afterwards light until about 5th July, when this fishery closed.

GRAND RIVER.

Caplin appeared plentiful on 10th May, and excellent catches were made each day until the 20th, after which none were reported until 15th June, when the average catch was fair until the 28th. They were more plentiful than for some years past.

Codfish were first reported on 16th May, and light catches were made inshore and on the banks each day until the 20th, after which none were reported until 3rd June, from which date until the 17th the catches varied from fair to poor but were light

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during the latter part of the month. Throughout July the catches were fair whenever bait was obtainable and weather suitable for boats to proceed to banks, as fish were also reported there in fair quantities. During August boats had all gone to banks and the inshore fishery had become wholly neglected. The catches during the first week of that month had been light, but on the 7th they became very plentiful and some excellent catches were made. The remainder of the season was stormy and great scarcity of bait prevented boats from accomplishing very much. This fishery is the principal one pursued here, about ninety boats being employed, which average 135 draughts, and but for the excellent catch already reported in August would have proved almost a complete failure.

Herring were not reported this season until 2nd May, from which date until about 3rd June they were plentiful. On the 4th they became somewhat scarcer, but good hauls were made until the 8th, none having been afterwards reported until 3rd July. On that date, although the catches, were only fair the fish are said to have been large, but the fishing during that month was much interrupted and but few were taken. During the remainder of the season as the boats were continually on the banks very little fishing was done inshore, notwithstanding that they were very good during the first two weeks of August.

Lobster fishery was reported poor on 2nd May and the catches continued light until about the 7th, when some good catches were made for about a week, particularly to the westward of this station. On the 15th they again were scarce and remained so until 9th June, when the last factory closed owing to the great scarcity. It is said that the lobsters were so very small and scarce the past season that some of the fishermen abandoned this fishery.

Mackerel. As far as could be ascertained this fish did not appear during the season.

Salmon were taken in small quantities from 10th to 28th May and varied from fair to good from 4th to 24th June from which date they were again scarce until 9th July, after which none were reported.

Squid were fairly plentiful during the season, catches varying from good to fair having been repeatedly made during June, August and September.

LONG POINT.

Caplin were not reported during the past season.

Codfish were first reported on 3rd June, and the catches were light until the 9th, when an improvement in this fishery was noted. On the following day the catches were again light owing to bad weather, but from about the 11th to 24th fair catches were made each day. From 26th June to 6th July the average catch was very fair, but nothing was afterwards reported until 26th September, when a very good catch was made and a few good catches during the second week of October. On 15th August the schooner "Orando," Capt. J. W. Publicover, from Whale Head, bound home via Halifax, reported to the bureau that the season's catch of codfish from Hannington to Bonne Esperance was the poorest for the past 40 years; boats scarcely averaging 20 qtls., and the total catch only estimated at 3,000 qtls.

Launce appeared very plentifully on 22nd June and some excellent catches were made during that week. They were reported scarce during the first week of July and with the exception of a very good catch on the 6th very few were taken. The only catches afterwards reported were on 26th September and 12th October, when excellent supplies were obtained.

Salmon appeared on 10th June and the average catch until 4th was good; there having been some excellent catches made during the last week of June.

NEWPORT POINT.

Caplin were reported plentiful from 8th to 19th June inclusive, and very good catches were made.

Codfish were reported in good quantities on the banks on 27th May and fair inshore. From this date until about 25th July the catches were fair, although the fishery was somewhat retarded by stormy weather and scarcity of bait. About this latter date they became somewhat scarcer on the banks and the boats only made fair catches while the inshore catch was still lighter. During the latter part of July strong winds prevailed and bait was scarce which accounted for the light catches. From 1st August to 15th October the average catch was fair, although irregularly reported, as boats were on the banks and only came in weekly. About the middle of August codfish and bait were reported plentiful on banks and boats made good catches. On the whole this fishery has been much better than last season, as the catch is estimated at 10,000 quintals, which is considerably in excess of the previous year.

Herring appeared plentifully on 2nd May and remained so until about the 20th, when a slight falling off was noticeable, after which the catches varied from good to fair, although somewhat irregular, during the remainder of the season. Total catch estimated at 1,000 brls, which is a shortage of 300 barrels in comparison with 1895.

Lobsters were taken in small quantities on 2nd May, but on the 4th they became more plentiful and the catches varied from good to fair until the 17th, when they were reported scarce and remained so until the 28th, after which none were reported. Total catch estimated at 500 cases, which is a very large decrease over last season's catch.

Salmon were taken in fair catches from 28th May to 17th June, and the total catch is estimated at 3,000 lbs.

Squid appeared much earlier this season and very good catches were made as early as 25th July, and continued until about 13th August, when they became scarce. On the 25th, however, they grew more plentiful and very fair catches were taken each day until 15th October.

PERCÉ.

Codfish were reported somewhat earlier this season and fair fishing was found on 19th May and continued until the 27th, when there was a slight decrease in the catch. This continued until about June 7th, when fair catches were again reported until the 12th, but afterwards became scarce, owing to the scarcity of bait, and continued so until 8th July. On the 10th, fair fishing was reported on the banks and was again reported fair on the 20th. The inshore catches from the 9th to 19th were fair notwithstanding that bait was very scarce. During the latter part of July codfish were again scarce, but in the first week of August boats proceeded to the banks, and the inshore fishery was abandoned. The catches on the banks throughout the three following months, although only reported about weekly, were very fair.

Herring appeared in good quantities on 2nd May, and catches varying from very good to fair were made each day until the 21st, when this fishery became very good and excellent hauls were made until 8th June. After this they began to decrease gradually and the last catch was reported on 28th July.

Lobsters were first reported on 2nd May, and light catches were made until the 18th, when they became more plentiful and fair catches were secured each day until the 27th. On this day a falling off was noticeable, and until 27th June, the last reported, the catches were light.

Squid appeared 13th August, and were on an average fair until 9th October.

SEVEN ISLANDS.

Caplin were taken in large quantities from 15th to the 20th October.

Codfish with the exception of a few good catches during the second and third weeks, were scarce until 8th August, after which some very fair catches were reported until about 3rd September when they again became scarce and remained so until the season closed. Total catch for the season considered about one-third short.

Halibut. Light catches were reported each day from 1st to the 6th June inclusive.

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Herring were first reported on 27th May and were plentiful until 5th June. Nothing was afterwards reported until about 4th August, when they were reported to have appeared at Point de Monts, but no catches were made until about 11th September, when some fair hauls were made.

Launce appeared plentifully on 27th May and were taken in very good quantities until about 24th June, when the catches were reported light for a week. On 3rd July, however, they again became plentiful and some excellent hauls were made until 28th August, after which the catches were good until 26th September.

Salmon were first reported on 27th May, but the catches were light until 1st June when very fair supplies were taken for about ten days. After this catches became light and remained so until 4th July, none having been reported after that date.

ST. JOHN'S RIVER.

Codfish were again reported irregular the past season, but is chiefly owing to the fact that this station is not a regular reporting station, the news of the fisheries being sent through Long Point of Mingan, which is the reporting station of this district. About 3rd June this fish was reported in fair numbers and until the end of July the average catch was good. Nothing was reported during the first two weeks of August, but on the 15th codfish were very plentiful and good fishing was reported. During the last week of September and third week of October good catches were frequently reported.

Launce were also reported irregularly but excellent supplies were taken during the last weeks of June, August and September and first week of July.

Salmon, as far as reported, were plentiful throughout the month of June.

THUNDER RIVER.

Caplin appeared in excellent numbers on 8th June and until about the 18th were taken in good quantities.

Codfish appeared fairly plentiful on 29th May and fair fishing was reported each day until 7th June, when the catches somewhat improved and good fishing was reported until the 19th. On this date they slackened off considerably and nothing was afterwards reported until 28th July from which date until 27th August the average catch was fairly good. From 28th August to 25th September the catches were good each day, but on the 26th there was another falling off and until the season closed the catches were fair although irregularly reported.

Launce were first reported on 8th August and an excellent quantity was taken. They were afterwards not reported until the 25th, when they were taken in fair supply until the last of the month.

Salmon were taken in good catches from 15th to 19th June inclusive.

ANTICOSTI.

ENGLISH BAY.

Alewives were not reported this year as usual.

Caplin were reported plentiful from 24th June to 15th July, but were afterwards scarce until the 21st, when they left the coast.

Codfish appeared in good quantities on 17th June, but during the succeeding four days the catches were light. On the 22nd, they again became good and remained so until the 27th, when stormy weather affected the catches which were light until 4th July. On the latter date this fishery was very good and lasted for about four days, after which it became fair and finally poor. During the remainder of the season the catches were light, there having been only an occasional good catch reported.

At Mozriol River, on the northern side of the island, this fishery is reported to have been very good.

Total catch at English Bay is estimated at 250 qtls.

“	Strawberry Cove	“	500	“
“	Caplin Bay	“	237	“

Which are quite large decreases in comparison to those of 1895.

Herring appeared in fair quantities on 25th May, but as the following day was stormy, the catch was light until about 4th June, when some very good catches were made for a few days. Bad weather again set in and little was done until about the 17th, when light hauls were reported each day for about a week. Throughout July and August, the catches were, with the exception of an occasional fair one, light, as the weather was stormy the greater portion of the time. Nothing was reported during the first two weeks of September, but from the 14th to 13th October, the average catch was fair.

FOX BAY.

Caplin are reported to have appeared on the southern side of the island, about the middle of June and to have remained in good quantities until the latter part of July.

Codfish were first reported on 4th June, in very good quantities but few were taken until about the 16th, when some good catches were made for a few days. About the 21st boats all left for Heath Point, where fishing was reported very good on caplin bait. During the first week of July some very good catches were made at Fox Bay and Heath Point, but bait becoming scarce the catches were consequently light until about the 15th, when caplin again were in good supply and good catches were then made until stormy weather suspended operations until about 21st August, when good fishing was reported at this station for a few days on squid bait. Nothing was afterwards reported; although it is thought that boats made some light catches in vicinity of this station. Total catch estimated at one hundred and fifty quintals.

Herring struck in on 20th May and excellent catches were made each day, until about 4th June, when they were reported to have left the bay. Bad weather then set in and nothing was reported until about the 16th, when they again appeared in fair quantities, but remained only two days. With the exception of a light catch on 4th July, nothing was reported after 17th June.

MAGDALEN ISLAND.

Codfish were first reported on 9th June in fair quantities but none were taken until about the 20th, as all boats were engaged in the lobster fishery. From the 20th to the 27th the catches were light each day, although fish were fairly plentiful, owing to the few fishermen taking part in this fishery. About the 30th they were very good but all boats were busily engaged in the lobster fishery which was poor. During the first two weeks of July fair catches were repeatedly made, but with the exception of a few fair catches in the first week of August, they were light from 14th July to 27th August. Although the catches were light during the last week of August, it is reported that fish were plentiful, but that few boats were engaged. Throughout September the fishery varied from good to fair and it is reported that although fishermen have done fairly well, and codfish were apparently in large quantities the whole season, it is wholly owing to the small number of boats engaged that the total catch was not much better.

Herring struck in plentifully on 28th April at Grindstone, and large quantities were taken until about 24th May. Fair catches were made at Etang-du-Nord on 8th May, and about the 11th they struck in at Amherst Harbour, and some very good hauls were made for about ten days. During the third week they were reported plentiful in all sections, but although some excellent hauls were made, the stormy weather interfered greatly with the fishery, and during the remainder of the season the catches were light. It is reported that during the last week of May large quantities were obtained for lobster and mackerel bait and that a large fleet of strange vessels, presumably bankers, were loading as they were fully as plentiful as in preceding years. During the month

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of September they were also reported in large quantities around Dead Island, and many barrels were taken in nets which had been set for mackerel.

Lobsters were first reported in fair quantities in Amherst Harbour on 14th May, but on the 16th they became scarce and catches were light until about the 28th. after which fair fishing was reported for about ten days. From 7th June to the close of the season the catches were light, although on 9th June they were plentiful in Pleasant Bay, and during the following week were taken in fair quantities. It is said that this fishery has been very fair on the south-eastern part of the islands, but on the south-western, north-western and northern parts was very poor in comparison with former years. Although the average quantity is about the same as in preceding years, still the number of boats have increased very rapidly, and where there are twenty boats now there was only one on the same ground ten or fifteen years ago.

Mackerel were first reported on 1st June and were taken in light but regular catches until the 23rd, after which they were not again reported until the third week of July, when light catches were again made until about 11th August. On this latter date boats which were on the northern side of the island were doing fairly, but the majority of boats had not salted one barrel, and although a few good hauls were made they did not appear to take hooks as in previous years. During the remainder of the season the general catch was light, although at Etang-du-Nord on 5th September boats were reported to have done well and prospects were good if the weather only kept fine. On 15th September reports from Bryon Island, the chief resort of the mackerel fishermen, stated that the fishery was very poor, and as afterwards reported, the catches were light and boats were taken up early in October, as the weather was very unfavourable for fishing. In comparison with previous years the past season has been very poor and the total catch about 50 per cent less than that of 1895.

I have the honour to be, sir,

Your obedient servant,

W. M. HUTCHINS,

Clerk in charge Fisheries Intelligence Bureau.

APPENDIX No. 12.

FISH CULTURE, 1896.

REPORT BY PROFESSOR EDWARD E. PRINCE, COMMISSIONER AND
GENERAL INSPECTOR OF FISHERIES FOR THE DOMINION
OF CANADA, FOR THE YEAR 1896.

To the Honourable LOUIS H. DAVIES,
Minister of Marine and Fisheries,
Ottawa.

SIR,—In my report last year I had the satisfaction of stating that the results of the season's operations (1895) exceeded those of any previous year, and that the output of fry was the highest on record, notwithstanding that I had taken steps in various ways to ensure greater economy in the expenditure at the various hatcheries under the department. I have not relaxed my efforts to accomplish continued substantial economy in carrying on the work of fish culture during the year now ending, and I am able again to report that, thanks to the energy and zeal of the officers in charge of the various hatcheries, and of the staff of assistants under them, the general success and extent of the season's results have not been impaired. Indeed, while a repetition of the phenomenal total of fry planted last year (viz, 294,040,000), could hardly be expected, except by sanctioning increased expenditure, yet it must be a matter for congratulation that the out-put of fry in 1896 is far in excess of that of any season prior to 1893. The total quantity of fry planted in 1892 was 135,959,500 and that planted this year was no less than 202,959,500. The average output annually of the department's hatcheries for the last ten years is 143,000,000, so that the present year exceeds the average by over fifty millions. Such results as these are highly satisfactory, when compared with those achieved in other countries whose annual expenditure is very much greater. In the United States the annual expenditure by the various states is approximately estimated at \$180,000; that of the United States Fish Commission, Washington, not less than \$150,000. This total cost is about ten times greater than that of this department's fish culture operations, yet the result, that is to say the output of fry is not quite four times that recorded in this report. Our results in other words are 150 per cent in advance of our neighbours so that, whereas they plant 3,000 fry for every dollar of public money expended, we are able to plant nearly 7,500 for each dollar spent. It is needless to say that no better evidence of efficiency in the department's hatcheries could be adduced. Most of the hatchery officers, it may be added, were trained under the former superintendent of fish culture (Mr. Samuel Wilmot), whose retirement from the service was referred to in the opening sentences of my last report.

Apart from the fish culture work, carried on under the Dominion Government, there are in Canada few attempts at artificial hatching of fish, and these are chiefly of a commercial nature and therefore limited in their scope. The provinces have not made any systematic efforts to replenish the inland waters by means of pisciculture; but an increasing number of applications for information, and practical instruction in the hatching and rearing of trout and other fish have reached the department, and afford gratifying evidence that private effort, on the part of enthusiastic individuals, will in the future, aid and second the efforts of the Dominion Government in this field. These subsidiary efforts embracing, as a rule, the culture of such fish as the speckled trout and other kinds not included at present in the government operations, will prove of

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inestimable value. The government hatcheries have been for the most part exclusively devoted to the rearing of various species which are of prime commercial importance. Other species, such as speckled trout, black bass, etc., being regarded mainly in the light of game fishes have not for some years been hatched in our establishments.

QUANTITIES OF FRY DISTRIBUTED.

The following table shows the numbers planted of various species propagated :—

Salmon (<i>Salmo salar</i>).....	8,551,500
Sockeye (Pacific) Salmon (<i>Oncorhynchus nerka</i>).....	10,393,000
Salmon-trout (<i>Salvelinus namaycush</i>).....	5,825,000
Lake Whitefish (<i>Coregonus clupeiformis</i>).....	78,190,000
Lobsters (<i>Homarus americanus</i>).....	100,000,000

202,959,500

The tabulated form below shows in separate columns the number, and name of each hatchery, the quantities of fry put out from each, the numbers of semi-hatched eggs sent from, and received at, the hatcheries, and the particular species of fry and eggs so distributed :—

No.	Name of Hatchery.	Number of Fry put out of Hatchery.	Number of advanced Eggs sent to other Hatcheries.	Number of advanced Eggs received from other Hatcheries.	Description of Fish
1	Fraser River, B.C....	10,393,000			Sockeye salmon.
2	Sydney, N.S.	243,500		250,000	Atlantic salmon.
3	Bedford, N.S.	1,300,000			do
	do	225,000		350,000	Great lake trout.
	do	2,700,000		3,000,000	Whitefish.
4	Dunk River, P.E.I.		Not in operation		
5	St. John River, N.B.	1,028,000			Atlantic salmon.
	do	400,000		500,000	Great lake trout.
	do	2,640,000		3,000,000	Whitefish.
6	Miramichi, N.B.	1,430,000	270,000	260,000	Atlantic salmon.
7	Restigouche, Que....	1,250,000	250,000		do
8	Gaspé, Que.	800,000			do
6	Tadoussac, Que.	2,500,000			do
10	Magog, Que.	1,650,000		2,000,000	Whitefish.
	do	1,750,000		2,000,000	Great lake trout.
11	Newcastle, Ont.	2,500,000	2,600,000		do
	do	2,700,000		3,000,000	Whitefish.
12	Sandwich, Ont.	61,000,000	15,000,000		do
13	Ottawa, Ont.	3,000,000		3,000,000	do
	do	950,000		1,500,000	Great lake trout.
14	Bay View, N.S.	100,000,000			Lobsters.
15	Selkirk, Man.	4,500,000	*4,500,000		Whitefish.
Totals.....		202,959,500	22,620,000	18,860,000	

*Operated part of season.

PLANTING LOBSTERS, OYSTERS, &C., IN BRITISH COLUMBIA WATERS.

In addition to the customary work carried on in the hatcheries, and fully detailed in the appended reports of the officers-in-charge, the department undertook an important shipment of various valuable species of fish from the Atlantic to the Pacific Ocean. Last year a very successful transplantation of large-mouthed black bass was accomplished in certain waters of Western Ontario, with the co-operation of the Provincial Government of Ontario: but the scheme authorized and carried out this season, while of a

similar nature, was of a more extensive and arduous character, viz.: the transshipment of lobsters, Atlantic oysters, large mouth black bass, and tom-cod or frost fish, from Nova Scotia to British Columbia.

The United States Fish Commission has made five or six such shipments during the last years with varying success, but no previous attempt had been made in the Dominion. As there are no true lobsters in the Pacific Ocean, and only a very diminutive species of oyster, which is somewhat locally distributed along the British Columbia coast, and of small economic importance, any successful effort to introduce into these western inshore waters the valuable crustacean and shell fish mentioned could not fail to be of benefit and possibly lead to new fishing industries on the Pacific coast. The full details of the scheme, as carried out, will be published in due course, as it is impossible at this stage to report, except in the most meagre way, upon the actual results observed since the date of the planting, in July, 1896. It suffices to say in this place that my report prepared in 1895, upon this proposed shipment, contained a suggestion that as an experiment one thousand live lobsters should be conveyed in a refrigerator car, part of them in tanks of cool seawater, part in kelp with ice, and part in eelgrass or rockweed; that females carrying eggs should be included, and if possible a few thousands of eggs detached from the parent lobsters and carried on trays in weed or otherwise. I also favoured the capture and conveyance of a number of lobsters, say three or four months old, and therefore of very small size, as such immature specimens might prove to be hardy if carried in sufficiently shallow suitable vessels. Barrels of live oysters, *i. e.* four or five thousand oysters, from New Brunswick or Nova Scotia oyster beds, were also to be carried, and some barrels of brackish water containing tom-cod or frost fish. *En route* through Western Ontario a few barrels of fresh water containing small black bass were to be taken on board, and planted in suitable ponds in British Columbia. The tom-cod it was designed to plant in some of the brackish lakes in Manitoba or the North-west, as certain of these lakes are less strongly impregnated with saline and alkaline matters, and a hardy fish might do well in them, especially as certain Branchiopods flourish in them, and these would form acceptable food for the planted fish.

On many occasions this latter part of the scheme I discussed with the late Sir John Schultz, whose experience in the western waters, and large professional knowledge, led him to strongly favour my proposal. The Rev. Father Lacombe, personally expressed to me the high value he placed upon such a proposal, as the planting of fish in waters, which now contain no species of fish whatever, would be a lasting boon to the population in the vicinity of these salt lakes, and a benefit to the Indian tribes adjacent. My scheme was not carried out in its entirety, but sufficient success attended the effort to show that a more extended attempt would overcome all difficulties. On July 2nd a shipment of over 600 live lobsters, 200 of them being females in "berry" and 150 of them small, left Halifax in charge of Mr. C. A. Stayner, whose great experience in the lobster fishery was invaluable in carrying out the plan. An assistant, with qualifications as a chemist and biologist, accompanied the shipment and rendered help under Mr. Stayner's directions. Eight barrels of fine live oysters were also shipped. The supply of tom-cod, which it was intended to take on at Moncton, New Brunswick, could not be procured at the time, but at Sturgeon Falls, in West Ontario, several barrels of fresh water, containing 40 very small black bass, were taken on board, as arranged, and by means of supplies of ice obtained at stated points, *en route* almost 50 per cent of the lobsters, practically all the oysters, and about 20 per cent of the black bass reached their destination on July 9th in a living and healthy condition. The whole were immediately planted in locations selected by Inspector McNab, New Westminster, and Captain J. T. Walbran, of the Dominion cruiser "Quadra," and approved by Mr. Stayner. As already stated, reports received since the planting of the lobsters, &c., clearly demonstrate not only that shipments of this character can be readily accomplished from ocean to ocean, but that such transplanted shellfish and crustaceans find suitable conditions, and survive in a healthy state, in sheltered areas judiciously selected in the Straits of Georgia. A full report upon the shipment and its results is in preparation, and when further infor-

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mation is available respecting the subsequent welfare of the fish planted, it will be published in due course, and will furnish a basis for any future scheme of the live character. In the meantime the following quotations from Mr. Stayner's report, submitted officially at the time, will indicate the nature of the steps taken :—

"I left Halifax on the 2nd of July, having in the special refrigerator car 600 lobsters and about 4 imperial quarts of spawn. The tom-cod were not awaiting me at Moncton as Inspector Chapman informed me that the fish could not be procured at the season.

"On the 4th at 11 o'clock p.m., we took in the five cans with 40 black bass, very small ones. Overseer Richardson reported that he could not get any bigger fish, and we obtained a bag of salt at North Bay.

"At Winnipeg the Canadian Pacific Railway department put new springs under the car in about one hour's time. The car still rode very roughly which no doubt caused the death of many of the lobsters. The floor of the car also had about an inch of water washing about all the time, which made it very uncomfortable as the assistant and myself had to stay in the car for many hours every day. We took five tons of ice at Halifax, two tons at Carleton Junction, Ontario, and one ton at Hector. We would not have needed so much but we feared being delayed at a wash-out in the Rockies as other trains had been for three days. We got through all right, but the train due on July 10th had not arrived on the 11th and the next day's train did not arrive till after midnight. At Revelstoke we took in four barrels of sea water sent there for us, but on tasting it I found it too fresh so we only ventured to use it mixed half and half with the Halifax water still on hand. At Sicamous we met officer McNeish awaiting the five cans of bass, but he stated that there was no suitable place to put them in on account of high freshets, so we took them on to New Westminster Hatchery.

"At New Westminster we transferred the whole shipment to the tug provided. We steamed over 100 miles from five o'clock in the morning till nine at night but could not find the water sufficiently salt anywhere. The whole straits of Georgia being quite high coloured with floating sediment from the Fraser River. We put 196 live lobsters including two very large ones weighing over ten pounds each, and many females with eggs, on inshore grounds adjacent to Nanaimo lighthouse in charge of Mr. Brown. We put 72 near the shore surrounded with a net. The rest we put overboard in deeper water *en route* to Nanaimo, hoping the water would be more salt near the bottom. On the 11th we put 6 barrels of oysters in the two cars, also the lobster eggs which I fear were spoiled owing chiefly to our carrying them about with us in the heat of the sun. The other two barrels of oysters we spread in tidal limits on the shore in charge of His Honour Judge Bole some nine miles up the north arm of Burrard Inlet, where it is very likely they will thrive as there are plenty of shells handy for cultch. They had not yet spawned. The oysters were in splendid condition, hardly one being spoiled.

"The six barrels remained for the "Quadra" to take and plant.

"The temperature of the refrigerator car was almost steadily 41° or 42° F. all the way west when shut up and 45° to 50° F. with the door open.

"The temperature of water in B.C. was 67° F.

SUGGESTED ASSISTANCE BY FISHERMEN.

That the protection of young fish and of spawning parent-fish on the natural breeding grounds should go hand in hand with artificial culture is a well-worn truism. The depletion which has become so apparent in the inland waters of the Dominion could be largely stopped if fishermen would study their own interests and avoid bringing ashore immature and comparatively valueless fish. Artificial planting may do something; but with the help of the fishermen themselves it can do infinitely more, and I cannot forbear quoting from the report last year of Superintendent James Nevin, formerly an officer in one of the department's hatcheries and now Superintendent of Fisheries in the State of Wisconsin.

Mr. Nevin states: "In my last annual report I made mention of the increase of whitefish in Green Bay. It affords me no little satisfaction to be able to state that the catch of this year and last show a steady increase over the catch of 1892. This increase is most perceptible on the grounds on which we have been planting steadily for the past eight years.

I regret very much that, in our efforts to propagate whitefish in the great lakes, the co-operation of the fishermen as a whole is not forthcoming. I deprecate exceedingly the enormous destruction by the fishermen of the small whitefish and other species; for there is no question in my mind that the fishermen would be well repaid for their forbearance if they would return all small whitefish they catch to the lake, instead of selling them for "No. 3 Family Whitefish," I believe there are several dealers in the state who will not buy the small whitefish; but there are others who advise the fishermen how to dispose of them to the dealer's advantage.—(Report of Fish Commiss., state of Wisconsin, 1895.)

From the same report I quote a further extract as embodying a scheme, which has for some years been advocated by the eminent Scottish authority upon fisheries, Professor McIntosh, of St. Andrews. Sea fishermen have, in many instances, been instructed and induced to artificially spawn cod, haddock and other fish and scatter the eggs in the water. This at any rate saves the eggs from total loss on deck or in the market, and a proportion of the dispersed eggs can hardly fail to survive. The state of Wisconsin, however, attempts officially to carry out this scheme as supplementary to fish culture in the state hatcheries:—"Men are placed" says the superintendent "on fishing tugs during the spawning season to spawn the female fish and impregnate the eggs. The eggs are then carefully measured and planted on the natural spawning grounds where they hatch out in the usual natural manner. This commission is the only one in the United States or in America that has made a practice of doing this work in this manner. The fishermen who were sceptical at first, and had so little faith in the work that they did not want us on their tugs, are our best friends to-day. That the work has been a success is proven by the results. At every point on the lake where this work has been done, the fishermen have caught quantities of small trout the second year after planting, where they had never caught them until we commenced planting the impregnated eggs back on the spawning grounds. If the fishermen, one and all, would adopt this method of maintaining the fish supply, there would be no need of a close season."

There may be grounds for questioning the concluding opinion, but there can be no doubt in thus saving ripe spawn, which would otherwise be certainly and immediately lost, there must result undeniable benefit to the fisheries, especially if pains be taken to return the fertilized spawn to appropriate localities, such as the parent-fish would naturally resort to. Close seasons, of course, protect the main run of any particular species of fish, but there are seasonal variations, which lead to the destruction of numbers of fish especially lake trout or salmon trout, whose ripe spawning conditions is often reached at a date prior to the legal close time.

The usual detailed reports of the officers in charge of the hatcheries at New Westminster, B. C., Sydney, N. S., Bedford, N.S., St. John River, N.B., Miramichi, N.B., Restigouche, P. Q., Gaspé, P. Q., Tadoussac, P. Q., Magog, P. Q., Newcastle, Ont., Sandwich, Ont., Ottawa, Ont., Selkirk, Man., and Bay View, Pictou, N. S., are appended. A brief report of the Moisie hatchery conducted for many years at the expense of Messrs. Holliday Bros, Moisie, P.Q., is also included in these detailed reports.

I have the honour to be, sir,

Your obedient servant,

EDWARD E. PRINCE,

Commissioner of Fisheries.

Marine and Fisheries—Fisheries Branch.

1.—FRASER RIVER HATCHERY, B.C.

NEW WESTMINSTER, 12th March, 1896.

Prof. E. E. PRINCE,
Commissioner of Fisheries for Canada.

SIR,—I have the honour to submit my annual report of operations in connection with the Fraser River fish hatchery for the year 1896.

On the 12th day of January a consignment of 4,500,000 semi-hatched whitefish eggs, from the Selkirk hatchery, reached New Westminster. I had them conveyed immediately to the hatchery and deposited in the glass incubators. The eggs had been well packed and arrived in good condition. During the month of March the young whitefish were planted without loss or mortality as follows:—

March 9, Harrison Lake.....	1,125,000	
do 11, do	1,125,000	
do 16, Shawnigam Lake.....	1,125,000	
do 20, Coquitlam Lake.....	250,000	
do 23, Pit Lake.....	250,000	
do 25, Deer Lake.....	125,000	
		4,000,000

The season's crop of young salmon were liberated as follows:—

March 7, Harrison River	1,363,840	
do 9, do	1,363,840	
do 11, do	1,363,840	
do 18, do	1,183,360	
do 20, Pit Lake.....	511,440	
do 21, do	596,680	
		6,393,000
		10,393,000

Making a grand total of 10,393,000 turned out from the hatchery in 1896.

On 28th September I sent caretaker McNeish with two men to Morris Creek, Harrison, with the necessary material to build a trap and make the other necessary preparations for capturing parent salmon and collecting and shipping the ova to the hatchery. On the 3rd of October the first lot of ova, consisting of 630,000, was received at the hatchery.

The water was so low in Morris Creek that the salmon could not reach their spawning grounds, the water continued to fall until the bed of the creek was a series of pools and gravel bars, and the water in the pools became very foul from dead and decaying salmon, as it was impossible for the salmon to reach the trap; one, was removed to the mouth of the creek, and ova in small lots were secured up to the 22nd of October, when it commenced to rain, raising the creek, and on the 31st October the last lot reached the hatchery, making a total of 6,770,000 eggs, which well fills the house.

I had the tram road between the river and hatchery repaired, and also the flume between the pond and the hatchery, with such other repairs to the premises as were absolutely necessary.

I have the honour to be, sir,

Your obedient servant,

JOHN McNAB,

Inspector of Fisheries.

2.—SYDNEY HATCHERY—CAPE BRETON.

NORTH SYDNEY, C.B., 18th November, 1896.

Professor E. E. PRINCE,
 Dominion Commissioner of Fisheries,
 Ottawa.

SIR,—I beg to submit the following as my annual report of the operations of the Sydney fish hatchery for the present year :—

No parent fish in recent years have been taken from the waters of this district for the Sydney hatchery, the ova coming from the Miramichi hatchery. On the 26th of March, 1896, 250,000 salmon ova were received from Mr. Sheasgreen, assistant superintendent of the Miramichi hatchery. These were immediately placed in the troughs of the hatchery. From the above date until the distribution of the fry in June the number of diseased eggs amounted to 6,490.

The remainder were successfully hatched out and the fry in excellent condition distributed in the following rivers :—

Margaree River, Inverness County.....	74,000
River Dennis do	48,000
Clyburn's River, Victoria County.....	50,000
North River do	71,500
Total.....	<u>243,500</u>

The waters adjacent the above rivers are more fished for commercial purposes than are the waters in any other section of this district. For this reason these rivers were again stocked this year.

In previous reports on the fisheries of Cape Breton I have pointed out that there are two runs of salmon entering our rivers. The first make their appearance during the month of June. These fish enter such rivers as Margaree, Little River and River Dennis in the County of Inverness. They also appear in the tidal waters of St. Ann's River, Clyburn's, Cape North and Middle Rivers in the county of Victoria, Mird River in the county of Cape Breton and Grand River in the county of Richmond. This is the commercial run of fish. The second run appears during the latter part of September and the month of October, when immense numbers of these salmon enter nearly all of our rivers, and it was from the parent fish of this latter run that in former years the Sydney fish hatchery was stocked with ova. The result is that while the autumn run of salmon has increased to such an extent, that our rivers have become literally alive with them, the mid-summer run of salmon, which are captured for commercial purposes, is becoming smaller year by year. Thus it would appear that we have been breeding from the wrong run of fish. For the past three years the salmon ova has been furnished from the Miramichi hatchery, and as these fish next year will have arrived at the growth when they will again re-enter their native rivers it is hoped that during the commercial fishing season salmon will be found more plentiful in our waters.

For this reason and the fact that the ova, I believe, can be furnished at a less cost than ova taken from Cape Breton salmon, I would recommend that the department continue to furnish the Sydney hatchery with ova from the New Brunswick hatchery.

The hatching capacity of the Sydney hatchery is about 950,000. The hatchery has not been worked to half its capacity since the change made in supplying the ova from abroad. I would therefore recommend that a greater quantity of ova in future be supplied this hatchery if such can possibly be done.

The hatchery is in need of some slight repairs. The caretaker, Mr. W. J. Dunlop, is faithful and painstaking.

I have the honour to be, sir,

Your obedient servant,

A. C. BERTRAM,
Inspector of Fisheries.

Marine and Fisheries—Fisheries Branch.

3.—ST. JOHN RIVER HATCHERY, N.B.

GRAND FALLS, N.B., 27th November, 1896.

Prof. E. E. PRINCE,
Dominion Commissioner of Fisheries,
Ottawa.

SIR,—I beg to transmit herewith my annual report of the work done and performed at the Dominion Fish Hatchery under my supervision, situated at the Rapide des Femmes on the River St. John, in the province of New Brunswick, and the results thereof, with a few remarks in connection with fish culture.

As I have already in my report for 1895 stated that there were laid down in this hatchery 1,200,000 sea salmon eggs, also in the month of March of this year I received a further supply of 500,000 salmon-trout eggs from Newcastle, and 3,000,000 whitefish eggs from Sandwich, Ont. These eggs were all received in fair condition, the ova continued to do well during the remainder of the hatching period, and hatched out a good percentage in the spring. The young fry of the different species of fish were all distributed throughout the counties lying along the valley of the River St. John in such waters as were suitable to the different kinds of fish. Frequently an application is made to the Fishery Department for a given quantity of young fry for some place or locality where the waters are entirely unsuited to the fry asked for. If the better judgment of the officer be followed and employees refuse or demur to plant the fry in such waters, then neglect or disobedience of orders is charged against them, and they are sometimes reprimanded therefor. At other times it is not possible to comply with all the applications that are forwarded for the simple reason that the fry have got too old to be carried with safety such long distances as would be required to fill orders, therefore we are compelled in order to preserve the fry to put them into the waters most convenient and accessible.

DISTRIBUTION OF FRY.

Whitefish.

Harvey Lake, York County	320,000
Lake George do	320,000
Lake Yohoe do	320,000
Oromocto Lake do	320,000
Long Lake, Victoria County	240,000
Lakeville Lake, Carleton County	240,000
Bryan Pond, Madawaska County	240,000
Long Lake, Victoria County	320,000
Germantown Lake, Albert County	320,000
Total whitefish	2,640,000

Sea Salmon.

Salmon River, Victoria County	48,000
Tobique River do	36,000
Oromocto River, York County	48,000
Salmon River, Victoria County	48,000
Skiff Lake, York County	48,000
Maduxnaqeg, Carleton County	48,000
Loch Lomond, St. John County	48,000
Washademoak do	48,000
Loch Alva do	48,000
St. John River at the hatchery	560,000
St. Croix River, York County	48,000
Total sea salmon	1,028,000

Salmon Trout.

Harvey Lake, York County	40,000
Lake George do	40,000
Lake Yohoe do	40,000
Baldhead Lake do	40,000
Oromocto Lake do	40,000
Lakeville Lake, Carleton County	40,000
Portage Lake, Victoria County	30,000
Rolston Lake do	30,000
Patersons Lake do	10,000
McAdam Lake, York County	10,000
Private Pond do	10,000
Long Lake, Victoria County	30,000
Put into St. John River at hatchery	40,000
Total salmon-trout	<u>400,000</u>

RECAPITULATION.

Whitefish fry planted	2,640,000
Salmon-trout do	400,000
Sea salmon	1,028,000
Grand total of fry this year	<u>4,068,000</u>

It will here be observed that a large quantity of young fish fry has been distributed from this establishment the present year, and I am pleased to be in a position to say further that it was performed in a systematic, practical and judicious manner without any appreciable loss, although we were required to carry a large quantity of them unusually long distances for the safety of the fish. On one occasion last spring we transported whitefish fry about 325 miles by rail, from the hatchery at Grand Falls to Germantown Lake, in Albert County.

COLLECTING SALMON OVA.

On the 29th of October, we left Grand Falls for Carleton, St. John, N.B., to strip the salmon that were confined in the pond, and arrived in Carleton the same night. The next day I went to the pond; there I found everything in readiness, as usual, under the supervision of Mr. Joseph O'Brien, a most efficient and obliging officer, he always renders us every assistance in his power in order to expedite the work of stripping the fish; we lost two days before beginning operations, on account of the egg cases and trays not arriving, although I shipped them the day before I left home. I found the salmon in first class condition, and yielded their eggs quite freely. On the 3rd of November I shipped in charge of my son 650,000 eggs for the hatchery. On the night of the fourth November he returned to Carleton, bringing back the empty egg cases and trays; on the sixth I again despatched my son with 650,000 more eggs, making in all about 1,300,000 salmon eggs that were laid down to hatch here during the present season, and at this date they are looking very well, but it is rather too soon to be able to judge of the possible results, nevertheless I anticipate a good yield of young healthy fry next spring.

On the 7th Mr. Alexander Mowat went to Bedford hatchery with about 700,000 eggs for Mr. Ogden, on the 11th he took about 300,000 more eggs for the same place, making in all about 1,000,000 that were despatched to the Bedford hatchery. About 220,000 eggs were sent to the Miramichi in charge of Mr. Mowat, when on his way home. The total number of salmon manipulated at the pond this year, was: females 440, males 175, making a total of 615.

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The spawning house at present in the pond is quite inadequate and wholly unsuited for the purpose, it is in the first place entirely too small, and very badly lighted, besides it is built upon some old piles or water soaked logs scarcely buoyant enough to float the little building that is erected thereon. Six or seven men are standing and working upon it, with a large barrel or hogshead filled with fresh water and usually a dozen or more visitors from the city and elsewhere, which are sure to be there when we are stripping the fish, hence it is simply submerged; we were frequently standing six or eight inches deep in water which was very disagreeable and injurious to health. I would therefore respectfully suggest to the department that a more suitable building for the purpose should be erected, and as it must be on the water in the pond, in consequence of the rise and fall of the tide, it will therefore require to be built on some floating foundation that will carry a reasonable number of people, together with the appliances necessary for stripping the fish, without sinking below the surface; and also a storeroom for the purpose of storing the egg cases, empty trays, and all the other appliances belonging to the work of spawning the salmon. Such a place is also very much needed for the purpose of packing the ova preparatory to despatching to the several hatcheries. Heretofore we had the privilege of packing them in an old blacksmith shop belonging to the Shore Line Railroad, but it has been taken by the city in making the new wharf improvements. The present season we were compelled to occupy a small shed wherein to do our packing; it was very inconvenient, as it is exceedingly small and dark, as there were no windows in it.

I do not think that any repairs will be required the next year unless something unforeseen might occur.

All of the appliances in the hatchery are in good order and there is a good supply of pure water.

All of the foregoing is most respectfully submitted.

CHAS. McCLUSKEY,

Officer in charge.

4.—MIRAMICHI HATCHERY—NEW BRUNSWICK.

SOUTH Esk, N.B., 20th November, 1896.

Prof. E. E. PRINCE,
Commissioner of Fisheries,
Ottawa.

SIR,—I beg hereby to submit the annual report of operations at this hatchery, for the year 1896.

As stated in my report for 1895, there were placed in this hatchery in the autumn of that year 1,561,600 salmon ova. During the month of March 250,000 of these ova, were transferred to the hatchery at Sydney, Cape Breton, and also 20,000 to the Restigouche hatchery—leaving a balance of 1,261,600. In addition to this number 260,000 salmon ova were received from Restigouche, about the latter part of April, to fill an application of the Hon. Mr. Adams. The ova hatched in a very healthy condition the total loss from the time the first were placed in the hatching troughs until distribution was completed being only 81,600. The fry were planted in the following streams:—

North-west Miramichi River	630,000
Main South-west Miramichi	120,000
Little South-west Miramichi	425,000
Renous River	75,000
Sevogle River	150,000
Kennebecasis River, King's County	10,000
Stewarts Brook	20,000

Total

1,430,000

The 260,000 ova received from Restigouche, were planted in the North-west Miramichi, not far from the fishing pools at "Camp Adams," and are included in the 600,000 allotted to that stream in the above statement, an application for 100,000 fry was made by T. G. Loggie, Esq., of Fredericton, for the main South-west Miramichi and another for 10,000 fry for the Kennebecasis River. These applications were satisfactorily complied with, and the numbers of fry mentioned are also included in the above statement.

After the distribution of fry was completed the work of repairing the hatchery and all appliances in connection therewith, was commenced. The supply pipes, which were leaking badly in several places were repaired as well as possible. The supply dam was newly gravelled and the embankments along the stream were extended and strengthened. The large crib within the retaining pond, which was carried away by the high freshet last winter, was rebuilt. The interior of the hatchery was thoroughly cleaned and repainted and the hatching troughs and trays varnished throughout. Several new scows for carrying parent salmon from the fishing stations to retaining pond, were also built, and everything in connection with the house was put in as good working condition as possible.

CAPTURE OF PARENT FISH.

Having had the nets put in readiness and all necessary arrangements made, the work of procuring the supply of parent fish was commenced on September 9th. During the latter part of the month of August, there was a very large run of salmon in the rivers, but these had all passed up beyond our fishing stations before we commenced operations. After that date there was no large number of fish entered the rivers at one time, but the run continued steadily throughout the season, thereby enabling our fishermen to be very successful in obtaining a full supply. The total number taken from September 9th until the nets were taken up on October 16th, was 405. Of this number 315 were taken by means of seine and set nets on the North-west Miramichi and the remaining ninety were taken by set nets on the Little South-west Miramichi. The total number consisted of 246 females and 149 males. The cost of procuring this number of fish amounted to \$511.67, showing the average price to be about \$1.26 each.

COLLECTION OF OVA.

Owing to a very high tide a few days previous to the time of beginning the work of stripping the fish, an accident occurred, whereby thirty fish were lost. When the tidal water was receding from the retaining pond through the narrow outlet, it caused a large hole to be worn under one side of the inclosure in which the fish were at the time, and it was only by the merest chance that a greater loss was not met with. Upon examination it was found that the fish that had escaped were 11 females and 19 males. Previous to this time 10 female fish had been liberated, that were beginning to show signs of fungoid growth. Thus the number of fish in the pond, when the work of stripping commenced was 225 females and 140 males. The first ova were obtained on October 17th, and the last fish were stripped on November 9th. The fish were all in a healthy condition at time of liberation. The total number of ova procured was 1,648,000.

In addition to this number 280,000 ova were received from the retaining pond at Carleton, St. John, N. B. This transfer was made by Mr. Alex. Mowat, of the Restigouche Hatchery. This makes a total of 1,928,000 ova—the largest number that has ever been at one time in the troughs of this hatchery. These ova are all in a healthy condition at the present date, no loss having occurred since placing them in the hatchery, except about 25,000 from the St. John shipment. This loss was undoubtedly caused by the rough motion of the wagon, driving over the frozen roads from the Newcastle Railway station. When the proper time arrives it would be advisable to remove at least 500,000 of these ova to Sydney or other hatcheries not fully stocked, in order that the fry may not suffer from overcrowding after the time of hatching.

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In conclusion I may say that the past year's operations have been very satisfactory and successful. Evidence of the beneficial results of fish culture on these rivers, is being continually brought to our notice. During the past season the catch of salmon for commercial purposes was above the usual average, and the anglers report an abundance of fish in all the different streams. Both net fishermen and sportsmen appear to be well satisfied with the prosperous condition of our salmon fishery, and its prosperity is greatly due to the benefits received from this institution, coupled with the improved protection which the rivers have been receiving during the past few years.

I am, sir, your obedient servant,

ISAAC SHEASGREEN,

Officer in charge.

5.—RESTIGOUCHE HATCHERY—QUEBEC.

RESTIGOUCHE HATCHERY, 28th November, 1896.

Prof. E. E. PRINCE,
Dominion Commissioner of Fisheries,
Ottawa.

SIR,—I have the honour to submit my annual report upon the operations of the Restigouche hatchery conducted under my supervision during the past year.

A very successful hatch of fry resulted from the crop of eggs placed in the hatching troughs in the autumn of 1895 and were distributed as follows, viz. :—

April 4th, semi-hatched eggs transported to the Miramichi hatchery	260,000
June 17th, Upsalquitch River	150,000
do 20th to 25th, Main Restigouche River	200,000
do 26th to 27th, Metapedia River	200,000
do 29th to 3rd July, Tom Kedgwick River	200,000
July 5th, Metapedia River	40,000
do 6th to 9th, Main Restigouche River	200,000
Total	<u>1,250,000</u>

This work was carried out with the greatest of care, and all of the above fry, with the exception of a few transported by rail, were towed in floating crates as adopted on the Restigouche, and were planted in perfect condition, being constantly subject to the fresh aerated water flowing through and among them while in course of transportation. This plan should always be adopted where it is found practical to do so.

CAPTURE OF PARENT FISH.

Operations at the Tide Head pond was began on the 15th May, and the pond at once made ready for the reception of the fish, and the two government nets put in fishing order as soon as possible. Below will be found a detailed statement of the numbers of fish captured in the departmental nets, and also fish purchased from licensed fisherman.

Date.	Murray Island. Government Net.	Pitts Creek. Government Net.	Melvin Adams. Licensed Fisherman.
May 27.....			6
do 28.....			6
do 29.....			3
do 30.....	14		11
June 2.....	35		22
do 3.....	21		18
do 4.....	30		11
do 5.....	27		0
do 6.....	13		3
do 9.....	43		5
do 10.....	51		6
do 11.....	20		5
do 12.....	21		5
do 13.....	18		
do 16.....	22		
do 17.....	17	9	
do 18.....	2	8	
do 19.....	17	4	
do 20.....	9	6	
do 23.....	12		
do 24.....	14		
do 26.....	8		
do 27.....	15		
do 30.....	14		
July 1.....	14		
do 2.....	7		
do 3.....	6		
do 4.....	4		
do 8.....	3		
do 9.....	1		
do 11.....	3		
Total.....	461	27	101
			589

The above figures are taken from the daily diary, which was kept and upon which reliance may be placed.

You will observe, however, only 27 fish were caught in the Pitts Creek Government net. This net was only fished five days, when it was taken out and the men discharged.

With the 101 fish already purchased from Mr. Adams, and the large catches being made in the Murray Island net, ample fish were secured for the stocking of the hatchery. In fact, had I known there was going to be such an immense run of fish, we could have obtained sufficient in the two Government nets without purchasing any. Eighty-seven of the parent fish deposited in the retaining pond died from the fungoid growth upon their bodies, and were buried, being injured in escaping through the nets lower down, and from other causes.

The work of seining and separating the fish into the divisions, and collecting the eggs began on the 17th of October, and a close record of both sexes kept as each fish was operated upon, and when the whole work was completed on the 5th of November it was found 543 fish had been manipulated, 193 males and 350 females yielding 3,000,000

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of eggs, which were safely conveyed by tow boat to the hatchery at Dee Side. Thus it will be seen there were 41 fish collected from the pond in excess of the actual record kept, this can only be accounted for by reason of the large catches made at a single tide, so many fish running into the pontoon and thence into the retaining pond, it was quite impossible to keep a correct account.

THE HATCHING HOUSE.

In my previous reports I referred to the dilapidated condition of the hatching troughs, a number of which was cast aside during the present season having become so badly decayed they were found unfit for further use. The interior of the building received the necessary repairs during the summer and put in proper condition for the reception of the ova this autumn, without extra cost; another season it may be found necessary to put in a new supply tank and supply pipe, the present being 10 years old, and constructed of wood are becoming unsafe.

Some action must be taken during the coming winter and spring in replacing a number of the hatching troughs, either with new ones, or the galvanized sheet iron tanks which I have already recommended. I have submitted plans of tanks to a competent tinsmith, cost of which will be from \$5.00 to \$6.00 per tank 6 ft. long x 2 ft. 3 inches wide, 10 inches deep, fitted out with proper hatching apparatus. I find these tanks will cost no more than the wooden troughs, and where hatcheries are sometimes overcrowded with a million or so of fry, the same building or space fitted up with the tank system would accommodate just double the quantity of fry, without the shadow of a chance of overcrowding and smothering, as is sometimes the case where hatcheries are overstocked with eggs. In addition to this at least half a million of eggs will need to be transported from this hatchery when the proper time arrives to some of the other institutions which may not be fully supplied. Unless this is done, overcrowding of the fry from the immense quantity of eggs now in the hatchery is sure to be the result in the spring.

THE RETAINING POND, TIDE HEAD.

A quantity of new plant will be required for another season's operations, viz.:—half dozen pontoons for conveying parent fish from the nets, a large fishing canoe and a boat, also 500 net stakes, and perhaps some new nets, and the old ones repaired, the whole cost not to exceed \$200.00.

In obedience to your instructions, I left here on the 27th of October to assist in the work of manipulating the fish at the Carleton Pond, St. John. Some 600 fish were operated upon, yielding upwards of 2,770,000 eggs, which were divided between Grand Falls, Bedford and Miramichi hatcheries, all the eggs being transported in good condition. The adult parent-fish were strong and healthy and in prime condition. I consider the Carleton pond the best in the Dominion for the impounding of parent salmon.

I would recommend the erection of a very large hatchery more central and conveniently situated, and increase the numbers of parent-fish at the Carleton Pond, so that the Nova Scotia hatcheries and also Prince Edward Island, if need be, could be stocked with semi-hatched eggs from a large institution. The Rapide des Femmes could be turned into a sort of auxiliary hatchery for the purpose of stocking the Tobique and other rivers in that vicinity, and also be supplied with semi-hatched eggs from the central establishment.

At the request of Colonel Tucker, M.P., and others, I visited the Mispick River in the vicinity of St. John with the view of giving them the benefits of my experience as to the feasibility of re-stocking those depleted waters, which at one time, were teeming with salmon. It was quite evident there would be a surplus of both adult salmon and eggs at the Carleton pond, I advised the planting of a dozen of the parent-fish in the Mispick River. The fish were conveyed from the Carleton pond in a pontoon and safely deposited in the river beyond the first chain of falls, I have no doubt but good results will follow this work.

GENERAL REMARKS.

Never was there such a fine run of salmon in the history of the country, both in point of numbers and size as ascended the Restigouche and its tributaries this year, and never were the conditions throughout the estuary and coast more favourable for making big catches. The spring was late and the fish came early, and ascended the rivers while in flood with a snow freshet which kept the water dark and at a very low temperature, there must have been upwards of 2,000,000 pounds of salmon taken in Baie des Chaleurs net fishery worth \$200,000. And between four and five thousand salmon taken in the Restigouche and tributaries with the fly worth at least \$100,000 to the settlers and the country. All classes of fishermen seemed perfectly satisfied.

The Restigouche River and Baie des Chaleurs is a mine of inestimable wealth to this country. The salmon industry alone causing hundreds of thousands of dollars to be circulated in the four counties. Therefore the great importance of the Dominion, and provincial governments working jointly with the Restigouche Salmon Club with the object of giving the rivers the best possible protection, as the wealth of the net fishery, as well as sport for the anglers depends upon the thorough protection of the river.

All of the above report is most respectfully submitted.

I have the honour to be, sir,

Your obedient servant,

ALEX. MOWAT,

Officer in charge.

6.—GASPÉ HATCHERY, PROVINCE OF QUEBEC.

GASPÉ BASIN, QUEBEC, 12th November, 1896.

To Professor PRINCE,
Dominion Commissioner of Fisheries,
Ottawa.

SIR,—I beg to submit the annual report of operations connected with the above hatchery during the past year.

The work in Dartmouth River was commenced on 16th May, the summer scows and flats being repaired, and other necessary work carried out.

The departmental nets were set on the 4th of June in Dartmouth River and remained until the 3rd of August. During this time 135 fish were captured, 37 more were obtained from Mr. William Stanley at the current rate of \$2.00 each. We thus had 172 fish: 7 died in pond during summer months, leaving 165. These were found to consist of 100 females and 65 males.

The spawning continued from October 12th to November 10th, yielding as follows:—

30 female averaging	14,000	=	420,000
30 do do	12,000	=	360,000
40 do do	9,000	=	360,000

Total..... 1,140,000

These were all placed in good condition in the hatchery, and the fish after the stripping was completed were taken back to the Main River in scows.

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Distribution of Fry.

The following statement shows the number of salmon fry bred and planted during the year, also the rivers in which they were put.

St. John's River.....	50,000
Cape Chat do	50,000
York River.....	100,000
Dartmouth River.....	600,000
Total.....	800,000

The instructions from the Department of Marine and Fisheries were, that I should send 100,000 salmon fry from the Gaspé hatchery to Cape Chatte River, at the request of H. McLachlin, Esq.

I was able to send only 50,000 because of the following reasons: The 20 cans which were at the hatchery required repairing which was done, and as they were small I thought it advisable to send not more than 2,500 in each, making 50,000 in all, and leave the rest for a second trip; but the man sent in charge of the fry on the SS. "Campana" missed his return trip leaving us without any cans at the hatchery; and to save the 50,000 still at the hatchery I was obliged to plant them in the Dartmouth River. All were planted in good condition.

The departmental nets were taken up August 3rd. The scows and flats were taken round to the pond boom to winter quarters, nets dried and taken to hatchery. The departmental nets have been set as before. Anglers are well satisfied with the work carried on.

According to instructions I placed large braces on the south side to prevent the building from pushing any farther out; but I postponed painting the interior.

The interior of the hatchery was well cleaned and aired. The appliances were fully prepared for the usual winter work of this establishment.

The hatchery is filled with eggs and I hope to have a good success this winter. According to report the upper waters of the St. John and Dartmouth Rivers are well stocked with parent salmon.

The St. John anglers with fly caught about 190.

The Dartmouth do do do 38-40.

I remain, your obedient servant,

HENRY DAVIS,

Officer in Charge.

7.—TADOUSSAC HATCHERY—PROVINCE OF QUEBEC.

TADOUSSAC, 18th November, 1896.

Professor PRINCE,
Dominion Commissioner of Fisheries,
Ottawa.

SIR,—I have the honour to submit my annual report, and I am pleased to state that the operations carried out at the Tadoussac hatchery for the season 1896, have been most successful both in the distribution of a large quantity of salmon fry and the collection of the largest crop of eggs ever made.

From the 2,700,000 salmon eggs collected during the months of October and November, 1895; a total of 2,500,000 were turned out in the month of June, 1896, in the following rivers and lakes.

Ste. Marguerite River north-east branch.....	400,000
Ste. Marguerite River north-west branch by Tableau....	150,000
A Mars River.....	200,000
St. John River.....	200,000
Little Saguenay River by Long Lake.....	200,000
Baude River.....	300,000
Chisholm River.....	600,000
Mowat's Lakes.....	400,000
Hatchery Lake.....	50,000

2,500,000

As usual, the distribution was performed with success in the Upper Saguenay, with the assistance of the tug boat "Forrest." We fill up our salmon cans in the evening to be ready to leave Tadoussac at midnight, to profit by the coolness of the nights and to be next morning in the Upper Saguenay River to reach the river where we have to plant our salmon fry and to return to Tadoussac during the day. A total of 1,044 salmon were captured by means of two departmental nets set at the "Point Rouge" station and "Petites Iles" station. On Saturday the 6th of June, we found Point Rouge fishing was full of salmon, and being obliged to open the door of the fishery to comply with the regulations of the Sunday clause, we took up 100 parent salmon to the pond, 29 males and 71 females, and liberated 60 at the fishery. The next day a Sunday, by the report of the guardian, the salmon have been seen entering the fishery by hundreds and going out by the back door of the park from half tide to high tide. From the 1,044 salmon, 529 parent salmon of the largest size were kept for the hatchery, 515 were liberated at the fishery, of which the bruised ones were given to employees of the hatchery, to prominent people, and some for charitable purposes. During the spawning time we found in the salmon pond 311 large females yielding 3,780,000 now on the trays on double rows and looking well. By repeated experience I found out that with much care in washing the eggs on the trays in double rows, they hatch out as well. The work of spawning commenced on the 26th of October, and ended on the 13th of November. During the period of confinement of the parent salmon, from May to November, there was no loss of any fish. The repairs made lately to the two dams of the Hatchery Lake will ensure a good supply of water for the breeding room during the winter. The hatchery is in good working order, no repairs required for the next season, except the usual ones of the painting and varnishing of troughs and trays. I will not set up the station of the Petites Iles next spring; by the record of the last few years, I believe that the fishery of the Point Rouge, will be sufficient to supply the number of parent salmon required for the Tadoussac hatchery. It will be a saving of one hundred dollars per year. At all events, I would respectfully recommend the retention of the Petites Iles station, in case that it might be wanted later on in bad years or to increase the catching of parent salmon for breeding purposes. The large increase, year by year, in the number of salmon caught in my district, and the exceptionable large catch of this season of 1896, is due to ascertainable causes, and in my opinion, ought to be credited, for a good part, to the Tadoussac hatchery. The little money spent by the Department of Fisheries is certainly yielding large profits, no money can be more wisely spent in the public interest. Increase the fish hatcheries and in a few years more, your department will be in position to confer great benefits upon many poor families along the north coast, in allowing a larger number of salmon licenses in the St. Lawrence River this great thoroughfare to so many fine salmon rivers. I would like to see a hatchery at the head waters of every fine salmon river, the result, would be, beyond any doubt, an enormous increase of salmon. An auxiliary Saguenay hatchery might be carried on at a small expense, as all the salmon eggs could be supplied by the Tadoussac hatchery. During the

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spawning time, on the 7th of November, I had the pleasure of the visit of P. V. Savard, Esq., M.P. for Chicoutimi and Saguenay. He seemed to take a great interest in the Tadoussac hatchery and is confident in the good result of the fish breeding. He visited the spawning building during the manipulation of the salmon, and was shown also the old dilapidated wharf of the salmon pond. Mr. Savard said that something must be done to repair it as soon as possible, as this salmon pond is visited during the summer season by hundreds of tourists. I may say that the operations carried out at the Tadoussac hatchery have given perfect satisfaction during the past season, the success in hatching and distributing of such large number of salmon fry, is very encouraging. The anglers in all the salmon rivers, tributaries of the Saguenay, report splendid catch and fine sport. The catch, by the salmon fishermen, for marketable purposes, shows an increase of nearly fifty per cent; the salmon fishery continues to be in a very prosperous condition. The good result of the last few years show that there is a brilliant future in store for the net salmon fishermen and fine sport for the anglers.

I have the honour to be, sir,

Your obedient servant,

L. N. CATELLIER.

8.—MAGOG HATCHERY.

REPORT OF OPERATIONS FOR 1896.

To PROFESSOR PRINCE,
Commissioner of Fisheries,
Ottawa.

In accordance with the rule of the department requiring a report of the year's work the following is submitted.

In March there were received at the hatchery 1,650,000 whitefish eggs and 1,750,000 salmon-trout eggs, about eighty-five per cent of which were successfully hatched and distributed as follows:

Whitefish.

Lake Megantic, County of Megantic.
Massawippi Lake, County of Stanstead.
Memphremagog Lake, Counties of Brome and Stanstead.
Orford Lake, Counties of Brome and Sherbrooke.
Brome Lake do do

Salmon Trout.

Megantic Lake, County of Megantic.
Massawippi Lake, County of Stanstead.
Memphremagog Lake, Counties of Brome and Stanstead.
Orford Lake, Counties of Brome and Sherbrooke.

Good accounts of the results of the fry planted have been received and if the salmon trout were more efficiently protected the benefit of artificial culture would be even more marked: but there is undoubtedly a general improvement: certain repairs which are necessary have been reported to the department and should be done without delay.

9.—NEWCASTLE HATCHERY—ONTARIO.

NEWCASTLE, 27th December, 1896.

Prof. PRINCE,
Commissioner of Fisheries,
Ottawa.

SIR,—I have the honour herewith to submit a report of the fish cultural operations carried on at the Newcastle hatchery during the past year.

The following schedule will show the points of distribution, also the number and kinds of fry placed in each locality last spring.

Salmon Trout.

Georgian Bay—Collingwood.....	350,000
do —Warton.....	200,000
Lake Huron —Southampton.....	150,000
do —Kincardine.....	150,000
Lake Simcoe—Barrie.....	150,000
Lake Couchiching—Orillia.....	150,000
Severn River.....	150,000
Lake St. Clair.....	500,000
do Ontario—Hamilton.....	150,000
do do Toronto.....	150,000
do do Cobourg.....	150,000
do do Newcastle.....	250,000
Total salmon-trout.....	<u>2,500,000</u>

Whitefish.

Lake Ontario—Hamilton.....	300,000
do do Toronto.....	300,000
do do Cobourg.....	300,000
do do Picton.....	300,000
do do Consecon.....	300,000
Bay of Quinté—Belleville.....	300,000
Lake Simcoe —Barrie.....	300,000
do Couchiching—Orillia.....	300,000
do Rosseau—Muskoka.....	300,000
Total whitefish.....	<u>2,700,000</u>

Schedule showing total number of fry and semi-hatched eggs distributed from the Newcastle hatchery during spring of 1896.

Eyed Ova.

Shipped to Magog, Que :.....	1,000,000
do Grand Falls, N. B.....	500,000
do Bedford, N. S.....	500,000
Salmon trout fry.....	2,500,000
Whitefish do.....	2,700,000
Total distribution from Newcastle.....	<u>7,200,000</u>

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I am pleased to say that the fry were all liberated in good condition, the only loss sustained during the season being on the 9th and 10th of May, when owing to the excessive heat of those two days we lost some 250,000 salmon trout fry in the tanks at the hatchery.

Collecting Ova

The total quantity of ova collected this year at Wiarton, was 5,000,000 of which 700,000 was delivered to Mr. Walker for the Ottawa hatchery, leaving a balance of 4,300,000 which were deposited in the troughs of this hatchery and are now apparently in a good and healthy condition. Had I been permitted to leave here for Wiarton on the 1st of October, which has been the usual time for years past, I would have succeeded in collecting at least 2,000,000 more eggs, but as I was not allowed to leave here until the 10th of October and owing to the rough and stormy weather it was impossible for me to get the nets set until the 22nd and as the fish started to spawn earlier this year than usual the result was that I missed the first run of fish.

I therefore hope that your department will be able to see their way clear to permit the operations at Wiarton to be started earlier another season. In regard to the condition of the hatchery as to repairs, there would require to be a new floor laid down in the upper hatching room and would also require to have a new set of hatching troughs as the old ones are badly decayed and leak considerably. If these repairs were carried out this hatchery would then be in good condition.

I have the honour to be, sir,
Your obedient servant,

JOHN KENEFICK.

10.—SANDWICH HATCHERY, PROVINCE OF ONTARIO.

SANDWICH, 27th December, 1896.

To Prof. E. E. PRINCE,
Commissioner of Fisheries,
Ottawa.

SIR,—I have the honour to submit my report upon the operations at the Sandwich hatchery, for the year 1896 :—

As stated in last year's report, this hatchery contained 100,000,000 whitefish eggs, from which were turned out 76,000,000 young whitefish and semi-hatched eggs which were disposed of as follows :—

EYED EGGS.

Ottawa, Ont	4,000,000
Newcastle, Ont.....	3,000,000
Magog, Que.....	2,000,000
Bedford, N. S.....	3,000,000
St. John River, N. B.....	3,000,000
Total.....	15,000,000

YOUNG FRY.

Point Edward, Lake Huron.....	3,000,000
Mitchells Bay, Lake St. Clair.....	3,000,000
Peaches Island, ".....	3,000,000
Belle Isle, Detroit River.....	2,000,000
Fighting Island, ".....	6,000,000
Bay below Fighting Island.....	3,000,000
Stoney Island, Detroit River.....	4,000,000
Bois Blanc Island, ".....	4,000,000
In lake below Bois Blanc Island.....	3,000,000
Pigeon Bay, Lake Erie.....	2,000,000
Barr Point, ".....	2,000,000
Colchester, ".....	2,000,000
Kingsville, ".....	1,000,000
Leamington, ".....	1,000,000
Rondeau, ".....	1,000,000
Port Stanley, ".....	1,000,000
Hamilton, Lake Ontario.....	1,000,000
Toronto, ".....	1,000,000
Niagara, ".....	1,000,000
In river at hatchery.....	17,000,000
Total.....	61,000,000

These young fry were placed in the water at the aboved named points in a good healthy condition.

This fall we have in the hatchery 95,000,000 whitefish eggs which are doing well, and I confidently expect will turn out a good percentage of young fry.

The total catch of fish this fall was 10,600 accounted for as follows:—

Liberated.....	5,830
Sold.....	4,500
Salted.....	150
Lost.....	120
Total.....	10,600

It will be observed by the above figures that there were more whitefish taken this year than last, which shows that whitefish are "holding their own," a fact which ought to be most encouraging and gratifying to all concerned in the artificial breeding of fish.

REPAIRS.

Among the repairs necessary in connection with the establishment here are the piers at Fighting Island and the painting of the interior and exterior of the hatchery.

I am, sir, your obedient servant,

WILLIAM PARKER.

Marine and Fisheries—Fisheries Branch.

11.—OTTAWA HATCHERY—ONTARIO.

OTTAWA, 31st December, 1896.

To Professor E. E. PRINCE,
Commissioner of Fisheries,
Ottawa.

SIR,—I beg to submit my annual report of the operations carried on at the Ottawa hatchery for the year 1896.

On the 27th November, 1895, there were received from the Newcastle hatchery 1,000,000 salmon-trout eggs which were laid down in the hatching troughs, and in February, 1896, were also received 3,000,000 of whitefish eggs from the Sandwich hatchery.

The eggs from both places were received in good condition.

The young fry came out in April and May strong and healthy, and were deposited in the waters named below.

I am happy to say that the charge and care of distributing the fry, having been entrusted to Mr. Andrew Halkett, who is a practical and most careful official in the Fisheries Department, complete success attended the planting of the fry in the different lakes, having sustained no loss, whilst last year, I am sorry to say, we were not so successful on account of the fact that the work had been entrusted to a person without experience.

I hope that one with such special qualifications of Mr. A. Halkett be appointed again this spring for the distribution of the fry as he had the experience of last year, when his success was most marked. On the 20th November last, we received 1,200,000 salmon-trout eggs which were laid down in the hatching troughs. They are doing very well so far.

I also expect to receive 3 or 4,000,000 whitefish eggs from the Sandwich hatchery.

DISTRIBUTION OF SALMON TROUT.

To 7th Lake (Joliette).....	50,000
Mississippi Lake	80,000
Lac des Sables.....	100,000
Roch Lake.....	60,000
Jones Falls.....	60,000
Lac Ouimet.....	200,000
Lake Wapizagowke.....	100,000
31 Mile Lake.....	80,000
Glenalmond.....	60,000
Beverly Lake.....	60,000
Charleston Lake	60,000
Venista Lake	40,000
Total.....	<u>950,000</u>

DISTRIBUTION OF WHITEFISH.

To Jones Falls.....	500,000
Tucker's Lake, Hawk's Lake, and Horse Shoe Lake...	300,000
White Lake.....	500,000
Bay of Quinté.....	500,000
Rideau Lake.....	100,000
Ste. Agathe.....	300,000
Sharbot Lake.....	300,000
Meache's Lake.....	500,000
	<u>3,000,000</u>

Everything in the hatchery is in perfect order, and no repairs at the hatchery will be needed this year.

During the year over 18,000 visitors registered and examined the fisheries exhibit and the hatchery.

I remain, sir, your humble servant,

JOHN WALKER,
Officer in charge of the Ottawa hatchery.

12.—BAY VIEW LOBSTER HATCHERY—PICTOU, N. S.

BEDFORD, N. S., 19th August, 1896.

Prof. E. E. PRINCE.

Dominion Commissioner of Fisheries,
Ottawa.

SIR,—I have the honour to submit my report of operation at the Bay View Lobster Hatchery for the season of 1896.

On the 7th May last I arrived at Bay View, and commenced to put the hatchery in order for the season's operations, and on the 12th May, the first eggs were received from the nearest factory.

On the 22nd May, the steamer "Caberfeidh" was employed to collect ova from all the factories from Bay View to Cape John and around Pictou Island. It was continuously engaged at that work for 17 days when 100,000,000 eggs were placed in the jars. At the end of that time the spawning school of lobsters had then gone and on the 10th June the steamer was discharged.

The first appearance of fry in the jars was on the 15th June, and the distribution by steamer commenced on 20th June and terminated on the 8th July, when 100,000,000 young lobsters had been successfully hatched and planted in the waters between Pictou and the main land.

With due care and attention it is possible to hatch almost every egg, and the loss is thus practically *nil*.

This has been the poorest season that the canners have had for many years, which is accounted for chiefly by the ice remaining late upon the coast, together with the heavy gales which prevented the fishermen from hauling their traps.

The hatchery is in good running order, except the supply tank, which has been leaking badly all summer and it will have to be replaced by a new one, if the department sanctions it, before another season's work is commenced.

This tank is placed directly over the steam boiler and pump, and the water leaking from it has injured the brick work around the boiler.

I consider that it will be necessary, this autumn, to construct a new tank and place it outside the hatchery.

The cost of a new tank will not be a large item. I shall report more fully on the matter at an early date.

The two new piers which I had constructed by departmental instruction last year have kept the wharf in good shape, and resisted the ice splendidly.

I am, sir, your obedient servant,

ALFRED OGDEN.

Marine and Fisheries—Fisheries Branch.

13.—SELKIRK HATCHERY—MANITOBA.

SELKIRK, 29th December, 1896.

To Prof. PRINCE,
Commissioner of Fisheries,
Ottawa.

SIR,—As the department did not sanction the usual preparations for work this season at the Selkirk hatchery, no fish culture operations have been carried on since the shipment of the whitefish eggs (4,500,000) to the New Westminster hatchery, British Columbia, which I despatched early in January. Inspector McNab reported that they arrived after their long journey in capital condition, which he attributes to their being well packed when shipped from this hatchery. I may say that I took special care in packing them in view of the dangers attaching to a protracted railway journey to the Pacific coast. As it is of importance to the department to know precisely the provision made in this hatchery for supplying water to the jars and tanks and the necessity for better and more suitable arrangements I submit a detailed report which Mr. W. T. Cleland, engineer, has furnished me:—

WEST SELKIRK, 9th March, 1896.

R. LATOUCHE TUPPER, Esq.

DEAR SIR.—In selecting a steam plant to do a given work, the most important question to be considered is economy of fuel. But in specifying the machinery to be used in the hatchery, this question seems to have been entirely overlooked, or perhaps the precedent of some other hatchery followed. The pump in use in your hatchery was designed and built to do heavy work with great pressure against it, so that strength and power, instead of economy of fuel was the object held in view. Now in the work you have to do there is no pressure but that of the atmosphere to overcome. It is simply this, to lift 300 gallons of water 50 feet high in one minute. To find the power necessary for this, the following simple rule is used. Multiply the weight of water in pounds by the height in feet and divide by 33,000 so the calculation is thus:

$\frac{300 \times 50}{33000} = 4\frac{1}{2}$ nearly. So it will be seen that only four and one-half or say five horse-power is required to do the work in hand. Now the pump in use, with its two large steam cylinders is capable of developing upwards of one hundred horse power, while a pair of common power pumps each having a capacity equal to the pump now in use, could be run with an engine of five horse power. I will now make a calculation of the steam required by such an engine and the pump now in use, showing you the saving of fuel that could be effected by the change.

The cubical contents of the cylinder of the steam pump (14 x 12) is 1846.8. Now each cylinder must be filled with steam twice for every stroke or a total for both cylinders of 7388.2 cubic inches of steam for every stroke. The capacity of the pump when new, as given me by the builders was 9.92 American gallons per stroke. It will be seen that it must run considerable over 30 strokes per minute to supply 300 gallons. By multiplying the cubic inches of steam used at each stroke by 30 we get 221,616 cubic inches of steam that must be drawn from the boiler each minute. The valve motion of this pump is such that it does not allow of the steam being used expansively, and steam from the boiler is forced into the cylinders during the whole stroke, the ports remaining open until the stroke has been completed, no matter how much or little work is being done by the pump. Now to be sure of having ample engine power, in case the hatchery was doubled or even trebled in capacity, I will make the calculation on an engine 8 x 10, which will give 15 horse power. The cubical contents of such a cylinder is 502 inches, and with the steam cut off at half stroke, it is obvious that only half of the cylinder will be filled with steam from the boiler, the remaining half of the stroke being accomplished by expansion so it will be seen that only 502 cubic inches of steam will be drawn from the boiler for every two strokes, or one complete revolution of the engine. Say the

engine runs 125 revolutions per minute, multiply this by 502 and we have 62,750 cubic inches of steam used per minute by the engine as compared with 221,616 cubic inches used by the pump at present. A difference of 158,866 cubic inches or nearly four times as much steam used by this high pressure pump as would be required by an engine doing three times as much work. I think it is not going too far to say that over 50 per cent of the fuel now used would be saved by the change. The power pumps spoken of are a simple force pump, and would cost less than half as much as the steam pump, which could I have no doubt be exchanged for, to some manufacturer or dealer for the others to good advantage, and if this change was made, a 16 horse power upright boiler would be large enough.

Another point where fuel could be saved would be the adoption of a first class heater for the feed water. Master machinists claim that a saving of from 15 to 40 per cent of fuel can be made by using a good heater. Then for heating the building I had the honour to call your attention to the waste of fuel in this way before, and recommended using the exhaust steam for this purpose. The saving of the fuel now used for this purpose, (which I have found by repeated trials amounts to over five cords per week in the winter months) would pay for the pipe work in less than five years. Another source of waste, not of fuel alone, but also of the life of the boiler, is the fact that the boiler has to run through the whole season without being cleaned out. As the scale and mud accumulates, a higher temperature must be imparted to the heating surfaces to evaporate the water. This very materially injures the boiler. I consider it absolutely necessary, that to feel the least assurance of being able to carry through a season's hatch successfully all the machinery should be duplicated. Because every hour this machinery runs, brings you so much nearer to the time when some small unforeseen thing will give out, such as the bursting of a tube in the boiler, corroding and breaking of a pipe or some connection, which would cause the loss of the season's labour, even though it had been carried to within a week or two of completion, and in fact that is the very time such an accident is most likely to take place.

I would also recommend that the boiler be removed from under the large tank, and put in the back room and the partition taken down, the hatching room would still receive the heat from the boiler, and avoid the dust and ashes that flies from it. The boilers could be put on a good foundation there very cheaply, facing the fuel room, and would be, in every way, better and handier.

But in all cases I consider an auxiliary boiler indispensable. And if the power pumps be adopted they are duplex, and can be run one at a time, and with this improvement you would have a plant second to none for economy of fuel and reliability for work. And the first cost of this plant, I do not think, would have been any higher than the machinery put in. You have spoken of doing away with the large tank up stairs. I do not think that advisable, but if the boiler was removed from under it, then giving it proper support, and I do not think it would give you any more trouble. As to the offtake pipes under the floor, they need rearranging, but as there are plenty of spare pipe they could be made serviceable at very little cost. I would also strongly advise extending the suction pipe at least 75 feet further out into the river in order to avoid the sand and gravel that has done so much damage to the pump, and also the necessity of dredging. You would also get much cleaner water further from the mud bank where the end of the pipe now is, especially in the spring when the ice begins to chafe the banks and the wash from the fields and streets is coming in. I think, sir, it would be a great relief to you to know though an accident should happen to your machinery, (which is liable to occur to the best), the eggs in the hatchery would incur no risk, as it would only necessitate the changing from one pump to the other or one boiler to the other. As for myself the anxiety caused by knowing how helpless we were in case of accident, was far heavier than my work. But with the machinery duplicated, you can calculate with some assurance on the issue.

I would consider it a grave mistake to increase the capacity of the hatchery and leave the machinery as it is at present.

It is unnecessary for me to add more. All is respectfully submitted.

Your obedient servant,

R. LATOUCHE TUPPER.

Marine and Fisheries—Fisheries Branch.

14.—MOISIE HATCHERY—QUEBEC.

QUEBEC, 29th December, 1896.

Professor EDWARD E. PRINCE,
Commissioner of Fisheries,
Ottawa.

SIR,—I beg to submit herewith the annual report of our Moisie salmon hatchery for season of 1896.

Having been unsuccessful the past year in obtaining sufficient mature salmon containing ova, owing to heavy freshets in fall of 1895 in Moisie River, orders were given that the men in charge of the expedition should leave earlier than usual for the upper waters in order to make sure of success.

The men and canoes left the post at the mouth of the river on Friday, 9th October, at 9 a.m., the weather being fine and clear, and arrived at the hatchery the following morning. Leaving the hatchery at 7 a.m. Saturday, they proceeded as far as the stream "Cachioiche" where they passed the night and Sunday the following day. On Monday at 7 a.m., a start was made for the upper waters and they arrived at the Forks at 12.30 p.m.

On Tuesday morning the men started to seine. At the first cast of the net they took three male salmon and two females good (full of spawn); the second cast they took seven males and four females, of the latter only two were good; at the third cast four males and two good females were taken and the men then returned to camp for the night.

Wednesday morning at 8 o'clock, they again started for the seining grounds and at the first cast of the net nine males and eight good females were taken. Having now secured all the ova required, only four of the last females were stripped of eggs and the fish were replaced in the river.

Returning to camp for the night, they left Thursday morning for the hatchery arrived there at 3 p.m. of same day and having deposited the eggs carefully in the trays in good order, they started for the post again on Friday morning.

The two buildings containing the trays having become very old and rotten, were completely rebuilt this year at considerable expense.

In a letter received from the caretaker of the salmon house, dated 22nd December, he reports everything in good order and progressing nicely.

I have the honour to be, sir,
Your obedient servant,

JOHN T. HOLLIDAY.

15.—BEDFORD HATCHERY—NOVA SCOTIA.

Dec. 31, 1896.

Professor E. E. PRINCE,
Dominion Commissioner of Fisheries,
Ottawa.

SIR,—I beg to report as follows upon the operations of this hatchery for the past season. The usual quota of salmon ova (500,000), whitefish (300,000) and salmon-trout (200,000), were received, and as the water was cool, in spite of the early season, the fry were very robust.

The waters named were planted with fry :—

Salmon.

Round Hill River, Annapolis Co., N. S.	50,000
Sequille " " " "	50,000
Bear " " " "	50,000
Moose " " " "	50,000
East " Pictou " "	50,000
West " " " "	50,000
Caribou " " " "	40,000
Stewiacke " Colchester " "	25,000
Pennant " Halifax " "	30,000
Sackville " Westmoreland, N. B.	40,000
	435,000

Great Lake Trout.

Round Hill Lakes, Annapolis Co., N. S.	40,000
Mill Stream " Pictou " "	40,000
Rocky " Halifax " "	40,000
Gough " " " "	40,000
	160,000

Whitefish.

Lake A. Law, Inverness Co., N. S.	1,000,000
Lake Ainsley, " " " "	500,000
Paradise Lake, Annapolis " "	250,000
Round Hill Lake " " " "	500,000
La Rose Lake " " " "	500,000
Sandy Lake Halifax " "	250,000
	3,000,000

The distribution of fry continued from April 14 until June 14, and as the fry were in splendid condition there was practically no loss.

I have previously reported in regard to certain repairs, and I have lost no opportunity of making improvements around the premises, planting shade trees and beautifying the grounds.

I am, sir,

Your obedient servant,

ALFRED OGDEN,

Officer in charge.

Marine and Fisheries—Fisheries Branch.

ANNEX 1.

REPORT ON OYSTER CULTURE BY THE DEPARTMENT'S EXPERT, 1896.

OTTAWA, 31st December, 1896.

To the Honourable
The Minister of Marine and Fisheries.

SIR,—I have the honour to submit my report on oyster culture for the season of 1896.

On the opening of navigation, I left Ottawa for the Maritime Provinces to continue the work still left unfinished from the previous season, at the close of navigation.

TRACADIE, N.S.

By the commencement of the season, beacons were placed around the area reserved for cultivation, and on the arrival of the steamer, the beds at Tracadie were examined, and while waiting the arrangements which were to be made for the planting of oysters, and their arrival, I was engaged in the removal of stones and weed from the area which was partially planted the year before, but owing to the hot weather which soon set in, I was unable to finish this work in time. Some clean shells were, however, scattered over the area. This will improve the bottom for planting purposes. These shells are also very valuable, if planted before spawning time, because they act as excellent spat collectors. On examination of the oysters planted before, I found evidence of growth, and notice that this summer's growth was rapid. They were almost too delicate to handle, and the less they were touched the better it was for them. The number of oysters planted on this bed this season was 230½ barrels from Buctouche and Bay'du Vin as well as 17½ barrels of shells.

One of the difficulties I have to contend with in the planting of oysters is to obtain them before the warm weather sets in, because as soon as the temperature of the water rises, the oysters begin to shoot out and the outside edges of the shells being exceedingly delicate and brittle, it is almost transparent. To handle, ship and transplant oysters in this condition only does them harm; they are broken by handling, this stunts their growth and in some cases these oysters are damaged to such an extent that they are actually killed. The cooler the weather, the firmer the oysters remain, and they are in better condition for transshipment and planting.

SHEDIAC, N.B.

My work being finished at Tracadie, I proceeded to Shediac in order to examine the three beds there, which were planted some time previously and which I am happy to state were found to be in a healthy condition. The oysters are growing to good sizes, and several small ones of various years growth were noticed on the reserved area. I also examined other portions of the area where no cleaning or planting has been done. On this area I found the grass gradually growing over and the silt settling upon the beds, owing to the fact that they have never been worked, and to the large amount of eelgrass which is growing over the whole area which consists of soft mud lying between the beds. On these uncultivated beds, some very fine oysters were found and an increase of small ones was noticed varying in size from the very smallest to the full grown oyster. Some time was devoted to cleaning these beds generally, as well as separating the young oysters from shells, stones or live oysters to which they were attached. By so doing the oysters grow more uniform in shape and size than when left to grow in clusters, and obtain more value on the market as a salable oyster.

Since these beds were planted, oyster spat and brood have been found growing in various places beyond the reserved area. I was also informed that some were growing at low water mark near Casey's Cape which is about six miles distant. I also visited the spit (at low water) running out from Indian Island on an area clear of seaweed and found several small oysters lying around among the mussels which abound there. I picked up a bucketful, and upon counting them, found it contained 362 small oysters of last year's spat. I then filled the same bucket with full grown oysters of a fair size, these I counted and found only 36, which shows that small oysters will grow to ten times the bulk of large ones if taken care of, and exemplifies the necessity of strictly enforcing the minimum size limit.

I regret to report some poaching on one of the beds. On my arrival here, before the ground was dredged or touched, I noticed marks of rakes on the bottom of bed No. 2, or Hannington's bed, at the southern end of the reserve. The water was clear and the bottom very easily seen. The ground had the appearance of having been recently harrowed over as if fished by rakes; the bottom being uneven where it was fished, and where left undisturbed, the sediment was thicker over the area. On close examination, I found that there were not nearly so many oysters on this bed as when I examined it last year, and what are left are very small. I also noticed a stake sticking out of one of the smaller beds I worked upon, barely awash at high water and on pulling it out, found that it had been driven into the bed with a line made fast at the lower end and attached to a piece of railway iron about three feet in length, to prevent its being washed away in case it should come out of the bottom, and to serve as a mark for some one who had no right to go there whatever. This is the first season I have noticed any poaching, and as these oysters grow to maturity they require greater vigilance on the part of the fishery officers. I am under the impression that these depredations are carried on during the night time, or in the early hours of the morning.

RICHMOND BAY, P.E.I.

My work in Shediac being completed and under instructions from the department I proceeded with the steamer to the rivers in Richmond Bay and surrounding waters for the purpose of examining the same and found them as follows:

Malpeque Bay.—I commenced my examination in Malpeque Bay on the east side, off Sandy Point and Prince Town wharf towards Keir's wharf. There are two beds of medium size called Old wharf or the Prince Town bed and Grog Island bed; the bottom of these areas is even, lying in about ten or twelve feet of water.

Although dirty in appearance when the cultch was brought to the surface by the dredge, on counting the oysters in this haul I found there 27 oysters and brood, in another haul 19 oysters and brood; this was on the Prince Town bed. On Grog Island bed the first haul brought 36 oysters, 21 brood, the second haul 31 oysters, 16 brood; the third haul 45 oysters and 17 brood. There are also some small beds in this locality of no importance. Some of these beds are caused by vessels throwing over their stone ballast with oysters and spat adhering to it, which shows that where clean soil exists, oysters are to be found.

In Shipyard River there were at one time some large oyster beds. These have been destroyed by mud-diggers, and scarcely any soil is now left suitable for oysters to grow on, as it is nearly all covered up with sediment caused by the washings and drainings of the land. This is now nearly all covered over with eelgrass. There are also some small areas at the mouth of this river with very little water over them. The ice is never very thick here, and very few oysters are to be found, these are only fished by the fishermen when the weather is too stormy to go outside; and then it is hardly worth their trouble. These areas, if applied for by persons wishing to lease them on the license system, might be granted.

Off Ramsey's lane on the south side of the channel between Keir's wharf and Little Marsh Point, mud-diggers have cut up the beds; this makes the patches so small, that very few oysters are found. These patches extend the whole length of the channel, and are now of little or no value to the fishermen; farmers still obtain their mud from these beds

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and from the middle ground on the other side of the south channel. This area is estimated at six acres and is composed of shells, sand and weed. Farmers have dug to a depth of thirty feet, without coming to the bottom of the shells. The ground is shallow and eelgrass is growing over it. In some places it is free from eelgrass, in the first haul on this area I found 41 oysters, 31 brood; on the second haul 16 oysters. Several boats commenced fishing here on the 16th September and averaged about one barrel per man per day, but the oysters have since become scarcer.

Small patches of oyster areas are to be found in the channel to the westward of the middle ground in this bay, and the hauls varied from 10 to 20 oysters and about the same quantity of brood.

This bay is bounded on the west by Bunbury or Big Curtain Island and Little Curtain Island. On Big Curtain Island the oysters are very numerous about low water mark. They attach themselves to the rocky ledges projecting from the north-east, northerly and north-west points. They are also picked up around the island on the flat sandy shores extending some distance out from high water mark. They are likewise found in large quantities between Big and Little Curtain Island and on the east side of Little Curtain Island on the sandy flats, and on Beech Point rocks which lie midway between Beech Point and Little Curtain Island. A person can wade at low water from Beech Point to Little Curtain Island, and from Little Curtain Island to Big Curtain Island which almost dries at low water spring tides.

A large number of the oysters which adhere to the soil around these islands never grow to maturity being killed by the ice in winter. They make excellent oysters for transplanting purposes being very clean, and easily obtained, as they can be picked by hand when the tide is out. The oysters which grow on the flats are single and very even in shape and size. Oysters are also found attached to the rocks at low water mark on Grover or Little Indian Island, which lies to the north of Malpeque Bay.

In Richmond Bay the oyster beds are located off the north-west part of Curtain Island, running in the whole length of the bay around Gull Point up to Shemody Creek. The beds on the outer part of the bay lie between Curtain Island and Cape Malpeque or Charles Point on the north, down to Taylor's Point and Gull Point on the south side, and are in deep water, although there are found some shoal patches off Curtain Island reef, Lot 16, and Gull Point runs off a long way with shallow water; oysters are found on all these places. Some of the beds situate within the above area are in about 20 feet of water, and very fine single oysters are obtained. They are about 5 or 6 inches long and fully developed. These oysters realize the best price in the market. This bay may be said to be a continuous oyster bed, for no sooner one is off one bed than another one is met with. The soil on the outer part of the bay is firmer than the inner part.

There are reefs and rocks running off the west shore of this bay between Cape Malpeque, Lot 16 and Gull Point; where oysters are taken from by means of narrow tongs made and used expressly for rocky bottoms. On the deep beds, tongs 23 feet long are used, these can only be worked during slack tide, the current being so strong that it sweeps the tongs from the bottom, or the contents of the tongs are washed away before they reach the surface, so that the fishermen are unable to use them only at slack water. I boarded a boat fishing northwest of Curtain Island where two men were using tongs on a bed in 20 feet of water. Their tongs were 23 feet long; they had caught about 3 bushels between them at 9.30 a. m. They stated that with strong tides they were unable to use their tongs on account of the weight of water. I have a dredge and caught 14 large oysters and 56 brood from this very bed.

In Oyster Cove there is quite a large bed in about 5 feet at low water. Mud digging is carried on to a small extent on the north side of this area. Very few oysters are taken from this bed; occasionally a man may fish on it and obtain a few. This would be a good area for cultivating purposes.

From Taylor's Point to Indian River and Barbara Weit River, continuous beds are found and on some of them there were some very good hauls, I had two hauls on a large bed off Mr. John McDonald's, M.P., shore with 24 oysters, 53 brood and 34 oysters and 50 brood. Further on towards the entrance of Indian River I had two more hauls on a large bed with 34 oysters, 86 brood and 40 oysters and 120 brood. The oysters on

all these beds looked very healthy, growing nicely and the beds appeared to be well stocked with oysters and brood, for natural beds.

Indian River seems as if it had been cut to pieces by mud-diggers. There are a few small patches of oyster beds in shallow water at the entrance with scarcely any oysters on them, but these could be used by individuals for transplanting purposes.

Fishermen report that where dredges have been used, off Townsend's Point the oyster beds are in a better condition. Mosies bed has been fished with dredges and the men state that more small oysters are found there than anywhere else. The men fishing off Lock shore on 40 acre lot also state that the oysters are of a larger sample than last year.

Barbara Weit River is in about the same condition as *Indian River*. I was informed that twenty years ago, this river had very fine oyster fishing grounds, as the beds extended the whole width of the river, and ran a long way up; but now, there is nothing but a shallow patch at the mouth where the water does not freeze sufficiently thick to allow mud diggers to work upon it. Very few oysters are found on this bed. Mud digging is carried on around the mouths of these rivers and off Chichester or Mill's Point, as well as up the bay along Lock Shore and Old Store to Shemody Creek. This area is cut to pieces by mud-diggers, also Lot 16 Cove. The men are now gradually working further out in the bay. Large numbers of boats fish oysters from Bentick or Gull Point right into Shemody Creek.

In Grand River oyster fishing is carried on the whole way up the river to the bridge. Very little fishing is done above bridge as the oysters are not so good. At the bridge the rivers divide off into three arms; Trout River, Smelt River and the Goose Pond. Mud digging has been carried on here, although the beds are not numerous. The oysters are also of an inferior quality as the water is brackish and the soil very soft. The oysters are very sharp, grow fast, in clusters, and are of an insipid flavour. The same may be said of the other arms lower down the river, viz.: the south-west arm on the right hand side coming down the river and Plaster Creek on the left. Oysters improve the lower down the river they are taken, and those caught below the ferry, are equal to the bay oysters taken off Curtain Island. On the 22nd September there were 136 boats fishing oysters between Grand River ferry and the bridge a distance of about four miles. In most of the boats there were two men fishing, and as a rule they averaged from one and a half to two barrels per man. Fishermen in Grand River and Richmond Bay report that oysters appear to be of a larger sample than those of last year and more small ones are to be found.

In Trout River, at the upper part the oysters are very thin, sharp and in clusters. They are found on small narrow ridges and in the mud, and are of little commercial value. At the lower end and mouth of the river, men were fishing, and these oysters were found to be slightly superior to those higher up the river. The men found the oysters scarce, but reported large quantities of small ones. They averaged about a barrel a boat per day. The beds are continuous with the exception of where they have been cut up by mud-diggers in the past.

Bideford River was found to be in about the same condition as Trout River at the upper part.

No fishing of any importance is carried on above Richard's Wharf; from there down, the beds become more numerous as far as Bird Island. The oysters also improve in quality the further down they are fished. Beds are found the whole way down the river. There are different kind of oysters taken from this river. Some of the beds are of a muddy bottom, while others are on sandy spits or points of the river. Those taken from muddy bottoms are large, long oysters in clusters. When taken, they are half buried in the mud, while those fished from the firm beds are smaller in size, of a much more regular shape and are taken more singly. There is a bed known as the Cooper bed on the opposite side of the channel abreast of the narrows with a very firm bottom, and fine oysters are taken from it, but they appear to be scarce, the men catching not more than half a barrel each per day, although there appear to be large quantities of small oysters which is a very good sign. On the points at the entrance of the narrows channel, the oysters taken there are rougher in appearance; the bottom is of a soft and

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muddy nature. In the narrows, the oysters are smaller, regular in size and shape, but of a good quality.

Between Bird and Hog Islands there is a long and narrow bed, very few oysters are taken from it now, although large quantities were taken formerly. Very little oyster fishing is done in the northern part of the bay which lies between Little Indian and Curtain Islands on the South, and Bird and Hog Islands on the North.

Oyster fishing is carried on to an enormous extent over the whole of this area, and it is astonishing how such a fishery can stand the strain so long. Excessive fishing is gradually depleting these beds; it is reported that more men were fishing this season than at any other time before and wherever a person happens to go over the water, boats are to be seen fishing on one bed or another, or picking oysters from the shoals and ledges running off from the islands and shores.

OYSTER FISHING SEASON IN RICHMOND BAY, ETC.

With reference to the waters of Richmond Bay, Grand River, &c., I desire to point out that a large number of fishermen spoke to me regarding the commencement of the oyster fishing season in these waters. They are one and all strongly of the opinion that shortening of the season would be a great advantage. They earnestly recommend that the beginning of oyster fishing be on the 1st of October in each year, to remain open until the close of navigation, and that no spring fishing be allowed. This, if carried out, would limit the number of oysters taken from Richmond Bay, and I have no doubt would have a decided beneficial result upon this industry, for the following reasons:—

1st. At the commencement of the existing season (16th September), the weather, as a rule, is too warm for storage and safe shipment. The oysters often arrive at their destination in a weak and poor condition, neither will they keep any length of time, as they have not finished growing; the outer part of the shell being very thin and brittle, while it hardens as the weather grows cooler.

2nd. The weather being warm, when it is fine every one who can handle tongs, will fish all day. The market thus becomes glutted, the price falls, giving very small returns to the regular fishermen.

3rd. If the season only began on the 1st October, the shell would become harder, the weather being cooler, and the chances are that less people would engage themselves in the industry. The oysters would keep better, and would not be so much injured, or the loss so great in transit, and in consequence the men would have every reason to expect better prices.

MUD DIGGING IN RICHMOND BAY.

It is alleged that mud digging is not carried on to the same extent as it was formerly. In most of the rivers, digging is carried on where there are sunken beds, that is to say, beds covered over with sediments of mud of various depths. Soft mud is also obtained at the heads of rivers where the water is brackish and the oysters (if any) of inferior quality; but in the bay, diggers are gradually working their way further from shore every year, and people there are not so particular as to the nature of the beds, whether alive or dead. For the protection of the fishermen themselves and the preservation of this valuable industry, I would suggest that a limited area be drawn in the bay, that is, in Malpeque Bay, lot 16, Grand River, and from Oyster Cove round to Mill's Point up to Shemoody Creek; that no mud digging be allowed beyond a quarter mile limit from shore, and then only on the dead beds. These areas might be dug upon for years to come, without going outside the above limit and would protect the offshore beds. All fishermen agree in saying that a serious injury is done to beds which are worked on and adjoining beds where the digger has been working, besides actually destroying the area worked upon. The valuable oyster industry should be protected for the benefit of fishermen in the future, as it is one of the sources where ready cash is brought to the island for distribution among fishermen, truckmen, merchants and others.

NORTH OR YORK RIVER.

Having finished Richmond Bay, I proceeded to Charlottetown for the purpose of examining North River (reserved by Order in Council of 4th December, 1893) in order to ascertain whether the beds were in a fit condition to allow public fishing.

I began my examination at the upper part of the reserve, at Forkey Creek. Only a few oysters and small oyster brood were found as far as the lower part of Scott's Island. This area is composed of soft mud, with very little soil left for oysters to grow upon, as the mud-digger has cut up most of it. From the lower part of Scott's Island down to North River bridge (the lower part of the reserve), oysters and brood were found in large quantities, growing on the sides of the channel, the beds are disjointed as far as the creek which runs in towards Dr. Jenkin's estate. From there down to the end of the reserve the beds are larger and more numerous; in fact it is one continuous oyster bed, with the exception of spots divided by mud digger cuts. The oysters are full grown, and the area literally covered with them. I examined the river in a boat with two fishermen, using a pair of tongs; the tongs when brought up were full of oysters and brood.

This area is clean, free from silt, oysters look very healthy, and in no way deteriorating in quality or quantity. It is natural for oysters in this river to grow in clusters, although they can be easily separated, and single oysters are to be found scattered over the area. The small ones are growing well; they are looking healthy and clean.

Since my examination, this area has been thrown open by the department to fishermen holding licenses, and I was informed that they landed over 500 brrrels as the result of their first day's labour. They have had good catches since, which goes to show that the setting apart of this area from the public has had the desired effect. I do not entertain the slightest doubt, that if other areas were closed for certain periods, it would have an identical effect; and I am happy to be able to state that this particular area has proved an excellent test case.

GEORGETOWN.

Having finished at North River I proceeded to Georgetown for the purpose of examining Brudenell, Montague, Boughton or Grand, and Cardigan rivers as well as Launching and St. Mary's bays in order to ascertain if any of the above areas were suitable for the preparation of beds for planting oysters. I found these rivers in the following condition:—

In Brudenell River from the upper part where mud digging has been, and is still carried on, mussels are growing, and the shells of old beds are found covered up with a coating of soft mud varying from one to five feet. These are termed sunken beds; the soil in the channel is composed of soft rotten mud. The sides are firm covered with eelgrass, and a sediment lying upon it from two to eight inches thick. The firm area in most cases is known, and consist of a sandy substance. The only available place for planting in this river lies between Brudenell or Gordon Island and Norton's Creek down to Bourke's Point. Mr. D. A. Mackinnon, M.P.P., has an area of about two acres leased here. I examined this area and found it firm, but covered with eelgrass. A few oysters were planted first above it in shallow water by a Mr. Delory, a resident near the shore. He informed me that the oysters grew, and several young ones were found attached to the woodwork of a bridge crossing Norton's Creek.

The water appears suitable for oysters to grow in, but there is no soil for the spat to attach itself to after it is emitted by the parent oyster, and this spat would therefore be smothered or lost in the eelgrass or mud.

Montague River from the bridge downwards was found to be in about the same condition as the Brudenell. A small patch called the middle ground, about 3 or 400 feet square was found just above French Creek. The bottom extends off shore some little distance. It is a firm sandy bottom, thickly covered with eelgrass lying in about 8 or 10 feet of water. Another more extensive area found just below lower Montague

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wharf running down towards the ferry wharf. This is also covered with eelgrass ; the bottom is very firm but there are no shells.

Grand River in the upper part off Johnson's old wharf, mud digging is still carried on. Some hard firm spots were found and the dredge showed that mussels were growing in large quantities. Nine oysters were caught in three hauls. This area seemed to be a very narrow ridge, not more than 6 or 9 feet wide left by the mud-diggers. The oysters were very large, of inferior quality, very irregular in shape and no sign of small ones. Mussels completely overgrew everything that was there. This area is very small and of no use for culture. One man informed me that he had taken a barrel of oysters from it some time ago. The sides of this river are steep, the shores firm, and covered with eelgrass, and the bottom of the channel composed of soft mud. The only place that seemed at all suitable for oyster culture was off Malcom's Cove, opposite Red Point. Here the soil is very much the same as in other rivers ; outside this area, the bottom is composed of stones and rock and is rough. No other place was found in any way suitable.

In Cardigan River mussels were noticed growing on some old oyster beds, where mud digging has been carried on ; a few old oyster shells were also found in a cove just below the wharf at Cardigan. Beyond this, nothing of importance was found ; the sides and channel of the river being the same as the others.

In Launching Bay at the mouth of Cardigan River the bottom appeared to be of a gravelly nature by the feel of the sounding pole. It was, however, impossible to obtain any soil with the dredges there being so much eelgrass growing. This ran along shore a considerable distance ; further off shore the bottom was soft and muddy.

St. Mary's Bay was found to be in about the same condition as other areas examined in this locality. In shallow water, the bottom being firm, covered with eelgrass, in deeper water the bottom became softer, and the soil was of a very black soft nature.

A firm area was found off Reynold's Point on the left hand side of the entrance to Oyster Creek, although covered with eelgrass. On the north side of St. Mary's bay off Panmure Island the soil appeared to be firm and gritty running a considerable distance off shore into about eight feet of water, where the bottom becomes soft and muddy.

The areas which I have mentioned as being firm, could be cleaned, shelled and planted as an experiment, if desired, or could be leased to any one making an application for them.

I can scarcely see where there would be any advantage in planting any of these areas as there is no soil suitable for the reception of spat, beyond the area which would be prepared. If the spat fell among the mud or eelgrass, it would never come to maturity, and would be smothered as soon as it fell.

Having completed the above work and the season being well advanced with the weather becoming so wild, I closed up with the services of the steamer "Zaidee" when she immediately returned to North Sydney, C.B.

YARMOUTH, N.S.

On proceeding to Yarmouth for the purpose of examining Eel Brook River, Salt Lake, Tusket River and Goose Bay, with a view of ascertaining the nature and suitability of the soil for oyster culture, I found the areas in the following conditions :—

At the upper part of Eel Brook about a quarter of a mile below the bridge I found a hard bottom on the western side of the channel, composed of a firm sediment of mud and eelgrass. Underneath this sediment which is from four to eight inches thick, decayed oyster shells were noticed. Towards the eastern side of the channel the bottom becomes very soft, the hard ground appears to form a very narrow ridge, the channel itself is very narrow, lower down towards the sluice or fall, the soil becomes soft over the whole width of the channel.

In the lower part of the lake the bottom is firm with eelgrass, and the area larger. The depth of water was about 16 to 18 feet, the bottom has a coating of mud about six inches thick, underneath this, dead oyster shells were found. I then examined the area in deep water to the eastward of and above the fall. The bottom is composed of very

large stones and a rough bottom ; the lake, so called, has been dammed up from time to time, the current has been diverted, which stops the course and circulation of the water and I am of the opinion that the water is too stagnant at the bottom, and the mud taken from there has a very offensive odour ; the water is brackish, and at the falls the bottom is shallow, there being a deep basin with no outlet to cleanse the bottom.

Shells can be found along the lands adjoining this brook and lake. A huge pile of shells is also lying on an island covered over with about a foot of earth. These shells are lying from eighteen inches to two feet in thickness. They appear to have been collected by Indians in the past, as flint arrow heads and chips of flint have been found here which do not abound in the locality unless imported by them. On examining the area I found an arrow head among the shells which points to the Indians camping here in the past. Since these areas have been dammed up there is no natural outlet (except the falls) and the sediment has since settled upon the beds and destroyed them.

Mr. Louis Potier, of Yarmouth, very kindly gave me all the information and assistance in his power and accompanied me during the examination of the areas. He has been keeping notes and experimenting in the brook and river from time to time ; I have taken an extract from his diary on the subject which is as follows :—

“The nature of the bottom varies, in some places. In channel it consists of mud, sand and gravel, old oyster shells, clay, rocks, &c.

“My first planting was 28th October, 1892, of about two bushels. On 5th July, 1894, I raised four oysters in first-class condition, and all of them from this planting. Second planting in boxes was 5th December, 1893 (in very cold weather), consisting of three boxes of seven pounds each, one box of three and a half pounds, this lot I put in on the west side of channel directly opposite Potier's Ledge.

“5th July, 1894, I raised one box from second planting, and examined it carefully and found the oysters in grand condition with an increase in weight. The third planting (consisting of half a bushel loose on the river) was in July, 1893. In September, 1893, I examined those planted in 1892, and found them all right. July, 1894, Mr. Sylvain Potier's son in taking up a killock hauled up a lot of mud mixed with old oyster shells only a short distance from where first planting of oysters was, and was surprised to find a number of young ones nearly as large as a fifty cent piece.”

While examining this area a box of Mr. Potier's oysters was raised which he planted on 5th December, 1893, these oysters were nearly all dead and dying. There seemed to be nothing in them, as they appeared to be starved out.

I do not consider this place suitable for oyster planting, as these beds have become extinct with a depth of from 12 to 20 feet of water, and I consider it due to the above mentioned causes.

I next tried off Rocky Point, where Abrams River joins Eel Brook River down to Passe au Chac and Birch Point. At the upper part the bottom is composed of hard rough ground, covered with large stones and spongy seaweed with a strong current. Lower down this soil is composed of stiff black clay. Mr. Potier planted some oysters (loose) here. We were unable to find them on account of the water being so thick, owing to the heavy rains and very high tides which were so frequent of late. Lower down, near the upper side of Birch Point, the bottom is rough and weedy, composed of smaller stones. I caught a large lobster in the dredge. From Birch Point to Sluice Point (Surrett Island) the current is very strong.

In Tusket River I tried in the roadstead at the Mussel ground. The bottom is rough and composed of large stones. This was in about six fathoms of water. In the upper part of the river at Little Birch Island, abreast of Plymouth, I found the bottom very rocky with a swift current. No soil was found suitable for planting oysters there.

I also examined a portion of Goose Bay lying between Tusket Wedge and Comeau's Hill, and found the bottom of the channel to consist of very firm and clean clay, with a sediment of small clam shells, which have been washed from off the surrounding flats by the current. No life was noticed here during the examination, but it is the most suitable place that I have seen in this locality where oysters might be planted as an experiment. This area would require shelling before planting. The current is not so strong as in other rivers ; the area is sheltered by extensive mud flats which uncover at low

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water, and the tides ebb and flow to and from the sea. No other area was found equally suitable as this, during my examination. There is a very extensive water area in this locality, but time would not permit of examining the whole.

BAY DU VIN, N.B.

Having concluded my examination at Yarmouth I proceeded to Bay du Vin to examine the oyster beds there, for the purpose of ascertaining the cause of depletion, etc.

On my arrival there I found the bay and river frozen over. The department was asked whether this area could be divided into sections for the preservation and protection of the oyster beds, but was unable to do anything until I personally examined it. The area in question which is about six miles long is annually fished by fishermen many of whom come from a distance. They are reported to load their schooners, irrespective of size and the consequence is that oysters are taken from the beds before they are full grown, with the result that these areas, the most valuable in New Brunswick, are becoming depleted through overfishing.

GENERAL REMARKS.

Temperature

During the past three seasons while on board the steamer, from the commencement to the close of each season, I have noted the temperature of the water (Sundays excepted) and found it to be as in the following table. The waters of the Maritime Provinces rise to a sufficiently warm temperature, and there is no reason why there should not be a spat fall each year, were the grounds in a fit condition to receive the same. With careful attention, I do not see why certain areas, after being restocked, should not be as prolific as they originally were.

The bays and rivers around the shores where oysters exist are to some extent land locked which gives a more even temperature than in the waters outside; thus I have noticed, when steaming from one port to another, that the water outside was lower than that in the bays and rivers.

TEMPERATURE of water during Month of
MAY.

Date.	1894.			1895.			1896.		
	Day.	Locality.	Tem.	Day.	Locality.	Tem.	Day.	Locality.	Tem.
1									
2									
3									
4									
5							M.	Tracadie Har., N.S.	44
6							Tu.		43
7							W.		44
8							Th.		45
9							Fri.		46
10							Sat.		47
11							Sun.		
12							M.		50
13				M.	Tracadie Har., N.S.	47	Tu.		46
14				Tu.	do	52	W.		44
15				W.	do	52	Th.		47
16				Th.	do	43	Fri.		48
17				Fri.	do	47	Sat.		49
18				Sat.	do	44	Sun.		
19				Sun.	do		M.		51
20				M.	do	48	Tu.		51
21				Tu.	do	56	W.		52
22				W.	do	55	Th.		53
23				Th.	do	58	Fri.		50
24				Fri.	do	48	Sat.		51
25				Sat.	do	49	Sun.		
26				Sun.	do		M.		50
27				M.	do	54	Tu.		51
28				Tu.	do	52	W.		49
29				W.	do	57	Th.		50
30				Th.	do	56	Fri.		52
31				Fri.	do	54	Sat.		50

JUNE.

1	Fri.			Sat.	Tracadie Har., N.S.	56	M.	Tracadie Har., N.S.	49
2	Sat.			Sun.	do		Tu.	do	51
3	Sun.			M.	do	53	W.	do	53
4	M.	Shediac Harbour, N.B.	56	Tu.	do	57	Th.	do	53
5	Tu.	do	56	W.	do	54	Fri.	do	54
6	W.	do	57	Th.	do	55	Sat.	do	56
7	Th.	do	56	Fri.	do	55	Sun.	do	
8	Fri.	do	55	Sat.	do	56	M.	do	55
9	Sat.	do	56	Sun.	do		Tu.	do	56
10	Sun.	do		M.	do	58	W.	do	56
11	M.	do	58	Tu.	do	56	Th.	do	55
12	Tu.	do	55	W.	do	61	Fri.	do	54
13	W.	do	58	Th.	do	58	Sat.	do	54
14	Th.	do	60	Fri.	do	60	Sun.	do	
15	Fri.	do	62	Sat.	do	60	M.	do	56
16	Sat.	do	64	Sun.	do		Tu.	do	56
17	Sun.	do		M.	do	61	W.	do	56
18	M.	do	62	Tu.	do	65	Th.	do	62
19	Tu.	do	63	W.	do	64	Fri.	do	60
20	W.	do	64	Th.	do	66	Sat.	do	60
21	Th.	do	63	Fri.	do	63	Sun.	do	
22	Fri.	do	63	Sat.	do	55	M.	do	61
23	Sat.	do	62	Sun.	do		Tu.	do	62
24	Sun.	do		M.	do	58	W.	do	61
25	M.	do	61	Tu.	do	56	Th.	do	62
26	Tu.	do	65	W.	do	55	Fri.	do	61
27	W.	do	65	Th.	do	59	Sat.	do	62
28	Th.	do	60	Fri.	do	61	Sun.	do	
29	Fri.	do	63	Sat.	do	60	M.	do	64
30	Sat.	do	65	Sun.	do		Tu.	do	60

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TEMPERATURE of Water during Month of JULY.

Date.	1894.			1895.			1896.		
	Day.	Locality.	Tem.	Day.	Locality.	Tem.	Day.	Locality.	Tem.
1	Sun.	Shediac Harbour, N.B.	65	M.	Tracadie Har., N.S.	55	W.	Tracadie Har., N.S.	60
2	M.	do	65	Tu.	do	59	Th.	do	63
3	Tu.	do	68	W.	do	62	Fri.	do	60
4	W.	Left Shediac for Tracadie, N.S.	55	Th.	do	67	Sat.	do	62
5	Th.	Tem. taken at sea	55	Fri.	do	66	Sun.	do	61
6	Fri.	Tracadie Har., N.S.	63	Sat.	do	65	M.	do	61
7	Sat.	do	62	Sun.	do	64	Tu.	do	61
8	Sun.	do	63	M.	do	64	W.	do	61
9	M.	do	63	Tu.	do	65	Th.	do	63
10	Tu.	do	61	W.	do	65	Fri.	do	66
11	W.	do	62	Th.	do	66	Sat.	do	66
12	Th.	do	62	Fri.	do	67	Sun.	do	68
13	Fri.	do	63	Sat.	do	64	M.	do	68
14	Sat.	do	65	Sun.	do	66	Tu.	do	69
15	Sun.	do	64	M.	do	66	W.	do	70
16	M.	do	64	Tu.	do	63	Th.	do	69
17	Tu.	do	63	W.	do	63	Fri.	do	68
18	W.	do	65	Th.	do	64	Sat.	Wallace Harbour	67
19	Th.	do	64	Fri.	do	65	Sun.	At sea	65
20	Fri.	do	66	Sat.	do	66	M.	Shediac Harbour, N.B.	72
21	Sat.	do	67	Sun.	do	66	Tu.	do	71
22	Sun.	do	69	M.	do	66	W.	do	72
23	M.	do	70	Tu.	do	66	Th.	do	72
24	Tu.	do	70	W.	Sailed from Tracadie.	63	Fri.	do	70
25	W.	do	69	Th.	Arrived in Shediac	62	Sat.	do	69
26	Th.	do	68	Fri.	Shediac Harbour, N.B.	67	Sun.	do	69
27	Fri.	do	68	Sat.	do	68	M.	do	70
28	Sat.	do	70	Sun.	do	67	Tu.	do	71
29	Sun.	do	72	M.	do	67	W.	do	72
30	M.	do	67	Tu.	do	67	Th.	do	72
31	Tu.	do	67	W.	do	67	Fri.	do	71

AUGUST.

1	W.	Tracadie Har., N.S.	65	Th.	Shediac Harbour, N.B.	66	Sat.	Shediac Harbour, N.B.	68
2	Th.	do	62	Fri.	do	66	Sun.	do	68
3	Fri.	do	68	Sat.	do	67	M.	do	68
4	Sat.	do	70	Sun.	do	66	Tu.	do	69
5	Sun.	do	70	M.	do	66	W.	do	69
6	M.	do	70	Tu.	do	68	Th.	do	70
7	Tu.	do	69	W.	do	69	Fri.	do	69
8	W.	do	70	Th.	do	70	Sat.	do	69
9	Th.	do	68	Fri.	do	69	Sun.	do	69
10	Fri.	do	66	Sat.	do	68	M.	do	71
11	Sat.	do	67	Sun.	do	67	Tu.	do	72
12	Sun.	do	66	M.	do	67	W.	do	72
13	M.	do	66	Tu.	do	67	Th.	do	72
14	Tu.	do	67	W.	do	67	Fri.	do	72
15	W.	do	66	Th.	do	68	Sat.	do	72
16	Th.	do	66	Fri.	do	69	Sun.	do	72
17	Fri.	do	65	Sat.	do	70	M.	do	72
18	Sat.	do	66	Sun.	do	68	Tu.	do	71
19	Sun.	do	60	M.	do	68	W.	do	69
20	M.	do	61	Tu.	do	66	Th.	do	68
21	Tu.	do	61	W.	do	65	Fri.	do	68
22	W.	do	64	Th.	do	64	Sat.	do	68
23	Th.	do	64	Fri.	do	63	Sun.	do	68
24	Fri.	do	64	Sat.	do	64	M.	do	68
25	Sat.	do	65	Sun.	do	64	Tu.	do	68
26	Sun.	do	64	M.	Shediac to Ch't'n, PEI	63	W.	do	69
27	M.	do	64	Tu.	Ch't'n to Murray Har.	60	Th.	do	69
28	Tu.	do	63	W.	Murray Harbour	62	Fri.	do	68
29	W.	do	64	Th.	do	63	Sat.	do	67
30	Th.	do	63	Fri.	do	64	Sun.	do	67
31	Fri.	do	63	Sat.	Charlottetown	64	M.	Point du Chêne	65

TEMPERATURE of water during the month of
SEPTEMBER.

Date.	1894.			1895.			1896.		
	Day.	Locality.	Tem.	Day.	Locality.	Tem.	Day.	Locality.	Tem.
1	Sat.	Tracadie Har., N.S.	62	Sun.	Charlottetown, P.E.I.	66	Tu.	Point du Chêne.	65
2	Sun.	do	62	M.	do	66	W.	Pt. du Chêne to Tignish, P.E.I.	58
3	M.	do	55	Tu.	West River, P.E.I.	66	Th.	Tignish Harbour.	58
4	Tu.	do	57	W.	do	66	Fri.	do	62
5	W.	do	59	Th.	do	66	Sat.	Malpeque.	61
6	Th.	do	58	Fri.	do	64	Sun.	do	61
7	Fri.	do	56	Sat.	do	65	M.	Richmond Bay	61
8	Sat.	do	54	Sun.	do	64	Tu.	do	63
9	Sun.	do	54	M.	do	64	W.	do	63
10	M.	do	56	Tu.	East River, P.E.I.	64	Th.	do	65
11	Tu.	do	60	W.	do	63	Fri.	do	67
12	W.	do	58	Th.	do	62	Sat.	do	66
13	Th.	do	58	Fri.	North River, P.E.I.	60	Sun.	do	64
14	Fri.	do	57	Sat.	do	59	M.	do	64
15	Sat.	do	59	Sun.	do	59	Tu.	do	63
16	Sun.	do	61	M.	Pownal Bay, P.E.I.	58	W.	do	62
17	M.	do	61	Tu.	Charlottetown	57	Th.	do	63
18	Tu.	do	63	W.	Orwell River	56	Fri.	do	62
19	W.	do	61	Th.	Vernon River	56	Sat.	Grand River.	61
20	Th.	do	62	Fri.	East River	58	Sun.	do	59
21	Fri.	do	61	Sat.	Charlottetown	57	M.	do	59
22	Sat.	do	60	Sun.	do	57	Tu.	do	59
23	Sun.	do	60	M.	Pinnette	58	W.	Malpeque Bay.	55
24	M.	do	60	Tu.	do	59	Th.	do	55
25	Tu.	do	58	W.	Ch't'n to Summerside	60	Fri.	Bideford	56
26	W.	do	52	Th.	Summerside, P.E.I.	60	Sat.	Malpeque.	56
27	Th.	do	56	Fri.	do	58	Sun.	do	55
28	Fri.	do	56	Sat.	do	56	M.	do	55
29	Sat.	do	56	Sun.	do	56	Tu.	Trout River.	55
30	Sun.	do	56	M.	do	56	W.	Malpeque.	55

OCTOBER.

1	M.	Tracadie Harb., N.S.	52	Tu.	Summerside, P.E.I.	56	Th.	Tignish Harbour.	54
2	Tu.	do	51	W.	do	55	Fri.	do	53
3	W.	do	52	Th.	do	56	Sat.	do	53
4	Th.	do	54	Fri.	do	55	Sun.	do	53
5	Fri.	do	60	Sat.	S. side to Pt. du Chêne	56	M.	do	53
6	Sat.	do	56	S.	Point du Chêne.	56	Tu.	do	52
7	Sun.	do	56	M.	do	54	W.	do	52
8	M.	do	53	Tu.	do	54	Th.	do	52
9	Tu.	do	52	W.	do	53	Fri.	do	52
10	W.	do	55	Th.	do	50	Sat.	do	51
11	Th.	do	55	Fri.	do	48	Sun.	do	51
12	Fri.	do	53	Sat.	do	49	M.	Point du Chêne.	50
13	Sat.	do	51	Sun.	do	49	Tu.	do	50
14	Sun.	do	51	M.	do	51	W.	do	49
15	M.	do	52	Tu.	do	49	Th.	do	49
16	Tu.	do	49	W.	do	49	Sat.	do	49
17	W.	do	48	Th.	do	49	Sat.	Pt. du Chêne to Charlottetown.	48
18	Th.	do	47	Fri.	do	48	Sun.	Charlottetown.	48
19	Fri.	do	49	Sat.	do	46	M.	do	48
20	Sat.	do	48	Sun.	do	46	Tu.	Charlottetown to Georgetown.	53
21	Sun.	do	47	M.	do	44	W.	Brudenell river.	52
22	M.	do	47	Tu.	Point du Chêne to Shemogue.	45	Th.	Georgetown.	52
23	Tu.	do	47	W.	Shemogue.	46	Fri.	do	50
24	W.	do	47	Th.	do	44	Sat.	do	50
25	Th.	do	47	Fri.	Shemogue to Wallace	43	Sun.	do	44
26	Fri.	do	48	Sat.	Wallace River.	42	M.	do	44
27	Sat.	do	47	Sun.	do	46	Tu.	do	49
28	Sun.	do	47	M.	do	45	W.	do	48
29	M.	do	47	Tu.	do	46	Th.	do	47
30	Tu.	do	47	W.	do	45	Finished with steamer for season.
31	W.	do	48	Th.	Fox Harbour.	43

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TEMPERATURE of water during the month of NOVEMBER.

Date.	1894.			1895.			1896.		
	Day.	Locality.	Tem.	Day.	Locality.	Tem.	Day.	Locality.	Tem.
1	Th.	Tracadie Harb., N.S.	48	Fri.	Wallace, N.S.	44			
2	Fri.	do	48	Sat.	do	44			
3	Sat.	do	48	Sun.					
4	Sun.	do		M.	Wallace to Tatamagouche	44			
5	M.	do	46	Tu.	Malagash Bar	41			
6	Tu.	do	45	W.	do	41			
7	W.	do	42	Th.	do	45			
8	Th.	do	42	Fri.	Tatamagouch to Brule	44			
9	Fri.	do	42	Sat.	Brule, N.S.	44			
10	Sat.	do	40	Sun.	do				
11	Sun.	do		M.	do	42			
12	M.	do	41	Tu.	do	40			
13	Tu.	do	39	W.	Brule to Pictou	41			
14	W.	do	41	Th.	Pictou to Tracadie	40			
15	Th.	do	40	Fri.	Tracadie Harbour	42			
16	Fri.	do	42		Finished for Season				
17	Sat.	do	43						
18	Sun.	do							
19	M.	do	36						
20	Tu.	do	34						
21	W.	do	32						
22	Th.	do	36						
23	Fri.	do	32						
24	Sat.	do	34						
25	Sun.	do							
26	M.	do	34						
27	Tu.	do	35						
28	W.	do	34						
29	Th.	do	32						
30	Fri.	Bay frozen over, finished for season							

THE YEARLY CATCH.

The following table compiled from annual reports of the Department of Fisheries shows the annual catch of oysters in the different provinces since 1869. These oysters were all taken from natural beds, and until very recently, no active steps have been taken to protect this valuable industry. Where the public demand is now greater than the supply, oysters are becoming more valuable in the market, and where areas are to be found they are now fished to excess. This must eventually ruin the industry if the evil is not checked in time.

Most of the men engaged fishing for oysters have other callings to attend to. While the season is open, fishing is prosecuted with vigour, not only during the open season but in close time as well; as poachers will always find a ready market for their wares.

Besides oyster fishing these men obtain employment during winter months in digging mussel mud from the beds, which is hauled on shore in very large quantities. The grounds have thus yielded a twofold return, but the latter system has proved very injurious to the former by yearly contracting the areas. The oyster grounds are in consequence not so productive nor so large as if mud digging had never been carried on.

TABLE showing the Aggregate Quantities and Value of Oysters caught in the Dominion since 1869, compiled from Annual Reports of the Department of Fisheries.

YEAR.	New Brunswick.		Prince Edward Island.		Nova Scotia.		British Columbia.		Totals.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Brls.	\$	Brls.	\$	Brls.	\$	Brls.	\$	Brls.	\$
1869	600	1,800							600	1,800
1870	14,000	42,000							14,000	42,000
1871	13,150	39,450							13,150	39,450
1872	24,620	73,860			200	600			24,820	74,460
1873	15,160	45,480	146	236	12,128	36,384			27,288	81,864
1874	12,830	38,490	41	82	1,342	4,026			14,318	42,772
1875	10,020	30,060			1,655	4,965			11,716	35,107
1876	7,911	23,733	7,905	23,715	1,040	3,120			16,856	50,568
1877	7,738	23,214	20,850	62,550	980	2,940			29,568	88,704
1878	11,270	33,810	17,902	53,706	918	2,754			30,080	90,270
1879	9,420	28,260	18,145	54,435	1,067	3,201			28,632	85,896
1880	12,280	36,840	20,297	60,891	1,861	5,583			34,338	103,314
1881	8,413	25,239	20,815	62,445	2,270	6,810			31,498	94,494
1882	5,859	17,577	57,042	171,126	1,745	5,235			64,646	193,938
1883	10,317	30,951	38,860	116,640	1,343	4,029			50,540	151,620
1884	11,851	35,553	28,290	84,870	1,595	4,785	220	1,250	41,956	126,458
1885	27,368	82,104	23,204	84,612	1,310	3,930	250	1,250	57,132	171,896
1886	28,043	84,125	33,125	99,375	1,397	4,191	300	2,100	62,905	189,915
1887	23,196	69,588	36,448	109,344	1,716	5,148			61,360	187,580
1888	16,384	49,152	35,861	107,588	1,589	4,767	1,200	2,400	55,034	163,907
1889	17,760	53,280	41,257	123,771	2,532	7,596	1,500	5,250	63,049	189,877
1890	16,710	50,130	35,203	105,609	3,013	9,039	1,750	7,000	56,676	171,878
1891	14,934	44,802	41,030	123,080	4,378	12,954	750	3,000	61,032	183,846
1892	17,840	53,520	32,937	98,811	3,776	11,328	1,000	4,000	55,533	167,959
1893	16,365	49,095	23,627	88,881	3,488	10,464	1,600	8,000	51,080	156,440
1894	16,960	67,840	24,055	96,220	2,512	7,536	1,600	8,000	36,127	182,108
1895	18,070	72,280	25,463	101,852	2,540	10,160	1,600	8,000	47,673	192,292
Totals	389,109	1,292,357	583,523	1,829,869	56,335	174,057	11,770	53,750	1,050,737	3,260,033

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OYSTER AREAS.

To check the depletion or prevent the extermination of these valuable beds, I strongly favour the granting of leases or licenses to individuals for the purpose of cultivation. This scheme has been carried on for several years past, but it has come to my notice that of late some applications were withheld, with really no object in view. It stands to reason that a man who has an area which he may call his own after having paid his dues, and who adheres to the regulations, will take better care of his stock than ordinary fishermen who merely fish here, there and everywhere with the result that the public beds become overfished; but a man who holds a license will protect the young oysters, keep his area in order, and dispose of his grown stock in the best markets.

On application to the department a license holder can obtain permission to take small oysters from public beds during the open season. Another thing is that if areas are held by private parties and these grounds are kept stocked with oysters, it assists in maintaining the public beds, as no one has control over the spat which oysters throw off at spawning time and this may settle on public areas or vice versa.

CLOSE SEASON.

The close season for oysters I may remark, is not observed as it should be, and officers should be instructed to be more vigilant. As it is, not only are the full grown oysters caught but many small ones are destroyed by being raked over during the warm weather. It would evidently be much more advantageous to fishermen were the grounds left untouched, until the legal season opened; but fishing will be carried on whenever these men can find a market, and that is no trouble at all. It would be an advantage to close the saloons for the sale of oysters during the prohibited season.

OYSTER RAKES,

My attention has been called to the fact that in oyster licenses as issued by the department, there is an unfairness about the matter, and that since it is found necessary to impose a license fee, it should be collected from each individual fisherman. For instance, in Richmond Bay, parties as a rule, fish from a boat occupied by two men. These boats pay \$1.00 for their license, while some of the men in the rivers who fish by themselves also have to pay \$1.00 or double what the two men pay. I am also informed that schooners will come to Bay du Vin with crews of six, eight or ten men. They only take out one license on which they pay the same fee as the others. This makes it very hard and unfair to single fishermen. The best way in my opinion to obviate this anomaly and regulate the fishery, would be to let each man pay for his license, say 50 cents for each instrument used in obtaining oysters. There would be nothing unfair in this arrangement as ordinary fishermen fish with two men in each boat.

I have the honour to be, sir,

Your obedient servant,

ERNEST KEMP,
Oyster Expert.

APPENDIX No. 13

THE FUR SEALING INDUSTRY OF THE NORTH PACIFIC OCEAN, AS
AFFECTED BY THE BEHRING SEA AWARD AND CONSEQUENT
LEGISLATION.

BY R. N. VENNING.

THE BEHRING SEA QUESTION.

The departmental report of 1895, continued down to the end of that year, a narrative of the status of this question, and dealt quite fully with the different phases thereof, which came up for consideration during the year, embracing a reasonably comprehensive statement of the practical effect upon the sealing industry of the Paris award regulations and the machinery provided for their practical application to British sealing vessels.

It is now proposed to briefly review the question in its different branches as it developed for the year 1896, just closed.

DEPARTURE OF THE SEALING FLEET.

On the 12th February, the Collector of Customs at Victoria, B.C., reported that fifty-one sealing vessels had cleared for the spring fishery, as against fifty-six in the season of 1895, the distribution being twenty-eight on the Asiatic and twenty-three on the North American side of the North Pacific Ocean.

At the time there remained in the harbour, thirteen schooners (including three owned by Indians), which would not leave until the month of June when they would fit out for participation in the Behring Sea venture at the expiration of the close season for seal hunting.

Marine and Fisheries—Fisheries Branch.

The following schedule shows the sealing fleet and the point of destination of each vessel which cleared for the spring fishery as above described :—

BRITISH COLUMBIA SEALING FLEET, UNDER LICENSE, 1896.

Vessel.	Master.	Special License.		Destination.
		No.	Date Issued.	
Teresa.....	George Meyer.....	1	December 13, 1895...	Japan.
Katharine.....	John E. Fulton.....	2	do 18, 1895...	do
Borealis.....	Adolphe Wasberg.....	3	do 20, 1895...	do
Ocean Belle.....	Augustus B. Whidden.....	4	do 21, 1895...	do
Mascot.....	Ernest Lorens.....	5	do 21, 1895...	do
Sadie Turpel.....	Aubry S. Crane.....	6	do 23, 1895...	do
Diana.....	Andrew Nelson.....	7	do 24, 1895...	do
Geneva.....	William O'Leary.....	8	do 28, 1895...	do
E. B. Marvin.....	Chas. J. Harris.....	9	do 28, 1895...	do
Fortuna.....	Thomas O'Leary.....	10	do 30, 1895...	do
Umbrina.....	Chas. Campbell.....	11	do 31, 1895...	do
Allie I. Alger.....	Colin E. Locke.....	12	do 31, 1895...	do
Labrador.....	John Haan.....	13	do 31, 1895...	B. C. Coast.
Aurora.....	Thos. H. Brown.....	14	January 6, 1896...	Japan.
Casco.....	G. LeBlanc.....	15	do 6, 1896...	do
Triumph.....	G. N. Cox.....	16	do 6, 1896...	do
Otto.....	John McLeod.....	17	do 7, 1896...	do
Kilmenev.....	William Halgrin.....	18	do 7, 1896...	B. C. Coast.
Viva.....	Mark Pike.....	19	do 10, 1896...	Japan.
Aristis.....	Patrick Martin.....	20	do 10, 1896...	do
Director.....	Fredk. W. Gilbert.....	21	do 10, 1896...	do
Kate.....	Carl Stromgren.....	22	do 11, 1896...	B. C. Coast.
Mermnad.....	W. H. Whiteley.....	23	do 11, 1896...	Japan.
Annie E. Paint.....	Alfred Bissett.....	24	do 11, 1896...	do
Minnie.....	Victor Jacobson.....	25	do 13, 1896...	B. C. Coast.
Agnes McDonald.....	Melville F. Cutler.....	26	do 13, 1896...	Japan.
Carlotta G. Fox.....	W. D. Byers.....	27	do 13, 1896...	do
Vera.....	Wm. Shields.....	28	do 14, 1896...	do
City of San Diego.....	Wm. D. McDougall.....	29	do 15, 1896...	B. C. Coast.
Mary Taylor.....	R. O. Lavender.....	30	do 16, 1896...	Japan.
Wanderer.....	Harry Parsons.....	31	do 17, 1896...	B. C. Coast.
Pioneer.....	W. E. Baker.....	32	do 17, 1896...	Japan.
Saucy Lass.....	D. Martin.....	33	do 18, 1896...	B. C. Coast.
May Belle.....	Edward Shields.....	34	do 18, 1896...	do
Venture.....	Andrew Matheson.....	35	do 18, 1896...	do
Florence M. Smith.....	Luke McGrath.....	36	do 18, 1896...	Japan.
Penelope.....	D. G. Macauley.....	37	do 21, 1896...	B. C. Coast.
Beatrice of Shanghai.....	William Heater.....	38	do 21, 1896...	do
Ida Etta.....	William O. Hughes.....	39	do 22, 1896...	Japan.
Fawn.....	Michael Foley.....	40	do 23, 1896...	B. C. Coast.
Oscar and Hattie.....	Theo. Magneseon.....	41	do 23, 1896...	do
Carrie, C. W.....	Isaac A. Gould.....	42	do 27, 1896...	do
Sapphire.....	William Cox.....	43	do 27, 1896...	do
Beatrice.....	Arthur H. Jones.....	44	do 27, 1896...	do
Dora Seward.....	H. F. Seward.....	45	do 28, 1896...	do
Victoria.....	Reuben Balcam.....	46	do 31, 1896...	do
Cape Beale.....	Jim Eight Quap.....	47	February 1, 1896...	do
Favourite.....	Laughlin McLean.....	48	do 5, 1896...	do
Ainoko.....	George Heater.....	49	do 7, 1896...	do
Libbie.....	Frederick Hackett.....	50	do 8, 1896...	do
Annie C. Moore.....	Charles Hackett.....	51	do 8, 1896...	do

[L.S.]

(Sd.)

A. R. MILNE,
Collector.

Port of Victoria, B.C., 12th February, 1896.

THE SEASON'S CATCH.

The following statement prepared by the Collector of Customs at Victoria, comprises a detailed return of the season's operations by the British sealing fleet, embracing the statistics of the dates and positions at sea where each seal was taken, together with the sex thereof, in the area affected by the Behring Sea award regulations.

SEALING SEASON, 1896—British Columbia Coast Catch.

License No.	Vessel.	Date of Return.	Males.	Females.	Total
25	Schooner Minnie	May 13, 1896	327	159	486
40	do Fawn	do 13, 1896	286	143	429
18	do Kilmoney	do 6, 1896	63	37	100
52	do Walter L. Rich	do 2, 1896	80	13	93
57	do Amateur	do 5, 1896	22	87	109
58	do Pachwellis	do 5, 1896	49	103	152
56	do Fisher Maid	do 5, 1896	8	55	63
46	do Victoria	do 6, 1896	78	86	164
45	do Dora Sieward	do 6, 1896	174	203	377
49	do Ainoko	do 6, 1896	198	230	428
35	do Venture	do 7, 1896	118	151	269
53	do San Jose	do 7, 1896	49	181	230
43	do Sapphire	do 7, 1896	217	201	418
22	do Kate	do 7, 1896	82	122	204
13	do Labrador	do 7, 1896	48	43	91
42	do Carrie C. W.	do 8, 1896	112	57	169
51	do Annie C. Moore	do 11, 1896	271	160	431
29	do City of San Diego	do 11, 1896	149	64	213
33	do Saucy Lass	do 13, 1896	301	170	471
50	do Libbie	do 13, 1896	358	144	502
41	do Oscar and Hattie	do 14, 1896	197	156	353
38	do Beatrice	do 14, 1896	239	142	381
54	do Dolphin	do 14, 1896	454	48	502
37	do Penelope	do 15, 1896	332	126	458
44	do Beatrice	do 16, 1896	272	91	363
48	do Favourite	do 16, 1896	514	310	824
55	do South Bend	do 22, 1896	17	53	70
34	do May Belle	Lost at sea with all hands			
31	do Wanderer	do crew saved			
59	do Mountain Chief				
47	do Cape Beale				
Catch of Indians in canoes			253	325	578
			5,268	3,660	8,928

Marine and Fisheries—Fisheries Branch.

SPRING CATCH in North Pacific, 1896, Victoria, B.C.

SCHOONER "MINNIE."

Date.	Position.				Catch.		Total.
	Latitude.		Longitude.		Males.	Females.	
	°	' N	°	' W			
Feb. 24	47	50	124	58	2	1	3
do 26	47	37	125	00	2	3	5
March 4	47	56	125	20	15	23	38
do 5	47	54	125	27	1	1	2
do 6	47	57	125	32	2	5	7
do 9	47	54	125	11	2	4	6
do 10	48	05	125	12	19	26	45
do 11	48	00	125	15	1	3	4
do 14	48	24	125	43	5	7	12
do 15	48	41	126	12	3	8	11
do 26	48	36	125	37	3	3	6
April 2	51	21	129	32	1	5	6
do 7	56	15	135	32	27	7	34
do 9	57	18	137	53	4	2	6
do 10	57	38	138	13	41		41
do 11	57	42	138	46	4	1	5
do 12	57	53	139	03	22	4	26
do 13	57	42	139	32	1		1
do 14	57	35	139	42	26	9	35
do 15	57	41	139	16	64	14	78
do 19	57	38	139	34	24	9	33
do 22	57	38	140	25	3	2	5
do 23	57	40	140	45	9	6	15
do 24	57	41	139	46	21	8	29
do 28	57	49	139	55	9	3	12
do 30	57	38	139	12	16	5	21
					327	159	486

SCHOONER "FAWN."

March 4	45	56	124	28	12	8	20
do 5	45	52	124	32	3	1	4
do 9	47	15	125	11	1		1
do 10	47	34	124	59	12	3	15
do 11	47	44	124	51	20	6	26
do 12	47	50	125	00	2	1	3
do 14	48	16	126	06	24	5	29
do 15	48	32	125	59	7	4	11
do 16	48	45	126	06	6	1	7
do 17	48	50	126	01	25	9	34
do 18	48	50	126	00		1	1
do 16	48	45	126	06	1		1
do 26	48	53	126	06	30	6	36
April 1	48	34	126	15	3	2	5
do 2	48	57	126	30	1		1
do 3	49	14	127	00	6	3	9
do 7	50	32	128	52	4	2	6
do 8	50	09	129	10	1	1	2
do 9	50	15	128	50	1		1
do 10	50	10	128	25	20	10	30
do 12	50	08	128	40	7	3	10
do 15	49	13	127	00	10	4	14
do 16	49	04	126	50	9	5	14
do 17	48	51	126	10	9	20	29
do 19	48	23	125	50	20	7	27
do 20	48	20	125	50	6	10	16
do 21	48	40	126	00	8	7	15
do 22	48	35	126	00	4	4	8
do 23	48	35	126	00	10	8	18
do 24	48	30	126	12	6	5	11
do 25	48	45	126	06	2	1	3
do 26	48	53	125	55	10	3	13
do 27	48	50	126	00	5	2	7
do 25	48	45	126	06	1	1	2
					286	143	429

SPRING CATCH in North Pacific, 1896, Victoria, B.C.—Continued.

SCHOONER "KILMENEY."

Date.	Position.		Catch.		Total.
	Latitude.	Catch.	Males.	Females.	
	° ' N.	° ' W.			
March 4	48 09	125 42		4	4
do 5	48 04	125 56		2	2
do 11	48 29	125 51	6	5	11
do 12	48 19	126 04		3	3
do 13	48 17	126 00	3	8	11
do 14	48 08	125 41	5	3	8
do 15	48 24	125 50		1	1
do 16	48 18	125 50	1	5	6
do 17	48 12	125 59	9	17	26
do 18	48 10	126 08	3	15	18
April 3	48 34	126 00		2	2
do 16	48 37	126 14		2	2
do 17	48 32	126 17		6	6
			27	73	100

SCHOONER "WALTER L. RICH."

March 9	48 15	126 23		5	5
do 10	48 14	126 13	1	5	6
do 11	47 42	125 02		5	5
do 15	47 23	124 43		2	2
do 16	47 24	125 00		8	8
do 17	47 23	125 15		4	4
do 18	48 01	126 00	3	4	7
do 21	48 05	125 55	1	3	4
do 25	50 08	128 49		8	8
do 30	50 23	129 30	1	4	5
April 9	54 16	133 50	1	4	5
do 12	54 44	134 09	2	2	4
do 15	54 24	134 20	1	4	5
do 16	54 40	134 29	2	11	13
do 23	50 49	130 23		2	2
do 25	49 36	128 06	1	1	2
do 26	49 32	127 05		8	8
			13	80	93

SCHOONER "AMATEUR."

			22	87	109
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This being an Indian schooner no proper log was kept.
Seals caught off the coast from Cape Flattery, south, to Cape Beale, north.

SCHOONER "PACHWELLIS."

			49	103	152
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This being an Indian schooner no proper log was kept.
Seals caught off the coast from Cape Flattery, south, to Cape Beale, north.

SCHOONER "FISHER MAID."

			8	55	63
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Seals caught off the coast from 40 miles south of Cape Flattery to Cape Beale, north.
Indian schooner ; no proper log kept.

Marine and Fisheries—Fisheries Branch.

SPRING CATCH in North Pacific, 1896, Victoria, B.C.—*Continued.*

SCHOONER "VICTORIA"

Date.	Position.				Catch.		Total.
	Latitude.		Longitude.		Males.	Females.	
	°	' N.	°	' W.			
March 9	47	15	125	17	4	3	7
do 10	47	10	125	19	11	5	16
do 15	45	01	125	10	3	1	4
do 16	44	55	125	05	3	.....	3
do 17	45	28	125	20	3	1	4
do 18	46	13	125	28	3	2	5
April 1	48	42	127	22	8	4	12
do 2	48	53	127	37	1	7	8
do 7	50	41	129	27	4	5	9
do 10	50	11	129	06	6	5	11
do 16	50	10	129	15	6	3	9
do 17	50	30	128	45	6	8	14
do 22	49	00	126	30	3	7	10
do 23	49	01	126	32	8	13	21
do 24	48	55	126	.....	5	10	15
do 26	49	15	126	.....	3	6	9
do 29	48	50	126	17	1	6	7
					78	86	164

SCHOONER "DORA SIEWARD."

Feb. 24	47	32	125	1	1	2	3
March 4	45	56	125	.....	3	5	8
do 5	46	12	124	20	4	4	8
do 9	47	08	125	06	6	9	15
do 10	47	19	124	50	5	9	14
do 11	47	22	124	45	8	7	15
do 15	40	58	125	55	7	12	19
do 16	41	20	125	10	14	18	32
do 17	41	41	125	40	14	15	29
do 18	41	26	125	32	6	9	15
April 1	48	30	126	23	3	4	7
do 3	47	31	125	04	11	13	24
do 9	47	55	125	10	8	7	15
do 15	47	36	125	10	14	16	30
do 16	47	35	125	35	14	17	31
do 17	47	02	125	04	12	16	28
do 19	47	04	124	34	6	7	13
do 20	46	50	124	36	8	5	13
do 21	46	36	124	36	7	5	12
do 23	47	15	124	20	2	3	5
do 25	48	04	125	36	4	7	11
do 26	49	05	126	36	8	9	17
do 27	49	01	127	05	3	2	5
do 29	48	56	127	12	6	2	8
					174	203	377

SPRING CATCH in North Pacific, Victoria, B.C.

SCHOONER "AINOKO."

Date.	Position.		Catch.		Total.
	Latitude.	Longitude.	Males.	Females.	
	° ' N.	° ' W.			
March 15	46 56	126 43	8	6	14
do 16	46 56	125 09	43	35	78
do 17	46 55	125 08	7	12	19
do 18	46 54	124 48	15	10	25
do 21	46 22	125 22	11	20	31
do 25	46 32	124 48	12	30	42
do 26	46 31	125 09	1	5	6
do 31	46 19	124 47	6	12	18
April 1	46 20	124 54	3		3
do 2	46 20	124 54		1	1
do 4	47 05	124 53	7	8	15
do 6	47 07	125 00	1	3	4
do 8	47 20	125 20	0	5	5
do 10	46 58	125 10	5	1	6
do 12	47 05	125 25		1	1
do 15	47 03	124 59	10	14	24
do 16	47 01	125 02	10	20	30
do 17	46 55	125 13	6	10	16
do 18	47 04	124 39		1	1
do 19	46 47	124 48	4	6	10
do 20	47 01	125 05	9	4	13
do 21	47 15	125 19	9	5	14
do 22	47 19	125 18	2		2
do 23	47 18	125 24	3	5	8
do 24	47 33	125 27		5	5
do 25	48 07	125 12	6	2	8
do 26	48 57	126 18	11	2	13
do 27	48 53	127 09	2	2	4
do 29	49 11	126 38	7	5	12
			198	230	428

SCHOONER "VENTURE."

March 3	49 33	127 14	1	1	2
do 4	48 54	126 43		2	2
do 6	49 01	126 50	2		2
do 10	48 21	124 59	3	7	10
do 11	47 59	125 14	2	2	4
do 12	47 31	124 49	1		1
do 15	44 48	124 39	1	5	6
do 16	44 38	124 22	4	6	10
do 17	44 42	124 30	3	3	6
do 18	44 53	124 36	13	11	24
do 20	46 18	124 22		1	1
do 21	46 11	124 22	2	5	7
do 22	46 40	124 20	1	3	4
do 25	46 37	124 33	17	36	53
do 26	46 42	124 20		8	8
do 31	45 55	124 32	7	13	20
April 2	46 55	124 27	1	1	2
do 4	47 06	124 38	1	2	3
do 6	47 21	124 47	2	3	5
do 8	47 58	125 10	1		1
do 15	48 34	126 03	7	5	12
do 16	48 30	125 13	17	9	26
do 17	48 34	125 59	4	2	6
do 20	48 47	125 42	18	12	30
do 21	48 23	125 06	2	4	6
do 24	48 43	126 04	6	4	10
do 26	49 25	126 48	1	3	4
do 27	49 20	127 06	1	3	4
			118	151	269

Marine and Fisheries—Fisheries Branch.

SPRING Catch in North Pacific, Victoria, B.C.—*Continued.*

SCHOONER "SAN JOSE."

Date.	Position.				Catch.		Total.
	Latitude.		Longitude.		Males.	Female.	
	°	' N.	°	' W.			
March 14	49	30	127	35	2	13	15
do 15	49	35	127	55	5	10	15
do 16	49	45	128	15	1		1
do 17	49	35	128	10	12	28	40
do 22	49	55	128	12		3	3
do 25	49	27	127	35	3	9	12
do 26	49	41	127	35	3	13	16
April 3	49	47	127	25		1	1
do 7	49	53	128	40	5	9	14
do 8	50	06	128	26		2	2
do 10	49	49	128	06		2	2
do 12	49	49	128	18	3	11	14
do 16	49	30	127	27	5	13	18
do 17	49	15	127	25	1	7	8
do 19	49	34	126	30		3	3
do 20	49	10	126	47		7	7
do 21	49	03	126	28		5	5
do 22	48	43	126	04		1	1
do 23	48	44	126	02		6	6
do 24	48	41	126	18	6	18	24
do 25	48	51	126	19		3	3
do 26	49	13	126	30	1	10	11
do 27	49	37	127	05		2	2
do 29	49	44	128	13	2	5	7
					49	181	230

SCHOONER "SAPPHIRE."

March 9	48	10	125	30	1		1
do 10	48	31	125	30	5	3	8
do 11	48	06	125	30	1	2	3
do 12	48	00	125	25	2	3	5
do 13	48	20	125	40	1	2	3
do 14	48	29	126	25	8	14	22
do 15	48	39	126	26	6	21	27
do 16	48	44	126	10	2	2	4
do 17	48	50	126	15	3	1	4
do 18	48	28	126	27	1	2	3
do 26	48	45	126	24	8	7	15
do 31	48	35	125	42	1		1
April 1	48	30	126	04	3		3
do 2	48	02	125	32	1		1
do 3	47	03	125	09	18	17	35
do 4	47	34	125	05	3	2	5
do 6	47	55	125	51	1	2	3
do 7	48	39	126	31		1	1
do 8	48	36	126	26	4	7	11
do 9	48	52	126	36	10	6	16
do 12	49	03	127	09	8	11	19
do 15	48	40	126	28	28	20	48
do 16	48	38	126	12	22	28	50
do 17	48	41	126	06	24	19	43
do 19	47	41	126	51	1		1
do 22	48	32	126	12	6	2	8
do 23	48	40	126	01	14	15	29
do 24	48	39	126	12	6	5	11
do 25	48	54	126	22	3		3
do 26	48	37	125	46	16	4	20
do 27	48	35	125	50	4	1	5
do 29	48	54	127	15	6	4	10
					217	201	418

SEAL CATCH in North Pacific, 1896, Victoria, B.C.—*Continued.*

SCHOONER "KATE."

Date.	Position.		Catch.		Total.
	Latitude.	Longitude.	Males.	Females.	
	° ' N.	° ' W.			
March 4	48 43	126 20	1	2	3
do 6	48 35	126 24	5		5
do 9	48 00	125 05	1	3	4
do 10	48 12	125 20	4	12	16
do 11	47 57	125 30	10	18	28
do 14	47 23	124 30		2	2
do 15	47 22	125 05	15	5	20
do 16	47 34	124 35	3		3
do 17	47 37	125 10	12	5	17
do 18	47 47	125 25	4		4
April 4	48 45	126 17	4		4
do 10	49 15	128 00	1		1
do 12	50 15	129 25	3	10	13
do 15	49 23	128 06		5	5
do 16	49 13	127 40	4	11	15
do 17	48 44	126 20	4	14	18
do 21	49 00	126 20	2	3	5
do 22	48 43	126 18		2	2
do 23	48 47	126 30	4	18	22
do 24	48 53	126 58	2	4	6
do 25	49 29	127 40	1	3	4
do 26	49 24	127 55	2	5	7
			82	122	204

SCHOONER "LABRADOR."

March 6	49 17	126 57	1	1	2
do 14	48 58	126 24	4	1	5
do 15	48 42	126 48	2	3	5
do 16	48 40	126 42	1	2	3
do 17	48 51	126 25	4	1	5
April 3	49 43	127 53	1	2	3
do 7	50 02	128 10	2	1	3
do 13	48 52	126 17	11	8	19
do 16	48 55	126 10	7	7	14
do 17	49 00	126 05	3	3	6
do 19	48 32	126 55	2	3	5
do 21	48 55	126 01	1	1	2
do 23	48 57	126 01	2	3	5
do 24	48 52	126 13	6	5	11
do 26	48 52	126 27	1	2	3
			48	43	91

Marine and Fisheries—Fisheries Branch.

SPRING CATCH in North Pacific, 1896, Victoria, B.C.—Continued.

SCHOONER "CARRIE C. W."

Date.	Position.				Catch.		Total.
	Latitude.		Longitude.		Males.	Females.	
	°	' N.	°	' W.			
Feb. 26.....	47	54	125	27	2	1	3
March 4.....	47	28	125	20	.....	2	2
do 5.....	47	32	125	10	1	3	4
do 6.....	47	01	124	48	3	10	13
do 9.....	47	08	124	30	2	.....	2
do 10.....	47	11	124	46	3	5	8
do 11.....	46	57	125	46	1	1	2
do 15.....	44	50	125	40	.....	1	1
do 16.....	44	48	125	08	5	9	14
do 17.....	45	09	125	42	2	1	3
do 18.....	45	15	125	25	2	5	7
do 21.....	47	43	125	13	4	3	7
April 2.....	50	35	129	00	5	3	8
do 6.....	51	30	131	00	1	.....	1
do 8.....	54	18	133	28	17	2	19
do 9.....	54	22	133	25	7	.....	7
do 12.....	54	18	133	20	6	2	8
do 15.....	54	39	133	35	8	.....	8
do 19.....	56	30	136	00	3	.....	3
do 23.....	57	05	139	43	2	2	4
do 24.....	56	48	138	57	19	4	23
do 28.....	56	40	137	44	17	2	19
do 29.....	56	20	137	25	2	1	3
					112	57	169

SCHOONER "ANNIE C. MOORE."

March 10.....	47	42	125	05	8	6	14
do 11.....	47	40	125	00	2	3	5
do 14.....	47	11	125	02	3	3	6
do 15.....	47	30	124	52	9	5	14
do 16.....	47	29	124	53	4	6	10
do 17.....	47	24	125	04	5	4	9
do 18.....	48	05	126	00	2	4	6
do 21.....	48	53	127	12	12	10	22
do 25.....	50	07	12	10	5	7	12
do 31.....	51	42	132	20	1	.....	1
April 2.....	54	50	133	51	.....	1	1
do 6.....	55	50	135	12	5	1	6
do 7.....	56	12	135	35	7	2	9
do 9.....	57	30	137	26	5	2	7
do 10.....	58	03	138	07	18	7	25
do 12.....	58	06	138	51	8	3	11
do 14.....	57	56	139	06	60	32	92
do 15.....	57	55	139	10	32	18	50
do 19.....	58	02	139	13	18	10	28
do 23.....	57	45	139	12	40	21	61
do 24.....	57	43	139	20	5	3	8
do 28.....	57	53	140	18	9	5	14
do 30.....	57	53	139	05	19	5	15
March 21.....	48	53	127	12	3	2	5
					271	160	431

SPRING Catch in North Pacific, Victoria, B.C.—*Continued.*

SCHOONER "CITY OF SAN DIEGO."

Date.	Position.		Catch.		Total.
	Latitude.	Longitude.	Males.	Females.	
	° ' N.	° ' W.			
March 11.....	48 48	126 20	2	4	6
do 14.....	46 52	124 50		1	1
do 15.....	47 00	125 00		5	5
do 16.....	47 00	124 50	1	14	15
do 17.....	46 59	124 50	2	3	5
do 18.....	47 18	124 50	4	6	10
do 21.....	48 12	126 23	4	9	13
do 22.....	49 11	127 13	1		1
do 25.....	49 41	128 06	5	4	9
do 26.....	49 53	130 15	1		1
April 7.....	56 42	136 05	1		1
do 8.....	57 00	136 37	3	1	4
do 9.....	57 39	137 25	1		1
do 10.....	58 03	137 53	11		11
do 12.....	57 59	138 05	7	1	8
do 13.....	58 17	139 49	1		1
do 14.....	57 57	138 20	20		20
do 15.....	57 58	138 13	44	5	49
do 19.....	57 45	138 11	8		8
do 22.....	57 53	138 23	1		1
do 23.....	57 51	138 30	9	4	13
do 24.....	57 52	138 28	13	5	18
do 28.....	57 54	140 06	10	2	12
			149	64	213

SCHOONER "SAUCY LASS."

March 6.....	48 37	127 40	3	2	5
do 9.....	48 25	127 10	5	3	8
do 10.....	48 50	126 28	4	7	11
do 11.....	48 55	126 50	11	7	18
do 13.....	48 15	126 19	2		2
do 14.....	48 30	125 58	12	6	18
do 15.....	48 19	126 17	6	3	9
do 16.....	48 33	126 17	2	1	3
do 17.....	48 44	126 03	6	3	9
do 21.....	49 25	127 19	20	17	37
do 22.....	49 35	127 14	4	3	7
April 6.....	57 00	136 52	2	1	3
do 7.....	57 25	137 31	22	12	34
do 9.....	58 10	139 06		2	2
do 10.....	58 17	139 17	2	3	5
do 11.....	58 35	139 13	3	5	8
do 12.....	58 45	139 45	3	4	7
do 13.....	58 34	139 33	30	12	42
do 14.....	59 40	139 37	34	10	44
do 15.....	58 50	139 40	30	14	44
do 18.....	58 18	139 15	1		1
do 19.....	58 20	139 21	19	12	31
do 23.....	57 35	139 31	20	18	48
do 24.....	57 51	139 35	20	5	25
do 28.....	58 00	140 47	18	10	28
do 30.....	51 41	140 20	12	10	22
			301	170	471

Marine and Fisheries—Fisheries Branch.

SPRING Catch in North Pacific, Victoria, B.C.—Continued.

SCHOONER "LIBBIE."

Date.	Position.				Catch.		Total.
	Latitude.		Longitude.		Males.	Females.	
	°	' N.	°	' W.			
March 4.....	48	32	126	26	3	2	5
do 9.....	48	09	125	23	6	4	10
do 10.....	48	08	125	41	7	2	9
do 11.....	47	50	125	18	12	4	16
do 13.....	47	26	125	13	.....	2	2
do 14.....	47	14	125	12	11	3	14
do 15.....	47	19	125	16	4	3	7
do 16.....	47	02	125	30	3	.....	3
do 17.....	46	58	125	14	4	3	7
do 18.....	47	20	125	06	1	.....	1
do 21.....	49	12	127	13	17	19	36
do 22.....	49	14	127	29	2	.....	2
April 6.....	57	37	138	39	2	.....	2
do 7.....	57	56	139	02	17	5	22
do 9.....	58	30	140	08	43	10	53
do 10.....	58	52	140	30	2	.....	2
do 11.....	58	32	140	25	4	.....	4
do 12.....	58	13	139	56	8	3	11
do 13.....	58	03	139	47	5	.....	5
do 14.....	57	43	139	19	80	24	104
do 15.....	57	42	139	29	20	18	38
do 19.....	57	49	138	48	35	6	41
do 23.....	57	36	139	55	20	9	29
do 24.....	57	38	139	35	7	5	12
do 28.....	58	04	140	11	28	11	39
do 30.....	57	26	140	10	15	10	25
do 31.....	49	19	127	13	2	1	3
					358	144	502

SCHOONER "OSCAR AND HATTIE."

March 3.....	45	52	124	59	2	2	4
do 4.....	45	56	124	39	1	3	4
do 5.....	46	02	124	54	3	3	6
do 9.....	46	42	125	41	5	3	8
do 10.....	46	42	125	21	4	2	6
do 11.....	47	04	124	33	1	.....	1
do 12.....	47	56	125	50	1	.....	1
do 13.....	47	54	125	27	1	.....	1
do 14.....	48	13	125	23	16	4	20
do 15.....	48	32	125	59	1	2	3
do 16.....	48	10	126	19	4	2	6
do 17.....	48	03	126	05	29	28	57
do 18.....	48	06	125	52	6	11	17
do 21.....	48	02	125	59	10	13	23
do 25.....	50	08	128	50	15	3	18
April 7.....	50	39	129	54	2	.....	2
do 8.....	50	19	129	15	5	.....	5
do 10.....	50	18	128	54	6	8	14
do 12.....	50	11	128	57	2	5	7
do 15.....	49	03	126	50	9	14	23
do 16.....	48	56	126	53	8	3	11
do 17.....	49	03	126	50	18	12	30
do 19.....	48	06	126	30	3	.....	3
do 20.....	48	55	126	23	5	11	16
do 21.....	48	45	126	12	3	1	4
do 22.....	48	49	126	31	3	3	6
do 23.....	48	51	126	23	4	6	10
do 24.....	49	06	127	04	4	3	7
do 25.....	48	37	126	41	5	4	9
do 26.....	48	50	126	41	19	7	26
do 27.....	48	53	126	50	2	3	5
					197	156	353

SPRING Catch in North Pacific, 1896, Victoria, B.C.—Continued.

SCHOONER "BEATRICE," OF SHANGHAI.

Date.	Position.		Catch.		Total.
	Latitude.	Longitude.	Males.	Females.	
	° ' N	° ' W			
March 4.....	48 35	126 19	3	5	8
do 6.....	48 37	126 23	2	6	8
do 9.....	48 29	125 31	5	2	7
do 10.....	48 31	125 33	4	.....	4
do 11.....	48 23	125 36	4	1	5
do 13.....	48 35	126 17	4	2	6
do 14.....	48 54	127	4	5	9
do 15.....	49 02	127 55	5	6	11
do 17.....	49 10	127 03	9	18	27
do 22.....	50 16	129 03	5	21	26
April 5.....	57 26	137 56	.....	1	1
do 7.....	58 01	138	8	11	19
do 9.....	57 55	140	2	3	5
do 10.....	58	139	16	2	18
do 11.....	57 43	138 47	1	.....	1
do 12.....	57 40	138 55	6	3	9
do 13.....	57 45	138 55	3	1	4
do 14.....	57 49	139 14	59	8	67
do 15.....	57 45	139	32	12	44
do 19.....	57 35	138 43	8	.....	8
do 23.....	57 50	139 02	14	6	20
do 24.....	57 49	139 08	26	15	41
do 28.....	57 49	141 08	18	10	28
do 30.....	57 07	140 25	2	4	6
			239	142	381

SCHOONER "LOUIS OLSEN."

March 14.....	48 51	127 08	7	.....	7
do 15.....	48 19	126 38	24	6	30
do 16.....	48 03	126 30	11	5	16
do 17.....	48 01	126 18	28	8	36
do 18.....	48 10	126 05	8	4	12
do 21.....	49 23	128 56	13	1	14
do 22.....	50 10	129 52	4	2	6
April 6.....	56 10	138 40	6	1	7
do 7.....	56 14	138 42	12	.....	12
do 9.....	58 24	140 24	13	.....	13
do 10.....	58 49	140 55	5	1	6
do 11.....	58 33	141 16	5	.....	5
do 12.....	58 35	140 44	10	.....	10
do 13.....	58 46	139 49	6	.....	6
do 14.....	58 14	139 25	98	6	104
do 15.....	58 20	139 31	53	8	61
do 18.....	58 34	140 13	6	1	7
do 19.....	58 10	140 05	5	.....	5
do 23.....	57 45	138 49	41	.....	41
do 24.....	57 39	138 50	16	2	18
do 28.....	57 57	140 38	39	.....	39
do 30.....	58 28	139 48	44	3	47
			454	48	502

Marine and Fisheries—Fisheries Branch.

SPRING Catch in North Pacific, 1896, Victoria, B.C.—*Continued.*

SCHOONER "PENELOPE."

Date.	Position.		Catch.		Total.
	Latitude.	Longitude	Males.	Females.	
	° ' N.	° ' W.			
March 4.....	48 14	125 25	4	7	11
do 5.....	48 25	125 35	1	1	2
do 6.....	48 18	126	3	2	5
do 13.....	48 40	126 30	6	9	15
do 14.....	48 26	125 55	10	13	23
do 15.....	48 37	126 10	6	4	10
do 16.....	48 29	126 24	3	2	5
do 17.....	48 31	126 27	14	11	25
do 18.....	48 34	126 05	2	2	4
do 21.....	49 20	127 37	18	12	30
do 22.....	49 25	127 53	2	2	4
April 6.....	56 59	138 19	3	1	4
do 7.....	57 18	138 38	12	7	19
do 11.....	57 34	138 47	5	3	8
do 12.....	57 40	138 36	4	11	15
do 14.....	57 31	138 28	53	13	66
do 15.....	57 39	138 20	65	11	76
do 19.....	57 35	138 58	24	5	29
do 23.....	57 24	139 21	25	.....	25
do 24.....	57 33	138 54	15	2	17
do 28.....	57 47	138 41	39	6	45
do 30.....	57 56	139 07	18	2	20
			332	126	458

SCHOONER "BEATRICE."

March 4.....	47 40	125 14	3	3	6
do 5.....	47 44	125 30	1	.....	1
do 13.....	48 38	126 00	5	3	8
do 14.....	48 41	126 40	15	17	32
do 15.....	48 41	126 51	8	5	13
do 16.....	48 34	126 33	1	.....	1
do 17.....	48 48	126 25	4	9	13
April 1.....	48 45	126 43	1	.....	1
do 6.....	53 28	134 01	2	.....	2
do 7.....	54 02	134 01	3	1	4
do 8.....	54 48	134 58	3	.....	3
do 9.....	55 06	134 08	1	.....	1
do 11.....	56 38	136 13	1	.....	1
do 12.....	56 42	136 54	5	.....	5
do 14.....	57 47	137 58	6	2	8
do 15.....	57 52	138 09	56	15	71
do 19.....	57 56	138 26	18	8	26
do 23.....	57 39	139 05	36	8	44
do 24.....	57 38	138 45	20	5	25
do 28.....	58 43	139 51	23	2	25
do 30.....	58 04	140 10	60	13	73
			272	91	363

SPRING Catch in North Pacific, 1896, Victoria, B.C.—*Concluded.*

SCHOONER "FAVOURITE."

Date.	Position.		Catch.		Total.
	Latitude.	Longitude.	Males.	Females.	
	° ' N.	° ' W.			
March 4	49	128		4	4
do 6	48 40	128 20	3	2	5
do 9	48 42	128 20	3	4	7
do 10	48 40	126 28	2	25	27
do 11	48 28	126	20	25	45
do 13	48 16	126 14	8	8	16
do 14	48 12	125 45	7	8	15
do 15	48 22	125 50		5	5
do 16	48 12	127	8	5	13
do 17	48 04	126 47	20	29	49
do 18	49 18	127 54	2	3	5
do 21	49 47	128 04	19	20	39
do 22	49 50	128 15		4	4
do 30	51 45	132 10	5		5
April 4	57 40	138 36	15	6	21
do 5	57 39	138 56	6	4	10
do 7	57 50	138 50	28	3	31
do 9	57 30	139 25	2		2
do 10	57 45	138 50	30	10	40
do 12	57 50	138 30	7	2	9
do 14	57 48	138 41	80	32	112
do 15	57 47	138 46	60	29	89
do 19	57 45	138 49	31	10	41
do 23	57 43	138 38	33	23	56
do 24	57 48	138 31	45	22	67
do 28	57 59	139 09	60	19	79
do 30	57 30	138 58	20	8	28
			514	310	824

SCHOONER "SOUTH BEND."

March 17	49 54	127 45		1	1
do 26	49 50	128 05	2	3	5
April 10	49 35	127 56		1	1
do 16	49 30	127 35	2	6	8
do 17	49 27	127 13	3	7	10
do 19	48 31	127 08	4	4	8
do 20	49 04	126 35	1	3	4
do 21	48 58	126 35		4	4
do 22	48 40	126 55	1	4	5
do 23	49 01	126 45	4	16	20
do 24	49 20	127 17		4	4
			17	53	70

Marine and Fisheries—Fisheries Branch.

SEALING SEASON, 1896.

Copy of Log-Catch in Behring Sea, 1896, Victoria, B.C.

SCHOONER "ADA."

License No. 67.

Date.	Position.		Catch.		Total.
	Latitude.	Longitude.	Males.	Females.	
1896.	° ' N.	° ' W.			
August 2.....	55 04	171 52	22	34	56
do 5.....	55 14	170 34	19	19	38
do 6.....	55 10	170 31	10	7	17
do 8.....	55 36	171 50	6	22	28
do 9.....	55 47	172 32	8	20	28
do 10.....	55 32	173 20	9	14	23
do 11.....	55 23	173 15	3	40	43
do 12.....	55 16	172 30	11	57	68
do 14.....	55 06	171 20		1	1
do 16.....	54 57	171 10		1	1
do 19.....	54 32	167 48		3	3
do 20.....	55 06	170 05	10	35	45
do 21.....	55 00	170 05	10	11	21
do 22.....	54 56	169 56	21	30	51
do 24.....	55 00	172 18	27	57	84
do 25.....	55 06	171 44	3	4	7
do 26.....	55 14	172 00	8	32	40
do 27.....	55 04	171 36	7	20	27
do 28.....	54 46	171 49	1	1	2
^a do 21.....	55 02	170 05			
do 30.....	54 54	169 00	1	11	12
do 31.....	54 54	168 45	6	23	29
Sept. 1.....	55 03	168 50	3	3	6
do 3.....	54 45	168 10	3	6	9
do 6.....	54 50	166 26	2	4	6
do 7.....	55 12	166 39	10	24	34
do 8.....	54 59	166 52		35	35
do 9.....	55 30	169 48	4	5	9
^b do 19.....					
^c do 21.....					
			204	519	723

^a Boarded by Lt. J. C. Hooker of U. S.S. "Grant."

^b Dutch Harbour, Alaska, boarded by Lt. R. M. Sturdevant, of U. S.S. "Perry."

^c Dutch Harbour, Alaska, boarded by Lt. C. S. Cochran, of U. S.S. "Bear."

COPY of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "AGNES McDONALD."

No. 26.

Date.	Position.		Catch.		Total.
	Latitude.	Longitude.	Males.	Females.	
1896.	° ' N.	° ' W.			
August 2.	55 16	167 57	3	5	8
do 5.	55 06	168 22	13	37	50
<i>a</i> do 6.	55 17	169 05			
do 9.	55 48	172 14	4	9	13
<i>b</i> do 9.	55 48	172 14			
do 10.	55 55	172 25	5	7	12
do 11.	55 50	172 09	8	10	18
do 12.	55 38	172 40	1	2	3
do 15.	55 52	172 00		1	1
do 21.	55 54	172 37	2	4	6
do 22.	57 25	172 57	6	7	13
<i>c</i> do 23.	57 33	173 07			
do 23.	57 33	173 07	5	7	12
do 24.	57 33	172 57	1		1
do 26.	57 08	173 00	21	11	32
do 27.	57 12	173 20	8	11	19
Sept. 1.	56 27	173 45	3	2	5
do 3.	54 02	169 36	2		2
<i>d</i> do 6.	54 59	168 02			
do 6.	55 00	168 00	16	9	25
do 7.	55 06	167 44	23	9	32
do 8.	55 01	167 29	7	1	8
do 9.	55 02	167 15	5		5
do 14.	55 08	168 12	3		3
do 15.	55 08	168 05	7	3	10
do 18.	54 55	166 30	4		4
			147	135	282

a Boarded by Lt. H. Emery, of U. S.S. "Wolcott."*b* Boarded by Lt. G. M. Daniels, of U. S.S. "Rush."*c* Boarded by Lt. G. M. Daniels, of U. S.S. "Rush."*d* Boarded by Lt. H. Emery, of U. S.S. "Wolcott."

SCHOONER "AINOKO."

No. 49.

August 1.	55 19	167 50		1	1
do 2.	55 44	167 51		30	30
do 5.	55 34	171 07	6	102	108
<i>a</i> do 5.	55 57	170 25			
			6	133	139

a Boarded and seized by Lt. W. G. Ross, of U. S.S. "Perry."

Marine and Fisheries—Fisheries Branch.

COPY of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "ALLIE J. ALGER."

No. 12.

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896.						
Aug. 2....	55 35	171 21	8	53	61	
do 5....	55 48	171 25	3	7	10	
do 6....	55 22	170 26	6	8	14	
do 7....	56 00	171 28	.....	3	3	
do 8....	56 02	171 43	3	5	8	
do 9....	55 57	171 23	3	5	8	
do 10....	55 53	171 30	3	22	25	One skin with shot holes.
do 11....	55 52	172 06	2	11	13	do do
do 12....	55 40	171 43	6	41	47	One skin with old shot holes.
do 18....	56 00	172 00	2	3	5	
do 20....	55 58	171 39	3	7	10	
do 20....	56 00	171 40	.....	.....	.....	Boarded by Lt. J. G. Ballinger of U.S.S. "Rush."
do 21....	56 19	172 10	5	16	21	Two skins with old shot holes.
do 22....	56 26	172 22	10	29	39	
do 22....	56 27	172 22	.....	.....	.....	Boarded by Lt. B. H. Camden of U.S.S. "Rush."
do 23....	56 25	172 36	.....	2	2	
do 24....	55 51	172 08	4	5	9	
do 25....	55 46	171 29	1	3	4	
do 26....	55 43	171 40	5	11	16	
do 27....	56 02	172 20	20	4	24	
do 31....	56 54	172 52	1	2	3	
Sept. 1....	56 47	172 43	.....	.....	.....	Boarded by Lt. J. G. Ballinger of U.S.S. "Rush."
do 1....	56 28	172 40	1	2	3	
do 2....	55 :2	171 07	.....	.....	.....	Boarded by Lt. R. M. Sturdevant of U.S.S. "Perry."
do 3....	54 53	170 29	6	8	14	
do 6....	55 19	170 00	1	.....	1	
do 7....	55 09	169 55	11	20	31	
do 8....	55 08	169 46	4	5	9	
do 9....	55 15	169 47	8	12	20	
do 14....	55 16	170 18	1	1	2	
do 15....	54 55	170 02	.....	.....	.....	Boarded by Lt. H. Emery of U. S. S. "Wolcott."
do 15....	54 55	170 06	6	3	9	
			123	288	411	

SCHOONER "ANNIE C. MOORE."

No. 51.

Aug. 2....	55 35	172 20	30	36	66	
do 5....	55 30	172 35	61	55	116	
do 6....	55 22	172 30	15	24	39	
do 8....	55 20	172 40	35	62	97	
do 9....	55 25	172 48	8	6	14	
do 10....	55 06	172 30	26	15	41	
do 11....	55 00	172 30	14	10	24	
do 12....	55 30	172 35	9	11	20	
do 20....	55 30	173 00	12	10	22	
do 21....	55 30	172 32	13	19	32	
do 21....	55 30	172 36	.....	.....	.....	Boarded by Lt. J. G. Ballinger of U.S.S. "Rush."
do 22....	55 25	172 45	45	35	80	
do 24....	55 07	173 00	52	43	95	
do 26....	55 10	172 33	52	25	77	
do 27....	55 12	172 50	30	26	56	
do 31....	54 52	171 00	47	29	76	
Sept. 1....	55 00	171 00	20	13	33	
do 3....	54 45	171 30	42	19	61	
do 7....	55 25	172 35	47	31	78	
do 9....	55 25	172 30	25	36	61	
			583	505	1,088	

COPY of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "ANNIE E. PAINT."

No. 24.

Date.	POSITION.		MATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896.	° ' N.	° ' W.				
July 25....	Attu.	Alaska.				
Aug. 1....	55 21	172 47	1	1	2	Boarded by J. G. Berry, Acting Collector of Customs.
do 2....	55 23	172 57	6	2	8	
do 5....	56 18	172 36	4	5	9	
do 9....	56 00	172 18	3	12	15	
do 10....	56 04	172 36	5	11	16	
do 11....	56 03	172 54	2	7	9	
do 12....	55 51	172 00	2	9	11	One skin with old shot holes.
do 20....	55 54	172 12	5	3	8	
do 21....	55 55	172 14				
do 21....	55 59	172 13		14	14	Boarded by Lt. B. H. Camden, of U.S.S. "Rush." Two skins with old shot holes.
do 22....	56 13	172 21	8	24	32	
do 23....	56 01	172 38	1	2	3	
do 24....	55 48	172 51				Boarded by Lt. J. C. Hooker, of U.S.S. "Grant."
do 24....	55 48	172 49	4	9	13	
do 25....	56 06	172 38		2	2	
do 26....	56 07	172 02	11	12	23	
do 27....	56 02	172 14	4	7	11	
do 31....	56 11	172 35	4	7	11	
do 31....	56 21	172 21				Boarded by Lt. B. H. Camden, of U.S.S. "Rush."
Sept. 1....	56 26	172 55	4	2	6	
do 3....	56 04	173 27				Boarded by Lt. J. H. Brown, of U.S.S. "Perry."
do 3....	56 04	173 27	2	5	7	
do 6....	55 50	172 00	1		1	
do 7....	56 14	171 51	1	1	2	
do 8....	54 52	170 40	1		1	
do 15....	55 23	169 54				Boarded by Lt. E. V. Johnson, of U.S.S. "Wolcott."
do 15....	55 23	170 00	4	3	7	
do 18....	54 26	170 10	2	2	4	
do 19....	54 10	169 50	1	2	3	
do 22....	55 08	166 50	5	2	7	
			81	144	225	

SCHOONER "ARIETIS."

No. 20.

Aug. 1....	56 19	172 32	12	49	61	
do 2....	56 09	172 16		4	4	
do 5....	56 28	172 33	4	9	13	
do 8....	56 05	172 09	1	2	3	
do 9....	56 11	172 11		2	2	
do 10....	56 07	172 44	5	18	23	
do 11....	56 01	172 53	2	7	9	
do 17....	56 02	171 58	1		1	
do 18....	56 07	171 40		2	2	
do 20....	56 47	172 26		8	8	
do 21....	56 49	172 39	10	41	51	
do 22....	56 57	172 26	5	50	55	
do 23....	57 00	172 40	6	27	33	
do 24....	57 06	172 50	1	7	8	
do 24....	57 06	172 40				Boarded by Com. F. A. Garforth, of H.M.S. "Pheasant."
do 25....	57 15	173 04	2	7	9	
do 26....	57 17	172 30	20	34	54	
do 27....	57 14	172 29		9	9	
do 31....	56 11	173 08	5	13	18	
Sept. 1....	56 08	173 21	1	6	7	
do 3....	56 20	173 09	7	7	14	
do 3....	56 15	173 16				Boarded by Lt. R. M. Sturdevant, of U.S.S. "Perry."
do 7....	57 12	173 13	9	10	19	
do 9....	57 06	172 50	7	7	14	
do 15....	58 37	173 07	10	11	21	
			108	330	438	

Marine and Fisheries—Fisheries Branch.

Copy of Log-catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "AURORA."

No. 14.

Date.	POSITION.		CATCH.		Total.	Remarks.	
	Latitude.	Longitude.	Males.	Females.			
1896.	° ' N.	° ' W.					
Aug. 1 ...	55 45	171 15	.....	3	3	One skin with gaff hole.	
do 2 ...	55 54	172 38	.....	2	6	Two skins with gaff holes.	
do 5 ...	55 53	171 47	.....	2	19	One skin with gaff hole.	
do 7 ...	55 45	171 52	.....	2	1	3	
do 8 ...	55 57	172 04	.....	.....	2	2	
do 9 ...	55 05	172 55	.....	.....	18	18	
do 10 ...	55 45	172 18	.....	2	20	22	Two skins with gaff holes.
do 10 ...	55 44½	172 11	.....	.....	.....	.....	Boarded and seized by Lt. Daniels of U.S.S. "Rush."
			.....	8	69	77	

SCHOONER "BEATRICE" (SHANGHAI).

No. 38.

July 31 ...	55 05	167 40	.....	.....	.....	.....	Boarded by Lt. D. F. A. de Otte of U.S.S. "Corwin."
Aug. 1 ...	55 07	167 29	.....	2	2	2	
do 2 ...	55 18	167 16	.....	3	24	27	
do 2 ...	55 26½	167 37	.....	.....	.....	.....	Boarded by Lt. J. G. Ballinger of U.S.S. "Rush."
do 3 ...	55 12	167 40	.....	2	2	2	
do 5 ...	55 17	167 30	.....	2	29	31	
do 6 ...	55 09	168 03	.....	1	3	4	
do 8 ...	55 05	169 19	.....	3	7	10	
do 10 ...	54 59	169 40	.....	4	25	29	
do 11 ...	55 00	169 30	.....	20	60	80	
do 12 ...	55 00	169 35	.....	10	23	33	
do 19 ...	54 50	168 53	.....	.....	.....	.....	Boarded by Lt. J. G. Ballinger of U.S.S. "Rush."
do 19 ...	54 59	169 49	.....	.....	.....	.....	Boarded by Lt. E. V. Johnson of U.S.S. "Wolcott."
do 20 ...	54 59	169 52	.....	12	18	30	
do 21 ...	55 01	169 42	.....	4	8	12	
do 22 ...	55 11	169 53	.....	14	10	24	
do 24 ...	54 47	170 47	.....	6	19	25	
do 25 ...	55 10	170 10	.....	7	5	12	
do 26 ...	54 54	169 48	.....	2	4	6	
do 27 ...	54 56	169 50	.....	8	24	32	
do 28 ...	54 44	170 07	.....	6	4	10	
do 30 ...	54 58	169 14	.....	4	4	8	
do 31 ...	54 55	169 09	.....	20	15	35	
Sept. 1 ...	55 00	169 05	.....	2	.....	2	
do 3 ...	54 54	168 50	.....	4	2	6	
do 6 ...	54 51	167 52	.....	.....	.....	.....	Boarded by Lt. H. Emery of U.S.S. "Wolcott."
do 6 ...	54 51	167 52	.....	10	5	15	
do 7 ...	55 11	167 37	.....	20	18	38	
do 8 ...	56 00	167 23	.....	10	37	47	
do 9 ...	54 41	167 33	.....	.....	.....	.....	Boarded by Lt. B. H. Camden of U.S.S. "Rush."
do 9 ...	54 55	167 20	.....	4	3	7	
do 14 ...	55 12	168 08	.....	3	.....	3	
do 15 ...	55 09	167 44	.....	.....	2	2	
			.....	179	353	532	

Copy of Log-Catch in Behring Sea, Victoria, B.C.

SCHOONER "BEATRICE."

No. 44.

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896.	° ' " N.	° ' W.				
July 30....	55 34 22	168 04				Boarded by Lt. B. M. Chiswell, and D. F. A. de Otte, of U. S.S. "Corwin.
Aug. 1....	55 22	168 30	4		4	
do 3....	55 26	169 36	20	10	30	Boarded and seized by Lt. R. M. Sturdevant, of U.S.S. "Perry."
do 5....	55 11	170 39	21	37	58	
do 5....	55 48	170 31				
			45	47	92	

SCHOONER "BOREALIS."

No. 3.

Date.	Latitude.	Longitude.	Males.	Females.	Total.	Remarks.
July 13 ...	Attu.	Alaska.				Examined by J. G. Berry, Actg. Collector of Customs.
Aug. 1....	56 01	172 51	3	17	20	
do 2....	57 03	172 47	1	4	5	Boarded by Lt. F. J. Haake, of U.S.S. "Perry." One skin with old shot holes.
do 5....	55 52	172 10		11	11	
do 6....	56 08	171 46	1		1	
do 8....	55 52	172 12	1	8	9	
do 9....	55 47	172 08	1	5	6	
do 10....	55 34	171 41	3	18	21	
do 11....	55 33	171 23	4	4	8	
do 12....	55 40	171 44	2	10	12	
do 22....	55 40	170 37	11	19	30	
do 24....	55 44	171 00	2	9	11	
do 25....	55 25	170 41	1	1	2	
do 26....	55 44	171 58	6	14	20	
do 27....	55 42	172 08	3	3	6	
do 30....	54 42	168 00		3	3	
do 31....	54 41	168 22	9	7	16	
Sept. 3....	55 54	173 22				
do 3....	54 49	173 08	2		2	
do 6....	57 47	173 54	4	17	21	
do 7....	58 28	173 43	4	22	26	
do 8....	58 26	173 47		1	1	
do 9....	58 20	173 49	7	48	55	
do 15....	58 49	173 56	5	14	19	
do 20....						
			70	235	305	Dutch Harbor, Alaska, boarded by Lt. H. G. Hamlet, of U. S.S. "Bear."

Marine and Fisheries—Fisheries Branch.

COPY of Log-Catch in Behring Sea, Victoria, B.C.—*Continued.*

SCHOONER "CARLOTTA G. COX."

No. 27.

Date.	POSITION.		CATCH.		Total.	Remarks.	
	Latitude.	Longitude.	Males.	Females.			
1896.	° ' " N.	° ' " W.					
July 27	Attn.	Alaska.					
Aug. 1	55 44 28	173 43	11	17	28	Examined by J. G. Berry, Acting Collector of Customs.	
do 2	55 54	173 52	1	4	5		
do 5	56 12 02	172 53 45		2	2		
do 8	56 07 04	173 07 45		1	1		
do 9	56 05	173 10	1	9	10		
do 10	55 59 15	173 11		7	7		
do 11	55 37 27	173 28 30	1	2	3		
do 12	55 20 20	173 24 15		11	11		
do 20	56 07 35	171 45 15	2	1	3		
do 20	56 06	172 04					
do 21	56 23 45	172 26	5	8	13		Boarded by Lt. B. H. Camden, of U.S.S. "Rush."
do 22	56 27 30	172 34 45	9	28	37		
do 23	56 23 30	172 41		1	1		
do 24	56 25 22	172 52 15	4	8	12		
do 25	56 09 38	172 06		6	6		
do 26	56 23 12	172 41 15	15	20	35		
do 27	56 30 02	172 51 30	5	11	16		
do 31	56 18 53	172 24 30	4	7	11		
	56 26	172 26 30					
Sept. 1	56 10 30	172 41	1	2	3			Boarded by Lt. G. M. Daniels, of U.S.S. "Rush."
do 3	54 31	172 56		2	2		
do 7	54 04 50	169 12 15	6	4	10		
do 8	54 50 16	168 51 30	4	6	10		
do 9	55 27	169 16					
do 9	55 06	169 16	3		3	Boarded by C. S. Craig, of U.S.S. "Corwin."	
do 15	55 19 10	171 43 45	2	3	5		
			74	160	234		

SCHOONER "CARRIE C. W."

No. 42.

Aug. 2	55 17	168 46	20	35	55	Boarded by Lt. H. Emery, of U.S.S. "Wolcott."
do 5	55 02	167 35	12	20	32	
do 6	55 06	168 36	5	12	17	
do 6	55 25	169 00				
do 8	54 58	167 58	2	4	6	
do 10	55 11	170 34	20	18	38	
do 11	55 05	170 40	22	55	77	
do 12	55 03	170 59	9	83	92	
do 19	54 41	168 58	3	1	4	
do 20	54 54	169 38	8	7	15	
do 21	54 59	169 46				Boarded by Lt. K. W. Perry, of U.S.S. "Grant."
do 21	54 59	169 45	14	4	18	
do 22	54 57	169 25	13	48	61	
do 23	55 39	171 47				Boarded by Lt. F. A. Levis, of U.S.S. "Grant."
do 24	55 46	172 54	3	11	14	
do 25	56 33	173 24				Boarded by Lt.-Comdr. F. A. Garforth, of H.M.S. "Pheasant."
do 26	56 20	172 20	5	52	57	
do 27	56 15	172 45	8	89	97	
do 30	54 22	170 45	48	15	63	
Sept. 1	54 35	170 56	10	4	14	
do 3	54 55	171 31	33	47	80	
do 5	54 16	171 02	8	31	39	
do 7	54 59	171 16	17	65	82	
do 8	55 03	170 59	2	11	13	
do 9	54 57	171 07	2	7	9	
do 15	55 12	171 34	2	8	10	
do 19	54 30	168 00	7	3	10	
			273	630	903	

COPY of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "C. D. RAND."

No. 64.

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896.	° ' N.	° ' W.				
July 31....	55 00	167 18				
Aug. 1....	55 00	167 40		1	1	Boarded by Lt. C. S. Craig of U.S.S. "Corwin."
do 2....	55 04	167 46	6	3	9	
do 3....	55 08	167 28½				Boarded by Lt. G. M. Daniels of U.S.S. "Rush."
Aug. 5....	55 07	167 40	12	12	24	
do 6....	55 17	168 28		6	6	
do 7....	55 24	168 53½	1	2	3	
do 8....	55 20	169 15	3	5	8	
do 10....	55 21	169 13				Boarded by Lt. F. J. Haake of U.S.S. "Perry."
do 10....	55 17	169 11	7	14	21	
do 11....	55 07	169 20	8	9	17	
do 12....	55 05	169 16	23	30	53	
do 19....	55 20	167 25	1	10	11	
do 20....	55 10	168 45				Boarded by Lt. K. W. Perry of U.S.S. "Grant."
do 20....	55 11	168 32				Boarded by Lt. H. Emery of U.S.S. "Wolcott."
do 20....	55 15	168 51	20	21	41	
do 21....	55 25	169 00	21	31	52	
do 22....	55 08	168 20				Boarded by Lt. J. H. Brown of U.S.S. "Perry."
do 22....	55 10	168 38	13	23	36	
do 24....	55 08	169 57	17	22	39	
do 25....	54 55	169 23	7	18	25	
do 26....	55 05	169 10	1	2	3	
do 27....	54 53	170 03	13	19	32	
do 27....	54 55	169 58				Boarded by Lt.-Com. F. A. Garforth of H.M.S. "Pheasant."
do 28....	54 49	170 01	2	3	5	
do 31....	54 44	170 48	13	18	31	
Sept. 1....	55 03	170 50	5	15	20	
do 3....	54 57	170 19	19	30	49	
do 6....	55 00	170 30		1	1	
do 7....	55 09	170 17	8	20	28	
do 8....	55 00	170 16	8	25	33	
do 9....	54 53	170 20	1	7	8	
do 14....	55 12	170 30	3	2	5	
do 15....	55 02	170 25	2	6	8	
do 20....	Dutch Harbour, Alaska.					Boarded by Lt. J. C. Hooker of U.S.S. "Bear."
			214	355	569	

Marine and Fisheries—Fisheries Branch.

Copy of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "CITY OF SAN DIEGO."

No. 29.

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896.	° ' " N.	° ' " W.				
Aug. 1....	54 52	167 50	1	2	3	
do 2....	55 06	167 50	2	3	5	
do 2....	55 13	167 38 15				Boarded by Lt. J. G. Ballinger of U.S.S. "Rush."
do 5....	55 20	168 06	8	13	21	
do 7....	55 18	168 32				Boarded by Lt. H. Emery of U.S.S. "Wolcott."
do 7....	55 13	168 31	1	1	2	
do 8....	55 01	168 40	4	2	6	
do 10....	56 01	173 13	6	25	31	
do 11....	56 09	173 53	4	12	16	
do 12....	56 18	173 30		1	1	
do 14....	57 11	172 46				Boarded by Lt. R. M. Sturdevant of U.S.S. "Perry."
do 16....	56 54	173 29		1	1	
do 21....	57 03	175 03	1		1	
do 22....	56 10	172 35				Boarded by Lt. J. G. Ballinger of U.S.S. "Rush."
do 22....	56 09	172 33	7	38	45	
do 23....	55 51	172 44	1	2	3	
do 24....	55 49	172 44	4	17	21	
do 25....	55 52	172 27	1	2	3	
do 26....	56 12	172 10	13	47	60	
do 27....	56 15	172 22	21	48	69	
do 31....	55 48	173 29	1	6	7	
Sept. 1....	55 53	174 19	1	7	8	
do 3....	55 40	172 58	12	22	34	
do 6....	56 18	172 30		2	2	
do 7....	56 23 30	172 40				Boarded by Lt. J. G. Ballinger of U.S.S. "Rush."
do 7....	56 24	172 39	2	38	40	
do 8....	56 28	172 32		1	1	
do 9....	55 49	172 17	1	9	10	
do 15....	54 59	168 25	2	8	10	
do 19....	Illoook,	Alaska.				Boarded by Lt. W. W. Hall [of U.S.S. "Bear."
			93	307	400	

Copy of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "DOLPHIN."

No. 54.

Date.	POSITION.		CATCH.		Total.	Remarks.	
	Latitude.	Longitude.	Males.	Females.			
1896.	° ' N.	° ' W.					
Aug. 1	55 10	167 30		2	2		
do 2	55 18	167 27				Boarded by Lt. G. M. Daniels of U.S.S. "Rush."	
do 2	55 12	167 31	11	6	17		
do 5	55 15	168 33	40	21	61		
do 6	55 16	168 29	7	5	12		
do 8	54 53	168 02	5	3	8		
do 10	55 06	169 00	30	12	42		
do 11	55 03	169 06	12	7	19		
do 12	55 08	168 36	20	10	30		
do 19	55 08	169 37					Boarded by Lt. J. G. Ballinger of U.S.S. "Rush."
do 19	55 08	169 37	5	3	8		
do 20	55 10	169 42	8	10	18		
do 21	55 09	169 12				Boarded by Lt. F. A. Levis of U.S.S. "Grant."	
do 21	55 05	169 21	20	24	44		
do 22	55 04	169 04	25	26	51		
do 24	55 13	170 05	30	11	41		
do 25	55 09	169 25	9	10	19		
do 26	55 00	169 46	7	11	18		
do 27	55 00	170 18	30	28	58		
do 28	54 45	170 34	3	6	9		
do 30	54 50	169 16	7	8	15		
do 31	54 53	169 12	20	27	47		
Sept. 3	54 50	170 00	9	8	17		
do 7	55 15	169 38	15	18	33		
do 8	55 10	169 07	8	9	17		
do 9	55 23	169 22				Boarded by Lt. D. F. A. de Otte of U.S.S. "Corwin."	
do 9	55 20	169 20	3	3	6		
do 15	55 22	170 00	9	6	15		
Oct. 8	Dutch Harbour, Alaska.					Boarded by Lt. C. S. Cochran of U.S.S. "Bear."	
			333	274	607		

SCHOONER "DORA SIEWERD."

No. 45.

Aug. 2	55 19	168 31	14	22	36	
do 5	55 15	167 48	12	20	32	
do 6	55 10	168 32	3	2	5	
do 8	55 08	169 08	8	9	17	
do 10	55 08	168 55	23	26	49	
do 11	55 11	169 06	14	19	33	
do 12	55 05	169 26	25	29	54	
do 20	57 14	172 20	8	9	17	
do 21	57 55	173 31	3	5	8	
do 22	57 31	172 43	11	33	49	
do 23	57 38½	172 56				Boarded by Lt. J. G. Ballinger of U.S.S. "Rush."
do 23	57 31	173 01	18	51	69	
do 24	57 35	172 45	5	11	16	
do 26	57 36	172 47	15	67	82	
do 26	57 42	172 47				Boarded by R. M. Sturdevant of U.S.S. "Rush."
do 27	57 35	172 42	24	44	68	
do 27	57 35	172 42				Boarded by Lt. K. W. Perry of U.S.S. "Grant."
do 31	57 12	172 32				Boarded by Lt. H. H. Holland of H.M.S. "Icarus."
do 31	57 12	172 32	22	29	51	
Sept. 1	57 20	172 46	18	26	44	
do 3	57 20	172 39	19	15	34	
do 3	57 27	172 39				Boarded by Lt. G. M. Daniels of U.S.S. "Rush."
do 7	57 31	172 46	28	22	50	
do 8	57 48	172 53	4	2	6	
do 9	57 39	172 48	35	26	61	
do 15	57 18	172 35	21	14	35	
do 15	57 18	172 35				Boarded by Lt. K. W. Perry of U.S.S. "Grant."
do 19	55 03	169 45	6	4	10	
			336	490	826	

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Copy of Log-Catch in Behring Sea, Victoria, B.C.—*Continued.*

SCHOONER "DORIS."

No. 65.

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896.	° N.	' W.				
July 29....	55 02	167 58				Boarded by Lt. R. M. Sturdevant of U.S.S. "Rush."
Aug. 2....	55 08	172 08	19	24	43	
do 5....	56 02	171 52	8	54	62	
do 8....	55 40	172 37	13	27	40	
do 9....	56 00	172 49		5	5	
do 10....	56 10	172 41	3	27	30	
do 10....	56 00	172 12				Boarded by Lt. Comdr. F. A. Garforth of H.M.S. "Pheasant."
do 11....	56 10	172 45	4	8	12	
do 21....	56 42	172 16	3	9	12	
do 22....	56 35	172 29	11	31	42	
do 22....	56 40	172 11				Boarded by Lt. B. H. Camden of U.S.S. "Rush."
do 23....	56 15	172 51	1	4	5	
do 24....	56 05	172 55	8	81	89	
do 25....	55 51	172 17	1	4	5	
do 26....	56 06	172 09	14	55	69	
do 27....	56 13	172 45	13	64	77	
do 31....	56 04	172 15	2	16	18	
Sept. 1....	56 18	172 53	2	5	7	
do 3....	55 44	169 31	4	9	13	
do 7....	55 43	167 00	1	37	38	
do 8....	54 57	166 51	9	24	33	
do 9....	54 47	166 40		6	6	
do 11....	54 54	166 54	9	36	45	
do 19....	54 42	166 56	4	7	11	
do 21....	Dutch Harbour, Alaska.					Boarded by H. G. Hamlet, Lt. of U.S.S. "Bear."
			129	533	662	

SCHOONER "E. B. MARVIN."

No. 9.

July 20....	Attu, Alaska.					Boarded by J. G. Berry, acting Collector of Customs.
do 30....	55 31	167 48				Boarded by D. F. A. de Otte of U.S.S. "Corwin."
Aug. 2....	54 58	170 00	3	3	6	
do 3....	55 18	167 48				
do 5....	55 50	167 47	9	17	26	
do 6....	55 32	167 50	2	7	9	
do 7....	55 06	168 26				Boarded by Lt. H. Emery of U.S.S. "Wolcott."
do 8....	55 03	168 05	3	9	12	
do 10....	55 47½	172 09				Boarded by Lt. B. H. Camden of U.S.S. "Rush."
do 10....	55 48	172 07	12	20	32	
do 11....	55 38	172 05	4	15	19	
do 12....	55 58	172 05	6	10	16	
do 20....	55 49	172 04		4	4	
do 21....	55 58	172 16	3	9	12	
do 22....	56 14	173 12	2	1	3	
do 24....	55 10	172 10	8	5	13	
do 25....	54 38	171 31	15	6	21	
do 26....	54 48	171 10	9	10	19	
do 27....	54 40	171 01	8	4	12	
do 28....	54 52	170 34	1	2	3	
do 30....	55 50	167 00	2	1	3	
do 31....	55 54	167 17	1	2	3	
Sept. 1....	55 12	170 40		1	1	
do 3....	55 42	172 35	4	5	9	
do 6....	55 57	172 13	2	1	3	
do 7....	56 12	171 45	4	3	7	
do 8....	55 51	172 12	1		1	
do 9....	55 00	171 30	6	5	11	
do 12....	55 34	171 52				Boarded by Lt. H. Emery of U.S.S. "Wolcott."
do 14....	55 12	171 16	1		1	
do 15....	55 10	171 20	3	2	5	
			109	142	251	

Copy of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "FAVOURITE."

No. 48.

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896.	° ' " N.	° ' W.				
Aug. 2	55 32	172 00	23	52	75	
do 5	56 02	173 25	18	32	50	
do 7	55 32	172 15	2	9	11	
do 8	55 26	172 25	8	44	52	
do 9	55 30	172 56	5	12	17	
do 10	55 21	172 30	11	40	51	
do 11	55 22	172 35	29	57	86	
do 12	55 30	172 15	47	65	112	
do 18	56 09	172 40	2	1	3	
do 20	56 23	173 18	5	9	14	
do 21	56 10	172 52		8	8	
do 22	55 25	172 11	78	91	169	
do 24	55 06	171 50	34	40	74	
do 25	55 23	171 48	5	6	11	
do 26	55 35½	171 51				
do 26	55 33	170 50	43	36	79	Boarded by Lt. Com. F. A. Garforth, of H.M.S. "Pheasant."
do 27	55 35	172 00	31	28	59	
do 28	55 14	172 08	3	2	5	
do 31	55 13	171 48	19	17	36	
Sept. 1	55 28	172 00	4	5	9	
do 3	55 23	172 50	21	15	36	
do 5	55 14	172 45	22	10	32	
do 7	55 27	172 15	24	12	36	
do 9	55 15	171 19				
do 9	55 09	171 09	7		7	Boarded by Lt. H. Emery, of U.S.S. "Wolcott."
do 15	54 00	170 43	13	4	17	
			454	595	1,049	

SCHOONER "FAWN."

No. 40.

July 29							
Aug. 2	55 00	170 00	11		11	Boarded by Lt. J. H. Brown, of U.S.S. "Perry."	
do 5	55 17	168 18	20	14	34		
do 6	55 10	168 06	2	4	6		
do 7	55 19	168 25					
do 8	54 53	169 23	8	8	16	Boarded by Lt. E. V. D. Johnson, of U.S.S. "Wolcott."	
do 10	55 05	170 40	15	14	29		
do 11	55 05	170 40	38	10	48		
do 12	55 05	170 40	24	8	32		
do 18	56 03	173 18	1		1		
do 20	55 45	172 28	10	5	15		
do 21	55 42	171 54	9	6	15		
do 21	55 42	171 54½					
do 22	55 44	171 28	52	20	72	Boarded by Lt. G. M. Daniels, of U.S.S. "Rush."	
do 24	55 26	171 52	50	33	83		
do 25	55 34	171 52	4	4	8		
do 26	55 18	172 08	40	33	73		
do 26	55 33½	172 08					
do 27	55 21	172 08	20	14	34	Boarded by Lt. Com. F. A. Garforth, of H.M.S. "Pheasant."	
do 31	56 55	173 18	6	3	9		
Sept. 1	57 03	173 28	2	2	4		
do 3	55 30	172 26	20	13	33		
do 5	55 20	172 20	4	2	6		
do 7	56 12 45	172 45½					
do 7	56 12	172 40	10	30	40	Boarded by Lt. J. G. Ballinger, of U.S.S. "Rush."	
do 8	56 19	172 22	1		1		
do 9	55 45	172 07	10	10	20		
do 14	55 18	171 50	2	1	3		
do 15	55 10	171 50	6	5	11		
do 17	54 30	169 58	1		1		
do 18	54 35	169 29	1		1		
do 19	54 35	169 10	4	4	8		
			371	243	614		

Marine and Fisheries—Fisheries Branch.

COPY of Log-Catch in Behring Sea, Victoria, B.C.—*Continued.*

SCHOONER "FLORENCE M. SMITH."

No. 36.

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896.	° ' N.	° ' " W.				
July 16 . . .	Attu,	Alaska.				
Aug. 2 . . .	55 00	170 45	8	1	9	Boarded by J. G. Berry, Acting Collector of Customs.
do 5 . . .	56 14	173 22	4	11	15	
do 8 . . .	55 50	172 36	1	4	5	
do 9 . . .	55 57	172 44	1	3	4	
do 10 . . .	55 40	172 40	5	20	25	
do 11 . . .	55 37	172 35	3	14	17	
do 12 . . .	55 40	172 25	1	4	5	
do 18 . . .	55 58½	171 24 10				Boarded by Lt. E. V. D. Johnson of U.S.S. "Wolcott."
do 20 . . .	55 30	171 10	3	5	8	
do 20 . . .	53 31	171 09				Boarded by Lt. G. M. Daniels of U.S.S. "Rush."
do 21 . . .	56 00	172 24	6	7	13	
do 22 . . .	56 16	172 32	7	7	14	
do 24 . . .	55 50	172 50	3	15	18	
do 24 . . .	55 48	172 54				Boarded by Lt. J. C. Hooker of U.S.S. "Grant."
do 25 . . .	55 57	172 34	2	1	3	
do 26 . . .	55 40	172 24	6	7	13	
do 27 . . .	55 43	172 16	2	3	5	
do 30 . . .	54 30	169 40	4		4	
do 31 . . .	54 24	169 24	7	2	9	
Sept. 1 . . .	54 46	169 56	3		3	
do 3 . . .	54 45	168 40	6	2	8	
do 6 . . .	54 59	168 06				Boarded by Lt. H. Emery of U. S.S. "Wolcott."
do 6 . . .	54 54	168 06	8	2	10	
do 7 . . .	55 12	167 56	20	9	29	
do 8 . . .	55 01	168 04	15	2	17	
do 9 . . .	55 09	167 50	7	4	11	
do 11 . . .	55 10	167 05	6	5	11	
do 14 . . .	55 10	168 12	5	2	7	
do 15 . . .	55 04	168 00	4	4	8	
			137	134	271	

COPY of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "IDA ETTA."

No. 39.

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896.	° ' N.	° ' W.				
July 24....	Attu,	Alaska.	.....	.....	.....	Boarded by J. G. Berry, Acting Collector of Customs.
Aug. 2....	54 49	169 49	.....	2	2	Boarded by Lt. J. H. Brown of U.S.S. "Perry."
do 3....	54 04	169 07	.....	5	11	
do 5....	55 14	168 41	6	2	3	
do 6....	55 01	169 13	1	2	3	Boarded by Lt. H. Emery of U. S.S. "Wolcott."
do 6....	55 03	169 07	.....	.....	.....
do 8....	55 46	171 23	9	30	39	
do 9....	55 50	171 49	2	2	4	
do 10....	55 34	171 27	1	6	7	
do 11....	55 42	171 20	.....	.....	.....	Boarded by Lt. R. M. Sturdevant of U.S.S. "Perry."
do 11....	55 35	170 25	4	15	19	
do 12....	55 46	171 11	7	18	25	
do 14....	57 01	172 30	.....	1	1	
do 20....	56 54	172 50	.....	1	1	
do 21....	57 12	173 00	.....	14	14	
do 22....	56 49	172 25	.....	54	54	
do 23....	57 00	172 35	5	30	35	
do 24....	57 06½	172 35	.....	.....	.....	Boarded by Lt.-Com. F. A. Garforth of H.M.S. "Pheasant."
do 24....	56 48	172 25	.....	12	12	
do 26....	57 36	173 09	2	17	19	Boarded by Lt. J. C. Hooker of U.S.S. "Grant."
do 27....	57 45	172 55	.....	.....	.....	Boarded by Lt. K. W. Perry of U.S.S. "Grant."
do 27....	57 36	172 56	2	11	13	Boarded by officer from H.M.S. "Icarus."
do 28....	56 50	172 27	.....	.....	.....
do 30....	55 55	170 50	.....	.....	.....
do 31....	55 05	171 06	7	10	17	
Sept. 1....	54 51	171 12	3	11	14	
do 3....	54 47	169 40	2	1	3	
do 6....	54 47	167 52	.....	.....	.....	Boarded by Lt. E. V. D. Johnson of U.S.S. "Wolcott."
do 7....	55 13	167 45	6	15	21	
do 8....	55 15	167 29	1	15	16	
do 9....	55 31	167 25	2	18	20	
do 14....	55 40	167 24	.....	6	6	
do 15....	55 42	167 26	4	5	9	
do 19....	54 53	168 15	1	4	5	
do 21....	Dutch Harb	our, Alaska.	.....	.....	.....	Boarded by Lt. C. S. Cochran of U.S.S. "Bear."
			65	305	370	

Marine and Fisheries—Fisheries Branch.

COPY of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "KATE."

No. 22.

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896.	° ' W.	° ' W.				
Aug. 1....	55 17	168 05		2	2	
do 2....	55 21	168 16	10	19	29	
do 5....	54 52	169 36	7	9	16	
do 7....	56 56	173 10		3	3	
do 10....	57 41	173 45	1	2	3	
do 11....	58 15	172 02	1	4	5	
do 15....	57 50	173 00		3	3	
do 18....	58 00	172 55		1	1	
do 20....	57 49	172 59	6	18	24	
do 21....	58 04	173 07	2	20	22	
do 22....	57 53	172 55	3	22	25	
do 23....	57 46	172 58½				Boarded by Lt. J. G. Ballinger of U.S.S. "Rush."
do 23....	57 46	172 58	4	16	20	
do 24....	57 35	173 01	3	8	11	
do 25....	58 04	173 22		3	3	
do 26....	57 33	172 53				Boarded by Lt. T. J. Haake of U.S.S. "Perry."
do 26....	57 33	172 53	6	39	45	Boarded and seized by Lt. T. J. Haake of U.S.S. "Perry."
do 26....	57 33	172 53				Released by Capt. C. L. Hooper, comdg. Behring Sea Patrol.
do 29....	Unalaska, Alaska.					
Sept. 3....	55 52	171 20	14	7	21	
do 5....	56 43	173 32	4	3	7	
do 6....	57 02	173 20	3	6	9	
do 7....	57 21	173 31	6	14	20	
do 9....	57 48	172 26	10	31	41	
do 15....	56 20	172 48	7	1	8	
			87	231	318	

SCHOONER "LABRADOR."

No. 13.

Aug. 1....	55 17	168 38		1	1	
do 2....	55 02	169 07	4	4	8	
do 5....	55 16	169 47	16	9	25	
do 6....	55 15	169 01				Boarded by Lt. E. V. D. Johnson of U.S.S. "Wolcott."
do 6....	55 11	169 10	1	4	5	
do 7....	55 30	169 32	1	1	2	
do 8....	55 08	169 00	1	2	3	
do 10....	55 24	170 03	8	3	11	
do 11....	55 06	170 04	8	16	24	
do 12....	55 01	169 51	4	8	12	
do 19....	55 59	169 30				Boarded by Lt. T. J. Haake of U.S.S. "Perry."
do 19....	55 28	168 30	9	10	19	
do 20....	55 39	168 20	3	3	6	
do 21....	55 17	168 14	3	6	9	
do 22....	55 16	168 10				Boarded by Lt. R. M. Sturdevant of U.S.S. "Perry."
do 22....	55 16	168 10	4	8	12	
do 24....	55 00	171 25	20	11	31	
do 25....	54 57	171 15	7	6	13	
do 26....	55 08	171 25	15	14	29	
do 27....	55 11	171 25	8	8	16	
do 28....	55 23	171 16	2	1	3	
do 31....	55 05	171 08	16	9	25	
Sept. 1....	54 14	171 20	6	5	11	
do 3....	55 01	171 30	2	1	3	
do 5....	55 06	171 00	3	2	5	
do 7....	55 05	171 01	3	3	6	
do 9....	55 27	170 06				Boarded by Lt. B. M. Chiswell of U.S.S. "Corwin."
do 9....	55 17	169 15	14	6	20	
do 14....	55 22	169 10	4	3	7	
do 15....	55 17	169 23	1	1	2	
do 19....	Dutch Harbour, Alaska.					Boarded by Lt. R. M. Sturdevant of U.S.S. "Perry."
			163	145	308	

COPY of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "LIBBIE."

No. 50.

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896.	° ' N.	° ' W.				
Aug. 2....	55 26	171 40	54	20	74	
do 5....	56 30	172 30	12	11	23	
do 7....	56 48	173 18	3	1	4	
do 10....	56 25	173 06	19	22	41	
do 11....	56 28	173 13	7	5	12	
do 12....	57 00	173 10	1	1	2	
do 15....	57 50	173 04		1	1	
do 18....	57 30	172 55	3	2	5	
do 19....	58 00	173 00	1		1	
do 20....	58 30	173 00	2		2	
do 22....	57 42	172 50	43	23	66	
do 23....	57 54½	173 10½				Boarded by Lt. J. G. Ballinger, of U.S.S. "Rush."
do 23....	57 54	173 10	30	38	68	
do 24....	57 30	174 14	10	19	29	
do 26....	56 56	173 18	34	38	72	
do 27....	57 04	173 27	25	35	60	
do 31....	56 09	173 08	12	16	28	
Sept. 1....	56 12	173 15	5	3	8	
do 3....	55 22	172 25	13	12	25	
do 5....	54 58	172 00	12	9	21	
do 6....	55 02	171 50	1		1	
do 7....	55 44	172 15	16	20	36	
do 8....	56 00	172 25	3		3	
do 9....	55 23	171 57	5	3	8	
do 15....	55 50	173 13				Boarded by Lt. B. M. Chiswell, of U.S.S. "Corwin."
do 15....	55 50	173 13	1	2	3	
			312	281	593	

SCHOONER "MARY ELLEN."

No. 63

Aug. 1....	55 07	167 10		1	1	
do 2....	55 25	167 33				Boarded by Lt. J. G. Ballinger, of U.S.S. "Rush."
do 2....	55 27	167 30	5	8	13	
do 5....	55 00	167 36	12	5	17	
do 6....	55 06	167 41	3		3	
do 7....	55 10	168 06½				Boarded by Lt. G. M. Daniels, of U.S.S. "Rush."
do 8....	55 05	168 50	4		4	
do 10....	55 18	171 18	12	4	16	
do 11....	55 25	171 18	27	32	59	
do 12....	55 20	171 22	32	13	45	
do 18....	55 45	171 57	9	8	17	
do 20....	56 35	171 52	2	3	5	One skin with two bullet-holes.
do 21....	56 35	172 47	1	1	2	
do 22....	55 55	171 57	24	20	44	
do 23....	55 43	171 45				Boarded by Lt. J. C. Hooker, of U.S.S. "Grant."
do 24....	55 28	172 02	43	29	72	
do 25....	55 40	172 00	3	2	5	
do 26....	55 28	172 02	24	22	46	
do 26....	55 27½	172 02				Boarded by Lt. Com. F. A. Garforth, of H.M.S. "Pheasant."
do 27....	55 21	172 01	18	26	44	
do 28....	55 20	171 40		3	3	
do 30....	56 07	171 37	1		1	
do 30....	55 55	170 50				Boarded by officer from H.M.S. "Icarus."
do 31....	56 13½	171 42½				Boarded by Lt. J. G. Ballinger, of U.S.S. "Rush."
do 31....	56 13	171 42	17	35	52	
Sept. 1....	56 07	172 05		2	2	
do 3....	55 32	172 55	12	28	40	
do 7....	56 13	171 58	8	12	20	
do 8....	55 51	171 55	3		3	
do 9....	55 04	170 38				Boarded by Lt. H. Emery, of U.S.S. "Wolcott."
do 15....	55 15	168 55	5	3	8	
do 18....	54 35	167 10		1	1	
do 19....	55 00	167 00	9	4	13	
do 22....	Dutch Harb	our, Alaska.				Boarded by Lt. W. W. Hall, of U.S.S. "Bear."
			274	262	536	

Marine and Fisheries—Fisheries Branch.

Copy of Log Catch in Behring Sea, Victoria, B.C.—*Continued.*

SCHOONER "MARY TAYLOR."

No. 30.

Date.	POSITION.		CATCH.		Total.	Remarks.	
	Latitude.	Longitude.	Males.	Females.			
1896.	N.	W.					
	Attu,	Alaska.					
July 28....	55 31	166 15	2	9	11	Boarded by J. G. Berry, Acting Collector of Customs.	
Aug. 5....	55 31	166 15	2	9	11		
do 11....	58 13	173 06	1	2	3		
do 12....	58 10	173 35		4	4		
do 20....	55 45	166 32		3	3		
do 22....	55 56	167 35	3	15	18		
do 24....	55 46	167 52		4	4		
do 25....	55 45	167 40		3	3		
do 27....	55 28	169 35	5	14	19		
do 28....	55 27	169 58				Boarded by Lt. F. J. Haake, of U.S.S. "Perry."	
do 28....	55 21	169 58		2	2		
do 30....	55 18	168 50	2	12	14		
do 31....	55 16	169 10	2	6	8		
Sept. 3....	55 24	173 23				Boarded by Lt. F. J. Haake, of U.S.S. "Perry."	
do 3....	55 38	173 20	6	13	19		
do 5....	55 37	173 30	1	3	4		
do 6....	55 30	173 25		4	4		
do 7....	55 27	172 36	5	4	9		
do 9....	55 07	169 20	1	2	3		
do 19....	54 04	163 50		1	1		
do 20....	53 55	162 45	7	1	8		
			35	102	137		

SCHOONER "MASCOT."

No. 5.

Aug. 2....	55 15	167 02	2	2	4		
do 8....	55 29	166 49	1	1	2		
do 10....	55 26	168 55	5	6	11		
do 11....	55 19	168 50	4	6	10		
do 12....	55 14	169 27	13	20	33		
do 19....	55 38	168 13	3	2	5		
do 20....	55 21	168 06	5	12	17		
do 21....	55 11	168 30	9	5	14		
do 22....	55 27	169 24	16	29	45		
do 24....	55 16	169 30	14	5	19		
do 25....	55 27	169 28	4	10	14		
do 26....	55 08	169 14	3	3	6		
do 27....	55 00	169 58	9	14	23		
do 28....	54 52	169 47		6	6		
do 30....	55 02	169 20	11	2	13		
do 31....	54 59	169 22	7	14	21		
Sept. 1....	55 02	169 36	1		1		
do 2....	54 57	169 50	2	1	3		
do 3....	54 55	169 21	7	1	8		
do 6....	55 22	169 05	3	2	5		
do 7....	55 13	169 45	17	5	22		
do 8....	55 22	169 30	4	3	7		
do 9....	55 20	169 16				Boarded by D. F. A. de Otte, of U.S.S. "Corwin."	
do 9....	55 20	169 12	5	3	8		
do 15....	58 32	173 30	12	11	23		
do 17....	58 27	174 04		1	1		
do 21....	58 24	173 20	14	18	32		
do 22....	58 24	173 55	5	9	14		
do 27....	58 12	174 00	1	4	5		
do 28....	58 29	173 38	11	18	29		
do 30....	58 39	173 34	3	13	16		
			191	226	417		

COPY of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "MAUD S."

No. 68.

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896.	° 'N.	' W.				
Aug. 1	55 42	167 35		2	2	
do 2	55 05	167 14	5	17	22	
do 5	55 52	167 18	7	28	35	
do 6	55 36	167 53	4	5	9	
do 8	55 30	168 42	3	3	6	
do 10	55 26	169 11				
do 10	55 28	169 52	12	29	41	Boarded by Lt. R. M. Sturdevant of U. S. S. "Perry."
do 11	55 05	170 13	7	16	23	
do 12	55 02	169 56	10	13	23	
do 20	56 00	171 39				Boarded by Lt. J. G. Ballinger of U. S. S. "Rush."
do 20	56 00	171 36	4	5	9	
do 21	56 01	171 36	4	4	8	
do 22	56 09	171 36	13	19	32	
do 24	55 15	172 29	16	11	27	
do 25	54 58	172 00	5	7	12	
do 26	55 15	171 15	18	34	52	
do 27	54 57	171 14	22	29	51	
do 28	54 56	171 00	7	3	10	
do 31	55 40	166 19		8	8	
Sept. 1	55 55	167 01		3	3	
do 2	55 52	167 24		2	2	
do 3	55 23	164 07	5	3	8	
do 6	55 39	165 08	9	11	20	
do 7	55 39	165 08	24	31	55	
do 8	55 38	165 07	19	26	45	
do 9	55 46	165 07	3	3	6	
do 11	56 16	165 29	6	5	11	
do 15	55 47	166 48	28	27	55	One skin with shot holes in shoulder.
do 18	56 17	166 57	11	12	23	
do 19	56 12	166 11	2	2	4	
			244	358	602	

SCHOONER "MERMAID."

No. 23.

July 25	Attu,	Alaska.				Boarded by J. G. Berry, Acting Collector of Customs.
Aug. 2	55 30	172 08	3	16	19	
do 5	55 35	173 00	3	26	29	
do 6	55 30	173 00	1	14	15	
do 8	55 26	173 00	4	22	26	
do 9	55 20	173 13	3	5	8	
do 10	55 25	173 10	11	9	20	
do 11	55 25	170 10	5	12	17	
do 12	55 20	173 00	8	18	26	
do 20	56 25	172 15	2	3	5	
do 21	55 39½	172 21½				Boarded by Lt. J. G. Ballinger of U. S. S. "Rush."
do 22	55 31	172 40	6	13	19	
do 24	55 05	172 10	18	19	37	
do 26	55 13	171 30	19	19	38	
do 27	55 18	171 46	13	4	17	
do 31	54 52	171 50	9	8	17	
Sept. 1	55 00	171 50	5	4	9	
do 3	54 50	170 00	13		13	
do 7	55 13	172 40	8	1	9	
do 9	55 25	172 45	6	7	13	
do 15	56 30	174 00	4	4	8	
			141	204	345	

Marine and Fisheries—Fisheries Branch.

COPY of Log-Catch in Behring Sea, Victoria, B.C.—*Continued.*

SCHOONER "MINNIE."

No. 25

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896.	° ' N.	° ' W.				
Aug. 1....	55 09	168 49	1	1	2	
do 2....	55 00	171 12	18	10	28	
do 5....	56 13	172 16	8	8	16	
do 6....	56 34	172 59	.....	1	1	
do 7....	56 20	172 27	1	1	2	
do 8....	56 09	172 47	2	4	6	
do 9....	56 16	173 17	2	9	11	
do 10....	56 16	172 52	5	11	16	
do 11....	56 15	173 29	3	12	15	
do 12....	56 07	171 56	.....	2	2	
do 15....	55 57	172 24	.....	3	3	
do 18....	56 06	171 39	1	.....	1	
do 20....	56 02½	171 51	.....	.....	.....	Boarded by Lt. J. G. Ballinger, of U. S. S. "Rush."
do 20....	56 02	171 54	2	7	9	
do 21....	56 10	171 45	5	12	17	
do 22....	56 05	171 55	19	24	43	
do 23....	55 45	171 37	.....	.....	.....	Boarded by Lt. F. A. Levis, of U. S. S. "Grant."
do 23....	55 24	171 00	1	3	4	
do 24....	55 24	171 06	9	16	25	
do 25....	55 07	169 38	10	17	27	
do 26....	55 02	170 28	.....	3	3	
do 27....	55 05	170 55	14	33	47	
do 28....	55 14	170 46	3	7	10	
do 31....	54 50	170 34	13	22	35	
Sept. 3....	55 24	171 42	20	25	45	
do 5....	55 02	171 16	2	3	5	
do 7....	55 40	170 50	20	7	27	
do 8....	55 33	171 13	1	1	2	
do 9....	55 35	171 30	15	23	38	
do 14....	55 52	171 10	4	7	11	
do 15....	55 43	171 25	7	6	13	
do 19....	Dutch Harbour, Alaska.		.....	.....	.....	Boarded by Lt. R. M. Sturdevant, of U. S. S. "Perry."
do 21....	do	do	.....	.....	.....	Boarded by Lt. J. C. Hooker, of U. S. S. "Bear."
do 25....	54 28	166 04	7	13	20	
			193	291	484	

SCHOONER "OCEAN BELLE."

No. 4

July 24....	Attu, Alaska.		.....	.....	.....	Boarded by J. G. Berry, acting Collector of Customs.
Aug. 1....	55 29	171 17	1	.....	1	
do 2....	55 19	172 01	7	2	9	
do 5....	57 57	173 14	1	3	4	
do 9....	57 54	173 13	.....	1	1	
do 10....	58 08	173 12	3	12	15	
do 11....	58 19	173 39	1	1	2	
do 12....	58 08	175 20	3	9	12	
do 12....	58 08	173 20	.....	.....	.....	Boarded by Lt. F. J. Haake, of U. S. S. "Perry."
do 14....	58 28	173 18	1	3	4	
do 16....	58 54	173 12	2	2	4	
do 18....	58 55	173 15	2	8	10	
do 19....	58 00	173 25	3	5	8	
do 20....	58 18	173 08	4	10	14	
do 21....	58 20	173 02	3	11	14	
do 22....	58 09	173 01	1	8	9	
do 23....	58 06	172 58	13	50	63	
do 24....	58 10	173 00	.....	3	3	
do 25....	57 40	173 18	2	11	13	
do 27....	57 44	173 19	.....	.....	.....	Boarded by Lt. F. A. Levis, of U. S. S. "Grant."
do 27....	57 46	173 19	4	13	17	
do 28....	57 55	173 12	.....	2	2	
do 31....	58 10	173 10	4	5	9	
Sept. 3....	55 18	172 57	17	21	38	
do 5....	54 56	172 50	5	11	16	
do 7....	55 30	172 26	8	16	24	
do 9....	55 30	172 07	9	12	21	
do 15....	55 00	172 15	2	.....	2	
do 18....	54 05	168 41	1	.....	1	
			97	219	316	

Copy of Log-Catch in Behring Sea, Victoria, B.C.—*Continued.*

SCHOONER "OCEAN ROVER."

No. 66.

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896.	° ' W.	° ' W.				
Aug. 1....	55 27	169 45	2	3	5	
do 2....	55 15	169 48	16	6	22	One skin with shot holes.
do 4....	55 30	169 57	1		1	
do 5....	55 14	169 14	21	32	53	do do
do 6....	55 09	169 13	2	1	3	
do 7....	55 18	169 20		1	1	
do 8....	55 18	169 19	9	11	20	
do 9....	55 26	169 14	1	1	2	
do 10....	55 28	169 20				
do 10....	55 28	169 20	6	16	22	Boarded by F. J. Haake, of U. S. S. "Perry."
do 11....	55 09	170 04	14	35	49	
do 12....	55 02	169 45	9	12	21	
do 16....	55 52	171 59		1	1	
do 18....	56 01	171 53	1		1	
do 20....	56 06	172 04				
do 20....	56 02	172 12		2	2	Boarded by Lt. B. H. Camden, of U. S. S. "Rush."
do 21....	55 58	172 04	1	3	4	
do 22....	56 11	172 17	4	44	48	
do 23....	56 09	172 39	2	10	12	
do 24....	56 01	172 59	5	3	8	
do 25....	56 18½	172 53				
do 25....	56 18	172 45	1	1	2	Boarded by Lt. Comd. F. A. Garforth, of H. M. S. "Pheasant."
do 26....	56 09	172 40	16	36	52	
do 27....	56 07	172 43	11	41	52	
do 30....	55 03	169 20		4	4	
do 31....	55 01	169 30	11	20	31	
Sept. 2....	54 52	169 46	2		2	
do 3....	54 49	169 18	5	12	17	
do 6....	55 00	166 45	2	10	12	
do 7....	55 10	166 40	4	27	31	
do 8....	55 04	166 40	9	33	42	
do 9....	55 04	166 58	1	3	4	
do 11....	55 40	166 48		9	9	
do 14....	55 09	167 34	3	11	14	
do 15....	55 00	167 00	8	20	28	
do 18....	55 12	167 22	3	2	5	
do 19....	54 59	166 26	10	12	22	
			180	422	602	

Marine and Fisheries—Fisheries Branch.

Copy of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "OSCAR AND HATTIE."

No. 41.

Date.	POSITION.		CATCH.		Total.	Remarks.	
	Latitude.	Longitude.	Male.	Female.			
	° ' N.	° ' W.					
July 29 ...	54 28	168 42				Boarded by Lt. F. J. Haake, of U. S. S. "Perry."	
Aug. 2 ...	54 51	169 31	7	13	20		
do 5 ...	56 18	172 57	22	23	45		
do 7 ...	56 28	172 54	7	11	18		
do 8 ...	56 09	173 04	2	4	6		
do 9 ...	56 08	173 40	6	4	10		
do 10 ...	56 11	172 50	12	8	20		
do 11 ...	56 00	172 56	10	11	21		
do 15 ...	58 02	173 45	3		3		
do 16 ...	58 02	173 27		6	6		
do 18 ...	58 13	173 08		1	1		
do 19 ...	58 23	173 48		13	13		
do 20 ...	58 27	173 26		10	10		
do 22 ...	57 00	173 20	12	10	22		
do 23 ...	56 45	172 57	22	16	38		
do 24 ...	56 47	172 57	4	9	13		
do 25 ...	56 01	172 50	7	5	12		
do 26 ...	55 49	172 01	62	8	70		
do 27 ...	55 44	172 03	22	16	38		
do 31 ...	54 55	171 45	42	19	61		
Sept. 1 ...	55 05	171 39	13	8	21		
do 3 ...	54 58	171 59	11	13	24		
do 5 ...	55 10	170 16	2	5	7		
do 7 ...	55 08	170 58	27	18	45		
do 8 ...	55 10	170 46					Boarded by Lt. E. V. D. Johnson, of U. S. S. "Walcott." do do
do 8 ...	55 10	170 46	9	5	14		
do 9 ...	55 07	170 39					
do 9 ...	55 07	170 39	11	8	19		
do 16 ...	54 59	170 34	4	5	9		
do 19 ...	54 42	169 10	2		2		
do 22 ...	55 22	166 44	12	9	21		
			331	258	589		

SCHOONER "OSPREY."

No. 61.

Aug. 2 ...	55 05	169 34	2	1	3	Boarded by Lt. K. W. Perry of U.S.S. "Grant." Boarded by Lt. E. V. D. Johnson of U.S.S. "Walcott."	
do 5 ...	54 47	168 14		1	1		
do 6 ...	55 25	168 07		2	2		
do 8 ...	55 04	169 45	1	6	7		
do 10 ...	54 58	169 54	3	3	6		
do 11 ...	55 00	169 41	8	13	21		
do 12 ...	54 54	169 21	5	9	14		
do 17 ...	55 05	168 20	1		1		
do 19 ...	55 09	168 40	4	4	8		
do 20 ...	55 15	167 53					
do 20 ...	55 14	168 57					
do 20 ...	55 20	168 59	6	7	13		
do 21 ...	55 19	169 20	1	1	2		
do 22 ...	55 18	169 45	3	12	15		
do 24 ...	56 04	172 38	3	14	17		
do 25 ...	56 30	173 14					Boarded by Lt.-Comdr F. A. Garfoot of H.M.S. "Pheasant."
do 25 ...	56 27	173 12		1	1		
do 26 ...	56 55	173 04	7	29	36		
do 27 ...	57 03	173 02	4	11	15		
do 27 ...	57 03	173 02	4	11	15		
Sept. 1 ...	56 55	173 58	1		1		
do 3 ...	57 04	172 55		1	1		
do 7 ...	55 09	169 35	6	4	10		
do 8 ...	55 15	168 59	2	4	6		
do 9 ...	55 25	169 23				Boarded by Lt. D. F. A. de Otte, of U.S.S. "Corwin."	
do 9 ...	55 21	169 18	5	3	8		
do 14 ...	55 01	169 58	1	1	2		
do 15 ...	55 11	169 16	4	5	9		
do 24 ...	53 25	151 06	1		1		
			68	132	200		

COPY of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "OTTO."

No. 17.

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896.	° ' N.	° ' W.				
July 22....	Attu,	Alaska.				Boarded by J. G. Perry, Acting Collector of Customs.
Aug. 1....	58 18	172 30	1	48	49	
do 2....	58 00	172 45		5	5	
do 5....	57 20	172 36	2	5	7	
do 8....	55 28	171 21	9	10	19	
do 9....	55 51	173 21	6	17	23	
do 10....	55 48	173 30	3	20	23	
do 11....	55 33	173 21	4	19	23	
do 15....	57 56	173 35	2	4	6	
do 20....	55 00	169 25	6	27	33	
do 21....	55 05	169 39				Boarded by Lt. F. A. Levis, of U.S.S. "Grant."
do 21....	54 57	169 35	3	7	10	
do 22....	55 03	169 38	6	25	31	
do 24....	54 43	171 30	8	39	47	
do 25....	55 02	171 18	5	12	17	
do 26....	54 56	171 18	10	30	40	
do 27....	54 54	171 17	7	10	17	
do 28....	54 56	171 51	7	2	9	
do 31....	54 45	172 05	7	21	28	
Sept. 1....	55 15	171 36	7	13	20	
do 3....	55 09	172 55	8	13	21	
do 5....	54 42	172 53	5	33	38	
do 7....	55 17	173 12	8	13	21	
do 8....	54 52	172 53		3	3	
do 9....	54 24	170 30	2	1	3	
do 14....	55 02	168 06	1		1	
do 15....	55 04	168 00	4	3	7	
			121	380	501	

SCHOONER "PENELOPE."

No. 37.

Aug. 2....	55 14	169 38	14	21	35	
do 5....	55 11	170 06	15	22	37	
do 6....	55 09	169 41	13	20	33	
do 7....	55 07	169 30	2	5	7	
do 8....	55 15	169 44	9	23	32	
do 10....	55 08	169 49	6	19	25	
do 11....	55 03	170 15	16	38	54	
do 12....	55 03	170 08	35	29	64	
do 19....	54 58	169 35				Boarded by Lt. J. D. Ballinger of U. S. S. "Rush."
do 19....	55 05	169 57				
do 19....	55 01	169 38	2	4	6	Boarded by Lt. E. V. D. Johnson of U. S. S. "Wolcott."
do 20....	55 10	170 17	11	21	32	
do 21....	55 16	169 39	25	22	47	
do 22....	55 11	169 28	33	53	86	
do 23....	55 00	168 51	1	3	4	
do 24....	54 56	169 41	15	44	59	
do 25....	55 11	169 57	6	15	21	
do 26....	55 14	169 46	9	24	33	
do 27....	55 21	169 55	40	98	138	
do 28....	55 17	169 36				Boarded by Lt. J. H. Brown of U. S. S. "Perry."
do 28....	55 15	169 40	10	13	23	
do 30....	55 03	168 07	12	17	29	
do 31....	55 11	168 22	11	19	30	
Sept. 2....	55 05	169 40	1	3	4	
do 3....	54 45	170 29	5	8	13	
do 7....	55 10	170 26	7	14	21	
do 8....	55 06	170 20	7	10	17	
do 9....	54 55	170 28	3	4	7	
do 11....	54 52	168 27	2	3	5	
do 14....	55 19	167 43	7	10	17	
do 15....	55 03	167 49	7	8	15	
			324	570	894	

Marine and Fisheries—Fisheries Branch.

COPY of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "PIONEER."

No. 32.

Date.	POSITION.		CATCH.		Total.	Remarks.	
	Longitude.	Latitude.	Males.	Females.			
1896.	° ' W.	° ' N.					
July 24.....	Attu, Alaska					Boarded by J. G. Berry, Acting Collector of Customs.	
Aug. 1.....	56 55	173 56	10	27	37		
do 7.....	57 06	173 40		1	1		
do 10.....	56 28	173 05	8	20	28		
do 11.....	56 25	172 30		4	4		
do 12.....	57 10	174 00	2		2		
do 18.....	57 20	173 10		2	2		
do 20.....	57 43	173 32	2	13	15		
do 21.....	57 48	173 00		5	5		
do 22.....	57 35	173 10	1	16	17		
do 23.....	57 34	173 00	5	19	24		
do 24.....	57 17	173 36					Boarded by Lt. Comdr. F. A. Garforth of H.M.S. "Pheasant."
do 24.....	57 15	173 35		3	3		
do 25.....	56 00	172 20		2	2		
do 26.....	55 45	171 20	20	9	29		
do 27.....	55 54	171 25	7	6	13		
do 30.....	54 58	167 42	8	2	10		
do 31.....	54 46	167 40	4	8	12		
Sept. 2.....	54 47	167 20	5	4	9		
do 3.....	54 40	167 00	6	7	13		
do 6.....	54 40	166 00	4	5	9		
do 7.....	54 45	166 30	10	25	35		
do 8.....	54 45	166 35	32	25	57		
do 9.....	54 40	166 40	2		2		
do 11.....	54 57	166 00	9	7	16		
do 14.....	54 59	166 49	7	3	10		
do 15.....	54 55	167 00	4	5	9		
do 18.....	54 40	167 00	3		3		
do 19.....	54 45	166 10	5	3	8		
			154	221	375		

SCHOONER "SADIE TURPEL."

No. 6.

July 15.....	Attu, Alaska.					Boarded by J. G. Berry, Acting Collector of Customs, U.S.	
do 30.....	55 29	167 18					Boarded by Lt. C. S. Craig, U.S.S. "Corwin."
Aug. 2.....	55 20	167 23½	3	8	11		
do 5.....	55 06	168 57½	5	6	11		
do 6.....	55 09	169 13	1	2	3		
do 6.....	55 09	169 13				Boarded by Lt. H. Emery, of U.S.S. "Wolcott."	
do 7.....	55 43	167 09		1	1		
do 11.....	58 23	172 41	1	2	3		
do 12.....	58 55	173 40	1	6	7		
do 18.....	57 32	172 49	1	1	2		
do 20.....	57 42	172 55	2	11	13		
do 21.....	57 53	172 28	6	3	9		
do 22.....	58 10	172 29	1	3	4		
do 23.....	58 01	172 39	10	9	19		
do 23.....	58 03	172 52					Boarded by Lt. J. G. Ballinger, U.S.S. "Rush."
do 24.....	57 54	172 33½	1	1	2		
do 26.....	56 53	172 42	15	35	50		
do 27.....	56 59	172 47	15	30	45		
do 29.....	57 30	173 15		2	2		
do 31.....	56 40	173 06	4	2	6		
Sept. 1.....	56 28	173 12	2	2	4		
do 3.....	55 16	172 16	2	3	5		
do 5.....	55 01	171 21½	4		4		
do 7.....	55 04	169 52½	15	14	29		
do 8.....	54 56	169 33	15	5	20		
do 9.....	54 48	169 18		1	1		
do 11.....	55 09	168 11		1	1		
do 14.....	55 14	168 00		2	2		
do 15.....	55 07	167 40	4	5	9		
do 19.....	55 28	167 00	6	4	10		
do 22.....	55 14	166 27	4	4	8		
			118	163	281		

COPY of Log-Catch in Behring Sea, Victoria, B.C.—*Continued.*

SCHOONER "SAN JOSE."

No. 53.

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
	° ' N.	° ' W.				
Aug. 2....	54 37	169 35	7	4	11	
do 5....	55 29	170 26	19	57	76	
do 5....	55 29	170 26				
do 6....	55 35	170 50		6	6	Boarded by Lt. R. M. Sturdevant, of U.S.S. "Perry."
do 7....	55 30	170 12		1	1	
do 8....	55 15	170 13	19	21	40	
do 9....	55 25	170 40	1	7	8	
do 10....	55 16	170 15	11	4	15	
do 11....	55 18	170 35	20	14	34	
do 12....	55 19	170 45	9	10	19	
do 15....	56 37	172 20		1	1	
do 18....	56 21	171 56		1	1	
do 20....	55 56	172 00	1	2	3	
do 21....	55 46	172 04				
do 21....	55 46	172 03	1	6	7	Boarded by Lt. B. H. Camden, of U.S.S. "Rush."
do 22....	55 53	171 23	6	25	31	
do 23....	55 46	171 28				
do 24....	55 53	172 01	3	13	16	Boarded by Lt. K. W. Perry, of U.S.S. "Grant."
do 25....	55 49	171 21		1	1	
do 26....	55 45	171 09	18	43	61	
do 27....	55 46	171 08	19	42	61	
do 30....	55 09	170 30	1	5	6	
do 31....	55 08	170 48	4	24	28	
Sept. 2....	55 20	170 30	1	3	4	
do 3....	55 10	170 23	4	21	25	
do 7....	55 45	167 25	2	24	26	
do 8....	55 27	166 48	2	21	23	
do 9....	55 24	166 50	1	3	4	
do 11....	55 00	166 42	8	46	54	
do 14....	56 08	167 15	1	7	8	
do 15....	56 06	167 00	2	22	24	
do 18....	54 49	166 50	1	5	6	
do 19....	54 43	166 20	1	4	5	
			162	443	605	

Marine and Fisheries—Fisheries Branch.

Copy of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "SAPPHIRE."

No. 43.

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896.	° ' N.	° ' W.				
Aug. 1	55 05	170 50	4		4	
do 2	54 57	172 11	49	17	66	
do 5	56 26	172 38	4	47	51	
do 8	56 27	172 33		2	2	
do 9	56 40	173 38	12	16	28	
do 10	56 25	172 50	26	61	87	
do 11	56 26	172 30	5	6	11	
do 12	56 23	172 48	2	1	3	
do 15	56 41	173 12	1	3	4	
do 19	54 52	168 28	12	12	24	
do 20	55 04	169 45	3	25	28	
do 21	55 11	169 15				
do 21	55 03	169 02	17	10	27	Boarded by Lt. K. W. Perry of U. S. S. "Grant."
do 22	55 08	168 50	56	51	107	
do 24	54 59	169 07	28	19	47	
do 25	55 06	168 45	26	34	60	
do 26	55 18	169 23	8	4	12	
do 27	55 15	169 18	41	36	77	
do 28	55 15	169 28	4	2	6	
do 30	55 9	171 37	1		1	
do 31	55 28	171 31	64	44	108	
Sept. 1	55 27	171 35	23	10	33	
do 3	55 23	172 06	30	13	43	
do 5	54 53	171 33	12	2	14	
do 7	56 17	172 52				Boarded by Lt. J. G. Ballinger of U. S. S. "Rush."
do 7	55 45	172 47	46	31	77	
do 8	55 55	171 40	2		2	
do 9	56 05	172 37	24	7	31	
do 11	55 57	171 28	1		1	
do 13	55 33	173 27	1		1	
do 15	55 59	172 55				Boarded by Lt. C. S. Craig of U. S. S. "Corwin."
do 15	56 13	172 05	14	8	22	
do 18	54 20	169 30	6	3	9	
do 19	54 30	169 15	6	10	16	
do 21	Dutch Harbour, Alaska.					Boarded by Lt. C. S. Cochran of U. S. S. "Bear."
			528	474	1,002	

SCHOONER "SAUCY LASS."

No. 33.

Aug. 2	55 24	170 56	8	6	14	
do 5	54 53	167 40	6	3	9	
do 6	55 00	168 40	10	3	13	
do 8	55 04	169 08	10	2	12	
do 10	55 0	170 10	16	6	22	
do 11	55 00	170 20	28	11	39	
do 12	55 11	171 02	41	15	56	
do 20	55 53	172 32	12	7	20	
do 21	55 34	172 27				Boarded by Lt. J. G. Ballinger of U. S. S. "Rush."
do 21	55 34	172 27	12	9	21	
do 22	55 43	171 37	40	19	59	
do 23	55 37	171 46				Boarded by Lt. L. O. Lewis of U. S. S. "Grant."
do 24	55 43	171 2	18	10	28	
do 25	55 58	172 38	4	2	6	
do 26	56 03	172 25	20	18	38	
do 27	55 56	172 16	18	8	26	
do 30	55 11	170 20	5	3	8	
do 31	55 04	169 40	20	31	51	
Sept. 1	54 53	169 49	3		3	
do 3	55 24	171 38	31	8	39	
do 5	54 30	172 20	4	9	13	
do 7	55 27	171 47	12	24	36	
do 9	55 14	171 55	12	16	28	
do 15	56 14	173 05	5	3	8	
do 18	54 25	167 50	1		1	
do 20	Dutch Harbour, Alaska.					Boarded by Lt. J. C. Hooker of U. S. S. "Bear."
			337	213	550	
Picked up by Schooner "San Jose"...				5	5	
			337	218	555	

COPY of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "SELMA."

No. 60.

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896.	° ' N.	° ' W.				
Aug. 1	55 07	167 47		1	1	
do 2	55 32	167 33				Boarded by Lt. J. G. Ballinger of U.S.S. "Rush."
do 2	55 28	167 30	1	3	4	
do 5	55 06	167 43	2	4	6	
do 6	55 06	168 08		1	1	
do 8	55 15	168 12	1	3	4	
do 10	55 14	168 17		4	4	
do 11	55 35	168 01				Boarded by L. E. V. D. Johnson of U.S.S. "Wolcott."
do 11	55 35	168 01	5	18	23	
do 12	55 40	168 08	2	7	9	
do 20	55 48	167 28		5	5	
do 21	55 48	167 24	1	4	5	
do 22	55 38	167 35	3	7	10	
do 24	55 26	168 43	1	5	6	
do 25	55 09	168 58	3	6	9	
do 26	55 00	169 13	1		1	
do 27	54 43	169 11	5	13	18	
do 27	54 44	169 14				Boarded by Lt. Comdr. F. A. Garforth of H.M.S. "Pheasant."
do 28	54 31	169 24	3	2	5	
do 30	54 42	168 51		4	4	
do 31	54 56	169 04	5	8	13	
Sept. 2	55 16	168 55	4	2	6	
do 3	55 17	169 08	4	6	10	
do 6	54 18	168 40	3		3	
do 7	54 29	168 07	12	6	18	
do 8	54 43	168 19	4	6	10	
do 9	54 54	168 34	1		1	
do 13	54 56	168 59	1	1	2	
do 14	54 53	168 01		1	1	
do 15	55 03	168 07	1	1	2	
do 17	54 30	167 42		1	1	
do 18	54 34	167 00	2		2	
do 19	54 30	166 05	1		1	
			66	119	185	

SCHOONER "SOUTH BEND."

No. 55.

Aug. 1	55 18	166 29	4	2	6	
do 2	55 01	167 10	3	6	9	
do 5	55 21	166 34	2	12	14	
do 6	55 20	166 41	1	3	4	
do 7	55 28	167 04		1	1	
do 8	55 33	166 52		6	6	
do 10	55 20	166 30	6	41	47	
do 11	55 20	166 20	3	23	26	
do 12	55 20	166 46		8	8	
do 13	55 29	166 31		3	3	
do 19	55 21	166 35	1	6	7	
do 20	55 40	166 41	2	13	15	
do 21	55 14	165 41	4	13	17	
do 22	55 31	166 10	4	20	24	
do 24	55 19	166 30		2	2	
do 26	55 33	167 04		1	1	
do 27	55 19	169 16	12	47	59	
do 28	55 13	169 28	2	4	6	
do 28	55 13	169 28				Boarded by J. H. Brown, Lt. of U. S.S. "Perry."
do 30	55 25	169 31	1	5	6	
do 31	55 26	169 30	4	22	26	
Sept. 2	54 51	168 48	1	5	6	
do 3	55 09	167 52	2	4	6	
do 4	55 19	167 24		1	1	
do 7	55 17	167 00	1	19	20	
do 8	55 11	167 20	4	18	22	
do 11	55 11	166 30	2	7	9	
do 15	54 25	165 40		8	8	
			59	300	359	

Marine and Fisheries—Fisheries Branch.

Copy of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "TERESA."

No. 1.

Date.	POSITION.		CATCH.		Total.	Remarks.	
	Latitude.	Longitude.	Males.	Females.			
1896.	° ' N.	° ' W.					
July 22	Attu,	Alaska.					
Aug. 1	56 05	173 01	14	27	41	Boarded by Lt. J. G. Berry, Acting Collector of Customs.	
do 5	56 19	173 19	1	2	3		
do 9	56 34	173 33	1	5	6		
do 10	56 41	173 28	12	19	31		
do 11	56 34	173 08	1	3	4		
do 12	56 42	172 44		1	1		
do 13	56 09	172 43					
do 19	54 43	168 32	2	1	3		Boarded by Lt. J. G. Ballinger, of U.S.S. "Rush."
do 20	54 55	170 01	8	10	18		
do 21	55 00	170 00					Boarded by Lt. J. C. Hooker, of U.S.S. "Grant."
do 21	55 01	170 16	4	8	12		
do 22	54 55	169 56	14	10	24		
do 24	55 08	169 45	12	21	33		
do 25	55 2	170 17	6	8	14		
do 26	55 03	169 31	8	12	20		
do 27	54 48	169 36	27	34	61		
do 28	55 08	169 28	6	4	10		
do 30	55 10	168 49	3	7	10		
do 31	55 14	168 47	17	25	42		
Sept. 1	55 11	169 22	2		2		
do 2	55 19	169 17		1	1		
do 3	55 14	169 26	4	6	10		
do 6	54 44	168 22	4	2	6		
do 7	55 06	168 12	15	24	39		
do 8	55 12	168 20	15	12	27		
do 9	55 29	168 24	19	24	43		
do 14	55 18	168 26	1		1		
do 15	55 22	168 24	6	9	15		
do 19	54 49	167 01	4	2	6		
			206	277	483		

SCHOONER "TRIUMPH."

No. 16.

July 14	Attu,	Alaska.				
Aug. 2	55 06	168 45	6	20	26	Boarded by J. G. Berry, Acting Collector of Customs.
do 2	55 06	168 45				Boarded by Lt. J. H. Brown, of U.S.S. "Perry."
do 5	55 17	167 55	20	27	47	
do 6	55 19	168 15	2	4	6	
do 7	54 53	168 16	3	4	7	
do 8	55 20	168 35	5	9	14	
do 10	55 22	169 16				Boarded by Lt. F. J. Haake, of U.S.S. "Perry."
do 10	55 18	169 27	12	23	35	
do 11	55 08	169 29	19	21	40	
do 12	55 08	169 16	13	23	36	
do 19	55 25	169 11				Boarded by Lt. J. H. Brown, of U.S.S. "Perry."
do 20	55 26	170 30	20	29	49	
do 21	55 27	170 20	8	13	21	
do 22	55 30	170 16	18	26	44	
do 23	55 39	171 47				Boarded by F. A. Levis, of U.S.S. "Grant."
do 24	55 36	171 55	13	19	32	
do 25	55 29	170 45	3	4	7	
do 26	55 28	170 49	19	30	49	
do 27	55 34	170 59	30	47	77	
do 28	55 40	170 48	3	3	6	
do 31	55 38	171 40	37	48	85	
Sept. 1	55 35	171 45	2	5	7	
do 3	55 35	172 13	31	39	70	
do 5	55 18	172 13	7	10	17	
do 7	56 03	172 46				Boarded by Lt. J. G. Ballinger, of U.S.S. "Rush."
do 7	56 15	172 25	19	27	46	
do 9	55 25	172 03	9	13	22	
do 12	55 48	172 30	2		2	
do 15	56 06	172 58				Boarded by B. M. Chiswell, of U.S.S. "Corwin."
do 15	56 03	172 58	3	2	5	
			304	446	750	

Copy of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "UMBRINA."

No. 11.

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896.	° ' N.	° ' W.				
Aug. 1....	57 27	172 50		10	11	
do 5....	56 00	171 55	11	34	45	
do 8....	56 05	172 00	1		1	
do 9....	56 09	172 23	1	2	3	
do 10....	56 00	172 15	9	21	30	
do 11....	55 50	172 20	5	7	12	
do 12....	56 00	172 10	2	12	14	
do 20....	56 03	172 50	3	10	13	
do 21....	55 58	172 25				Boarded by Lt. B. N. Camden of U. S. S. "Rush."
do 22....	56 04½	172 35				Boarded by Lt. J. G. Ballinger of U. S. S. "Rush."
do 22....	56 04	172 35	12	22	34	
do 24....	55 48	172 40	3	6	9	
do 25....	56 03	172 35	3	8	11	
do 26....	55 55	172 21	4	10	14	
do 27....	55 44	172 32	5	6	11	
do 30....	54 23	167 50	2		2	
do 30....	54 23	167 45				Boarded by Lt. H. W. Perry of U. S. S. "Grant."
do 31....	54 35	168 00	1		1	
Sept. 3....	55 47	172 20	20	34	54	
do 5....	55 23	172 45	3	1	4	
do 7....	56 17	172 10	7	8	15	
do 9....	55 20	171 56	6	2	8	
do 15....	56 09	172 57	4	2	6	
do 15....	56 08	172 57				Boarded by Lt. C. S. Craig of U. S. S. "Corwin."
			103	195	298	

SCHOONER "VENTURE."

No. 35.

Aug. 2....	58 28	169 02		1	1	
do 8....	56 01	171 47	3	6	9	
do 9....	55 49	171 13		8	8	
do 10....	55 35	170 34	12	7	19	
do 11....	55 35	170 34	15	27	42	
do 12....	55 35	170 53	29	38	67	
do 18....	56 07	171 41		1	1	
do 21....	55 53	171 11	4		4	
do 21....	55 53	171 11	1		1	
do 22....	55 30	170 46	28	11	39	
do 24....	55 35	171 13	9	2	11	
do 25....	56 38	172 01	9	12	21	
do 26....	56 50	172 21	18	57	75	
do 27....	56 51	172 25	20	46	66	
do 28....	56 45	172 19				Boarded by Lt. J. C. Hooker of U. S. S. "Grant."
do 31....	56 24	172 20	7	4	11	
Sept. 1....	56 52	172 32		1	1	
do 1....	57 19½	172 44				Boarded by Lt. G. M. Daniels of U. S. S. "Rush."
do 3....	55 19	170 24	6	2	8	
do 6....	55 28	170 49	1		1	
do 7....	55 40	170 50	15	1	16	
do 9....	55 11	170 15	18	8	26	
do 15....	55 23	169 57				Boarded by Lt. E. F. D. Johnson of U. S. S. "Wolcott."
do 15....	55 23	169 57	12	3	15	Boarded by Lt. J. C. Hooker of U. S. S. "Grant."
do 21....	Dutch Harbour, Alaska.					
			207	235	442	

Marine and Fisheries—Fisheries Branch.

Copy of Log-Catch in Behring Sea, Victoria, B.C.—*Continued.*

SCHOONER "VERA."

No. 28.

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896. July 17.....	° ' N. Attu,	° ' W. Alaska.				Boarded by J. G. Berry, Acting Collector of Customs.
	57 50	174 10				Boarded by Lt. J. H. Brown, of U.S.S. "Perry."
Aug. 1.....	58 15	173 48	3	19	22	
do 2.....	58 31	173 32	4	5	9	
do 5.....	58 16	173 53	4	6	10	
do 7.....	56 16	173 00		3	3	
do 8.....	56 23	173 09		2	2	
do 10.....	58 14	172 48				Boarded by Lt. F. A. Levis, of U.S.S. "Grant."
do 10.....	58 15	173 23		7	7	
do 11.....	58 38	173 44	1	1	2	
do 19.....	54 51	169 17½				Boarded by Lt. J. G. Ballinger, of U.S.S. "Rush."
do 19.....	55 05	169 53		1	1	
do 19.....	54 59	169 49				Boarded by Lt. E. V. Johnson, of U.S.S. "Wolcott."
do 20.....	54 57	170 15	1	3	4	
do 21.....	55 14	171 15	1	1	2	
do 22.....	55 07	170 00	6	9	15	
do 25.....	55 19	167 50	5	18	23	
do 26.....	55 17	168 07		7	7	
do 27.....	55 27	168 13				Boarded by Lt. D. F. A. de Otte, of U.S.S. "Corwin."
do 27.....	55 22	168 00	7	35	42	Boarded by Lt. B. H. Camden, of U.S.S. "Rush."
do 28.....	55 26	168 19				
do 28.....	55 27	168 20	2	5	7	
do 30.....	55 15	167 12	3	8	11	
do 31.....	55 24	167 45	3	17	20	
Sept. 3.....	55 50	173 20				Boarded by Lt. F. J. Haake, of U.S.S. "Perry."
do 6.....	55 18	168 54	1	2	3	
do 7.....	55 21	168 47	2	11	13	
do 8.....	55 19	167 49	5	13	18	
do 9.....	55 15	167 52	3	14	17	
do 11.....	55 14	167 31	2	2	4	
do 14.....	55 08	167 47½	2	4	6	
do 15.....	55 06	168 11	8	8	16	
			63	201	264	

SCHOONER "VICTORIA."

No. 46.

Aug. 1.....	55 36	171 54	3	5	8	
do 2.....	55 30	172 11	31	11	42	
do 5.....	55 47	172 13	16	50	66	
do 6.....	55 50	172 15	5	7	12	
do 9.....	55 45	171 53	14	11	25	
do 10.....	56 01	172 05	33	37	70	
do 11.....	56 05	172 05	27	36	63	
do 12.....	55 55	172 00	41	66	107	
do 20.....	56 07½	172 05				Boarded by Lt. Geo. M. Daniel, of U.S.S. "Rush."
do 21.....	56 07	172 02	4	9	13	
do 22.....	57 03	172 58	27	13	40	
do 23.....	57 06	172 57	36	75	111	
do 24.....	57 04	172 59	22	15	37	
do 24.....	57 03	173 00				Boarded by Lt. Com. F. A. Garforth, of H.M.S. "Pheasant."
do 26.....	57 06	172 50	43	18	61	
do 27.....	57 00	172 52	36	50	86	
Sept. 1.....	56 45	172 50	9	1	10	
do 3.....	55 46	172 42	44	3	47	
do 7.....	56 11	172 06	14	10	24	
do 8.....	55 44	171 50	1	2	3	
do 9.....	55 33	171 16	14	13	27	
do 15.....	55 33	171 17	40	9	49	
do 21.....	Dutch Harbour, Alaska.					Boarded by Lt. C. S. Cochran, of U.S.S. "Bear."
			460	441	901	

Copy of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "VIVA."

No. 19.

Date.	POSITION.		CATCH.		Total.	Remarks.	
	Latitude.	Longitude.	Males.	Females.			
1896.	° ' N.	° ' W.					
Aug. 5....	55 01	168 04	2	1	3	One skin with shot holes.	
do 7....	55 02	169 22	1	1	2		
do 8....	55 05	169 35	3	3	6		
do 10....	55 15	170 28	4	7	11		
do 11....	55 10	170 12	8	7	15		
do 12....	55 02	170 03	6	1	7		
do 16....	57 20	166 35	.....	1	1	
do 22....	57 53	173 00	4	5	9		
do 23....	57 47	172 50	6	10	16		
			34	36	70		

SCHOONER "WALTER L. RICH."

No. 52.

Aug. 1....	55 28	170 58	2	2	Boarded by F. A. Levis of U. S. S. "Grant."
do 2....	55 32	171 58	3	26	29	
do 5....	56 18	172 25	2	22	24	
do 9....	56 28	173 22	.....	10	10
do 10....	56 17	172 57	4	23	27	
do 11....	56 20	172 20	2	23	25	
do 12....	.....	.....	.....	.....	.....
do 15....	56 50	173 40	1	.....	1
do 18....	56 34	173 02	1	5	6	
do 20....	57 09	173 01	.....	6	6
do 21....	56 51	172 40	1	9	10	
do 22....	56 39	172 06	.....	.....	.....
do 22....	56 35	172 14	1	33	34	Boarded by Lt. B. H. Camden of U. S. S. "Rush."
do 23....	56 05	172 17	.....	3	3
do 24....	56 00	172 45	2	12	14	
do 25....	56 30	173 01	4	5	9	
do 26....	57 07	173 50	1	38	39	
do 27....	57 17	173 50	3	45	48	
do 29....	57 39	174 23	1	6	7	
do 31....	56 52	173 36	.....	8	8
Sept. 1....	56 25	173 50	1	2	3	
do 3....	55 31	173 02	5	16	21	
do 7....	56 15	172 59	
do 7....	56 15	172 57	2	34	36	
do 9....	56 15	172 29	7	17	24	
do 14....	55 54	172 50	1	1	Boarded by Lt. C. S. Craig of U. S. S. "Corwin."
do 15....	56 03	172 57	.....	.....	.....
do 15....	56 00	172 47	1	6	7	
do 19....	54 19	168 00	.....	5	5
			44	355	399	

Marine and Fisheries—Fisheries Branch.

Copy of Log-Catch in Behring Sea, Victoria, B.C.—Continued.

SCHOONER "ZILLAH MAY."

No. 69.

Date.	POSITION.		CATCH.		Total.	Remarks.
	Latitude.	Longitude.	Males.	Females.		
1896.	° ' N.	° ' W.				
Aug. 2 ...	55 48	171 48	28	45	73	
do 5....	55 45	172 30	30	51	81	
do 6....	55 30	172 15	20	19	39	
do 8....	55 53	172 00	12	25	37	
do 10....	55 53	172 06	15	34	49	
do 11....	55 45	172 10	15	19	34	
do 12....	55 40	172 20	10	17	27	
do 20....	56 10	172 15	4	8	12	
do 20 ...	56 09	172 23				
do 21....	56 00	172 10	5	4	9	Boarded by Lt. B. H. Camden, of U.S.S. "Rush."
do 22....	56 00	172 20	20	20	40	
do 24....	55 47	172 00	30	7	37	
do 26....	55 48	171 55	40	21	61	
do 27....	55 59	172 06	75	20	95	
do 31....	55 55	171 41	10	21	31	
Sept. 3 ...	57 14	172 59				do do
do 3....	57 14	172 58	5	3	8	
do 7....	55 15	168 50	20	13	33	
do 8....	55 06	168 35	15	19	34	
do 9....	55 12	168 30	43	10	53	
do 14....	55 44	167 17	15	5	20	
do 15....	55 40	167 10	12	5	17	
do 18....	54 40	166 54	10	10	20	
do 19....	54 40	166 40	3	8	11	
do 21....	Dutch Harbour, Alaska.					Boarded by Lt. H. G. Hamlet, of U.S.S. "Bear."
			437	384	821	

SEALING SEASON, 1896.

CATCH OF AMERICAN SCHOONERS.

Landed at San Francisco, U.S.

Schooner "Penelope," returned Feb. 29th	400
do "Luiza D." do Oct. 7th.	689
do "Rattler" do Oct. 9th.	938
do "Alton" do Oct. 15th	821
do "Falcon" do Oct. 17th	340
do "J. Eppinger" do May 16th	1,361
do "Jane Gray" do	491
do "W. B. Ogden" do Sept. 6th	32
	5,072

Landed at Seattle, U. S.

hoooner "M. M. Morrell"	905
do "W. Ainsworth"	925
do "Elsa"	935
do "St. Lawrence"	800
	3,565

Total catch of U. S. schooners..... 8,637

CATCH OF BRITISH COLUMBIA SCHOONERS.

On British Columbia coast	10,703
Japan coast	17,968
Copper Island coast	1,306
In Behring Sea	25,700
	55,677

CATCH OF UNITED STATES SCHOONERS.

Landed at San Francisco	5,072
do Seattle	3,565
	8,637

CATCH ON ISLANDS OF ST. GEORGE AND ST. PAUL.

Landed at San Francisco	40,000
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CATCH ON RUSSIAN COAST AND ISLANDS.

Landed at San Francisco	14,896
	119,210

Total, Pacific catch 119,210

A. R. MILNE,
Collector.

PORT OF VICTORIA, B.C.

BRITISH COLUMBIA

Vessel.	Tons.	Master.	CREWS.		BOATS.		PARTICULARS			
			White.	Indians.	Boats.	Canoes.	B. C. Coast.		Japan Coast.	
							Males.	Females.	Males.	Females.
Ada.....	91	G. R. Ferey.....	6	20	1	10				
Agnes MacDonal.....	107	M. F. Cutler.....	25		10				235	310
Ainoko.....	75	G. Heater.....	6	12	2	6	198	230		
Allie J. Algar.....	75	C. E. Locke.....	23		9				397	262
Amateur.....	18	C. Jipson.....		16		8		87		
Annie C. Moore.....	113	C. Hackett.....	8	34	2	16	271	160		
Annie E. Paint.....	82	A. Bissett.....	26		12				419	396
Arietis.....	86	P. Martin.....	25		9				715	319
Aurora.....	41	T. H. Brown.....	20		6				44	281
Beatrice (Shanghai).....	66	Wm. Heater.....	6	26	2	13	239	142		
Beatrice.....	49	A. H. Jones.....	6	11	2	6	272	91		
Borealis.....	37	A. Wasberg.....	13		7				82	245
Carlotta G. Cox.....	76	W. D. Byers.....	25		9				552	670
Carrie C. W.....	92	J. A. Gould.....	9	31	2	16	112	57		
Casco.....	63	C. LeBlanc.....	22		7				186	622
C. D. Rand.....	51	J. O. Townsend.....	6	27	2	13				
City of San Diego.....	46	W. McDougall.....	6	22	1	11	149	64		
Diana.....	50	A. Nelson.....	18		6				475	522
Director.....	87	F. W. Gilbert.....	23		7				460	433
Dolphin.....	72	John Daley.....	8	26	3	13	454	48		
Dora Siewerd.....	93	H. F. Siewerd.....	10	32	2	16	174	203		
Doris.....	60	Fred. Griffiths.....	6	25	1	12				
E. B. Marvin.....	96	C. H. Harris.....	23		11				397	439
Favourite.....	80	L. McLean.....	6	33	2	16	514	310		
Fawn.....	59	M. Foley.....	9	26	2	13	286	143		
Fisher Maid.....	21	C. Chipps.....		9		4	8	55		
Florence M. Smith.....	99	L. McGrath.....	27		11				396	206
Fortuna.....	97	Thos. O'Leary.....	24		7				162	372
Geneva.....	92	W. O'Leary.....	26		8				190	309
Ida Etta.....	69	W. O. Hughes.....	22		9				195	455
Kate.....	58	C. Stromgren.....	7	25	2	12	82	122		
Katherine.....	81	J. E. Fulton.....	20		6				99	116
Kilmeny.....	18	W. Halgarn.....	4	12	1	6	63	37		
Labrador.....	25	John Haan.....	7	10	2	5	48	43		
Libbie.....	92	F. Hackett.....	8	23	2	14	358	144		
Mary Ellen.....	63	D. McPhee.....	6	24	3	11				
Mary Taylor.....	43	R. O. Lavender.....	19		6				174	209
Mascot.....	40	E. Lorenz.....	6	16	2	7			99	93
Maud S.....	97	R. E. McKiel.....	10	20	3	11				
Mermaid.....	73	W. H. Whitley.....	25		8				438	502
Minnie.....	46	V. Jacobsen.....	6	20	2	10	327	159		
Ocean Belle.....	83	A. B. Whidden.....	18	13	3	10			154	430
Ocean Rover.....	55	O. Buckholtz.....	7	18	2	9				
Oscar and Hattie.....	32	T. Magnesen.....	9	23	3	14	197	156		
Osprey.....	40	G. N. Fulton.....	8	10	3	5				
Otto.....	86	J. McLeod.....	9	25	2	12			534	185
Pachwellis.....	20	J. Nyitam.....		20		10	49	103		
Penelope.....	70	D. G. Macaulay.....	6	25	2	12	332	126		
Pioneer.....	66	W. E. Baker.....	24		7				439	410

Marine and Fisheries—Fisheries Branch.

SEALING REPORT, 1896.

OF CATCH.					Number of Special Sealing License.	Remarks.
Vicinity of Copper Islands.		Behring Sea.		Total.		
Males.	Females.	Males.	Females.			
		204	519	723	67	Boarded 3 times in Behring Sea by U.S. Cutters.
		147	135	282	26	do 4 do do
		6	133	567	49	Seized in Behring Sea, 5th Aug., by U.S.S. "Perry."
16	32	123	288	1,118	12	Boarded 5 times in Behring Sea by U.S. Cutters.
				109	57	
		583	505	1,519	51	do 1 do do
		81	144	1,040	24	do 5 do do
		108	330	1,472	20	do 2 do once by H.M.S.
						do U.S.
16	19	8	69	437	14	Seized in Behring Sea, 10th Aug., by U.S.R.S. "Rush."
		179	353	913	38	Boarded 6 times in Behring Sea by U.S.S. Cutters.
		45	47	455	44	Seized in Behring Sea, 5th Aug., by U.S.S. "Perry."
		70	235	632	3	Boarded 2 times in Behring Sea by U.S. Cutters.
		74	160	1,456	27	do 3 do do
		273	630	1,072	42	do 4 do 3 times by U.S.S.
						once by H.M.S.
63	139			1,010	15	
		214	355	569	64	do 8 do do
		93	307	613	29	do 6 do 7 times by U.S.S.
				1,092	7	by U.S. Cutters.
19	76			1,076	21	
85	98			1,101	54	do 5 do by U.S.S.
		333	274	1,203	45	do 6 do 5 times by U.S.S.
		336	490	662	65	do 4 do once by H.M.S.
		129	533	1,087	9	do 4 do 3 times by U.S.S.
		109	142	1,873	48	do 2 do once by U.S.S.
		454	595	1,043	40	do 4 do do H.M.S.
		371	243			3 times by U.S.S.
				63	56	once by H.M.S.
		137	134	873	36	do 4 do by U.S.S.
				708	10	
44	180			950	8	
162	29			1,033	39	do 9 do 7 times by U.S.S.
3	10	65	305	522	22	do 3 do 2 do H.M.S.
		87	231	215	2	do 3 do by U.S.S.
				100	18	Foundered at sea with 207 skins.
		163	145	399	13	Boarded 5 times in Behring Sea by U.S.S.
		312	281	1,095	50	do 2 do do
		274	262	536	63	do 8 do 6 times by U.S.S.
						2 do H.M.S.
		35	102	520	30	do 2 do by U.S.S.
		191	22	609	5	do 1 do do
		244	358	602	68	do 2 do do
		141	204	1,285	23	do 1 do do
		193	291	970	25	do 4 do do
		97	219	900	4	do 2 do do
		180	422	6.2	66	do 3 do once by H.M.S.
						twice by U.S.S.
		331	258	942	41	do 2 do by U.S.S.
		68	132	200	61	do 4 do 3 times by U.S.S.
						once by H.M.S.
		121	380	1,220	17	do 1 do by U.S.S.
				152	58	
		324	570	1,352	37	do 3 do do
30	14	154	221	1,268	32	do 1 do by H.M.S.

BRITISH COLUMBIA

Vessel.	Tons.	Master.	CREWS.		BOATS.		PARTICULARS			
			White.	Indians.	Boats.	Canoes.	B. C. Coast.		Japan Coast.	
							Males.	Females.	Males.	Females.
Sadie Turpel	56	A. S. Cram	9	20	4	8			288	294
San Jose	31	Fred. Cole	7	18	2	10	49	181		
Sapphire	109	Wm. Cox	9	40	3	18	217	201		
Saucy Lass	38	Daniel Martin	6	22	1	11	301	170		
Selma	21	J. Mohrhouse	3	10	1	5				
South Bend	21	C. F. Dillon	4	10	1	5	17	53		
Teresa	63	G. Meyer	10	15	2	9			130	101
Triumph	98	C. N. Cox	14	23	5	12			348	258
Umbrina	99	C. Campbell	25		10				265	477
Venture	48	A. Mathieson	6	16	2	8	118	151		
Vera	60	Wm. Shields	22		7				317	255
Victoria	63	R. Balcam	8	22	2	11	78	86		
Viva	92	M. Pike	26		7				280	327
Walter L. Rich	76	E. F. Robbins	8	27	2	13	80	13		
Zillah May	66	S. Balcam	9	22	3	11				
Totals	4,222		809	889	263	442	5,015	3,335	8,470	9,498

PORT OF VICTORIA, B.C., November, 1896.

Marine and Fisheries—Fisheries Branch.

SEALING REPORT, 1896—*Concluded.*

OF CATCH.					Number of Special Sealing Licenses.	Remarks.
Vicinity of Copper Islands.		Behring Sea.		Total.		
Males.	Females.	Males.	Females.			
.....		118	163	863	6	Boarded 3 times in Behring Sea by U.S.S.
.....		162	443	835	53		do 3 do do
.....		528	474	1,420	43	do 4 do do
.....		337	218	1,026	33	do 3 do do
.....		66	119	185	60	do 3 do
.....		59	300	429	55	do 1 do
.....		206	277	714	1	do 2 do do
7	13	304	446	1,376	15	do 6 do do
34	7	103	195	1,081	11	do 4 do do
.....		207	235	711	35	do 4 do do
.....		63	201	836	28	do 7 do do
.....		460	441	1,065	46	do 3 do
.....		34	36	677	19	Seized in Behring Sea, 24th Aug., by U.S.R.S. "Rush."
.....		44	355	492	52	Boarded 4 times in Behring Sea by U.S.S.
.....		437	384	821	69	do 3 do do
479	827	10,185	15,515	53,324		

Total catch of sealing fleet for 1896	53,324
do Indian canoes on B. C. coast	2,353
Grand Total	55,677

A. R. MILNE,
Collector of Customs.

THE PATROL FLEET.

The duty of enforcing the award regulations was, during the year, entrusted to the following vessels which formed the patrol fleet of the United States Government; the revenue cutters, "Rush," "Bear," "Corwin," "Walcott," "Grant," "Perry," while the vessels detailed for that service by Her Majesty's Government were the "Icarus," "Pheasant," and "Satellite."

SEIZURES.

During the year there were seized and brought to trial, four British sealing schooners, viz.: "Ainoko," "Viva," "Beatrice," and "Aurora."

The charges against the "Ainoko," "Viva," and "Beatrice" were substantially that of killing fur seals within the sixty mile zone around the Pribilof Islands, in contravention of the Behring Sea Award Act.

The charges having been inquired into and adjudicated upon by the Admiralty Court of British Columbia, the ships, their equipment, and everything on board thereof, and the proceeds thereof, were condemned as forfeited to Her Majesty. It was further ordered, however, that upon payment by the defendants, respectively, within thirty days of the date of judgment, of the sum of £400, and the plaintiffs' costs in the action, the ships, &c., should be restored to the owners.

In the case of the "Aurora," which vessel was seized by the United States revenue cutter "Richard Rush," the charge was a breach of the award regulations prohibiting the use of firearms in fur seal killing in Behring Sea. This case was also inquired into and adjudicated upon, the learned judge pronouncing that it had not been proved that the ship had contravened the Behring Sea Award Act, and ordering that the vessel, her equipment, &c., be restored to the owners without damages, and awarding the defendants their costs in the action.

THE CASE OF THE SCHOONER "KATE."

In addition to the above-mentioned seizures, which were brought to trial, there was the seizure in Behring Sea, and subsequent release, of the British sealing schooner "Kate." It appears from the information obtained on this subject, that the "Kate" was seized by the United States cutter "Perry," on the 26th day of August, 1896, in latitude 57° 33 north, longitude 172° 53 west, for an alleged violation of the regulations of the Paris tribunal award, as embodied in the Imperial legislation.

The certificate of seizure by the officers of the United States revenue cutter, recites "the following evidence, found upon search, is relied upon to prove the said violation of the law." The evidence thus relied upon is then set out as follows: "The aforesaid schooner, Kate, was found cruising within the area of award on the date given, namely, August 26, 1896, in latitude, 57° 33 north, longitude, 172° 53 west, from Greenwich, having on board two (2) fur seal skins, bearing evidence of having been shot in Behring Sea.

"Having reason to believe from the evidence above cited that the aforesaid British schooner Kate has contravened the Behring Sea Award Act, 1894, in the following particulars, to wit: In having on board two (2) fur seal skins bearing evidence of having been shot in the Behring Sea, in violation of the said Act, and article 6 of the regulations of the Paris award, incorporated in said Behring Sea Award Act, 1894, I have this day seized the aforesaid British schooner Kate, her tackle and cargo, by authority of the said Act, and Orders in Council issued thereunder."

The particular clause of the award regulation of which a contravention is thus assumed, reads as follows: "The use of nets, fire-arms and explosives shall be forbidden in the fur seal fishing. This restriction shall not apply to shot guns, when such fishing takes place outside of Behring sea during the season when it may be lawfully carried on."

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On seizure, the vessel was towed to Ounalaska, where she was released by order of Captain C. L. Hooper, the United States officer in command of the Behring Sea Patrol Fleet, "she not having any guns on board."

According to the positions given, the point at which this vessel was seized is, approximately, 85 or 90 miles off the western point of St. Paul Island, whence she was towed to Ounalaska, where she was released on the 29th of August, three days after her seizure.

It would be difficult to suppose a case which would better illustrate the unfriendly and extreme interpretation placed upon the Paris regulations by the United States officials charged with the important duty of enforcing imperial legislation in this regard.

The vessel was legally cleared and licensed to participate in a perfectly legitimate industry, fitted out for the Behring Sea spearing season, and according to the certificate of the collector of customs, had no fire-arms of any description on board, yet she was seized and towed from the sealing grounds on the charge of shooting seals.

It is unnecessary to comment further upon this incident, which cannot be defended. Clearly, the absence of the prohibited implements on board this vessel should have secured her from interference, and it can scarcely be contended that the facts in connection with this unjustifiable seizure can assist the United States government in their attempt to secure acquiescence in the proposed supplementary arrangements referred to elsewhere in this report.

This appears to be a case where the interested parties are justly entitled to due recompense for loss and damage, occasioned by the unwarranted proceedings of the United States officials. A claim on their behalf has been accordingly forwarded to Her Majesty's government.

PROPOSAL FOR SUPPLEMENTARY ARRANGEMENTS AS TO FIRE-ARMS, AND EXPERT EXAMINATION OF SEAL SKINS.

Under the heading, "The Agreement for the Sealing up of Implements," the report of last year referred briefly to an arrangement which had been made between Her Majesty's government and that of the United States, during 1894, applicable during the close season, but which, having failed in its object to secure sealers from unnecessary interference and seizure, was not renewed by Her Majesty's government. This resulted in an attempt by the United States government to make it appear that some such arrangement was not only necessary but desired by the sealers to protect them from graver inconvenience and loss, and that it should be extended to the vessels plying their calling in Behring Sea during the open season, to secure them against the suspicion of using concealed fire-arms, such implements being forbidden in those waters.

When the representations of the United States reached the Canadian government at the beginning of the year 1896, steps were taken to secure the views of representative sealers on the subject, because it was stated that the masters of sealing vessels had signified a desire that their arms should be sealed up as a protection.

The conclusion could not be avoided that whatever reasons existed against the voluntary measure in the first instance, which had proved a failure, and which, Her Majesty's government had declined to renew, retained their full force and were indeed much stronger against the proposed obligatory arrangement.

It was thought that if no alternative remained for the sealers to avoid seizure under the circumstances, the question of waiving the principle involved might become expedient, but some means seemed possible where such large interests were involved, whereby the sealers could either transfer their guns and send them home, or leave them in custody at some rendezvous, until the operations in Behring Sea were concluded. Such a course it was considered would change the appearance of necessity for an agreement for a practical extension of the award restrictions, out of which might grow other and perhaps more objectionable expedients.

It is not unlawful to carry fire-arms into Behring Sea on board sealing vessels; only their effective use there constitutes an offence; and it cannot be conceded that the officers

of the United States government are justified in visiting and searching British vessels merely to ascertain whether or not they carry fire-arms, more especially when those implements are not only necessary to certain periods and localities of their sealing voyages, but are legally carried under license for the very purpose of a sealing voyage.

The Canadian government then proposed the following arrangements to obviate the appearance of difficulty which had been raised by the United States authorities:—

1. In regard to the vessels sailing from Victoria, for Japanese waters, the collector of customs at Victoria, having seen the greater number of the owners, and several of the masters, made arrangements for transhipping all fire-arms from Hakodate by steamer to Victoria.

2. In the case of vessels proceeding to the neighbourhood of the Commander Islands, efforts would be made to have the fire-arms transferred to some home-bound vessel, or left at some rendezvous, until operations in Behring Sea are concluded.

3. With regard to vessels proceeding direct to Behring Sea from British Columbia, the masters to be furnished with certificates that they have no fire-arms or ammunition on board.

The main object of the Canadian government has been to protest against the persistent attempt to stamp the industry of pelagic sealing as being *contra bonos mores*, and to characterize it as a class of poaching or piracy, demanding extraordinary espionage and inordinate and abnormal interference and restriction, which has been so consistently maintained towards British sealers, both before and since the award.

The course above proposed, it was considered, would very materially impair, if not entirely remove the fallacious arguments for an admission of the necessity to resort to any extension of the already cumbersome restrictions upon the legitimate business of pelagic sealing. The manner in which British vessels have been searched and ransacked by United States vessels at sea, because the use of fire-arms to kill seals within the waters of Behring Sea is forbidden, was fully explained in the report for 1895, at page 143, under the heading: "Boarding of British vessels by United States patrol ships." It was hoped that the arrangements above explained would satisfy the United States government that no fire-arms would be used, where such use was illegal, especially in the case of the vessels which were provided with certificates that no such implements were on board. Such, however, was not the case, and the United States Secretary of State suggested the following additional expedients:

1. That vessels proceeding direct to Behring Sea from Victoria, should present the certificate of the collector of customs that no fire arms were on board, to the collector of customs, or to the commander of the United States fleet patrolling Behring Sea, at Unalaska; that thereupon such vessels be searched by duly authorized patrolling officers, and the fact endorsed on the certificate, that such certificate duly endorsed may be accepted by the officers of the patrolling vessels as evidence of the fact that no fire-arms are concealed on board; unless some information or evidence of violation of law, other than mere suspicion, is in the possession of, or found by the boarding officer.

2. That a representative of the United States government be allowed to inspect seal skins taken in Behring Sea, and landed at British Columbia ports, to discover whether or not the seals had been shot.

Regarding the first proposal, although unwilling to admit the necessity for the endorsement of the British certificate by United States officials, rather than appear as interposing any undue objections to proposals of such a nature as to render their acceptance at all possible, the Canadian government yielded to the wishes of the United States government, on condition that it should be distinctly understood that the language of the proposal should be changed so that the words "may be accepted" should read "shall be accepted," and that the endorsed certificate should be accepted by all boarding officers as proof that no fire-arms were carried.

To the second proposal, as to the expert examination of seal skins in home ports, the Canadian government were wholly unable to assent.

In this view of the matter Her Majesty's government concurred, and when the decision was communicated to the government of the United States, they were unwilling to agree that the endorsement of the vessel's certificate that no fire-arms were carried, even after search by their own officials, should be final, holding that search would be

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useful in disclosing whether fire-arms or other implements were on the vessel during any prohibited time, in violation of the law, and whether there were any skins which had been shot, if the vessel had been engaged in Behring Sea where the use of fire-arms is prohibited, or freshly killed seals during the close season.

This contention in no way strengthens the position of the United States government in this connection, and is fully covered by the foregoing remarks as to the search of vessels for implements legally carried, or on the mere suspicion of supposed offences.

In renewing the second proposal touching the expert examination of seal skins, the United States went further than the original one, because such an expedient was designed for the purpose of determining the sex of the seals, as well as for the ascertainment of whether they had been shot, which latter was the extent of the original proposal. Apart entirely from the practical point of view, the Canadian government was not prepared to concede the expediency of such a step, and being unable to see that either Great Britain or Canada are under any obligation to submit British subjects in Canada to such irritating surveillance by foreign officials, in their home ports, was not inclined to seek such legislation as might be necessary to that end.

Even if the above objection did not exist, it would be difficult to appreciate what practical good could result or what desirable end could be served by such an examination. Suppose it were possible to establish that any wounds which might be found in the seal's skin, were the result of gunshot wounds, and that they could readily be distinguished from those made with spears, it would be impossible to so demonstrate that the animal from which the pelt had been taken, had been killed by means of fire-arms.

Among those engaged in the sealing business, it is a matter of common knowledge that the skins of a large number of seals killed by spears have shot wounds, so that no possible significance could attach, through the presence of these wounds, in determining that the ultimate capture of the seal was brought about by the use of implements prohibited in Behring Sea. There is no method of showing that these shot wounds were not received during the migration, outside Behring Sea, where there is no restriction upon the sealers in this respect; or that they may not have been made by the hunters of a vessel other than the one which eventually secured the animal through the aid of a spear.

Moreover, sealers knowing of such an examination awaiting them could readily add a spear wound to the skin, even if the seal had been shot; thus effectually destroying the utility of any such test, and establishing, by that evidence, the death of the animal by the spear just as conclusively as could the shot wounds prove its death by the use of the inhibited instrument.

Any attempt of the nature must, it would seem, fail in its object, and must be viewed with apprehension of the possible complications and endless litigation likely to arise out of so problematic an expedient.

The case of the schooner "E. B. Marvin" in 1895, and the case of the "Kate," seized during the present year, which forms a separate paragraph of this report, amply demonstrate its futility.

No agreement was reached during the sealing season for the application of any of the supplementary proposals.

MEMORIAL FROM SEALERS.

During the presence of the Honourable the Minister of Marine and Fisheries in Victoria, B.C., he was presented with a memorial from representatives of the Victoria sealers' association, as follows:—

"The Victoria sealing industry comprises 65 schooners, representing 4,292 tons, with a value of \$643,800, employing 807 whites and 903 Indians, making with their wives and families—of those employed—about 8,500, directly dependent on this industry. The income derived from the season's catch, taking the average catches and prices for the past three years, amounts to \$750,000 annually.

"In 1893 the restrictions imposed on pelagic sealing deprived us of the months of May and June for sealing on the coast, being the two best months of our spring sealing.

In the Behring Sea we were restricted from sealing during the month of July. Restrictions were also made prohibiting our vessels using fire-arms and from sealing within a sixty mile zone around the Pribylov Islands, thus depriving us of one of the two best months of sealing in the sea and the best portion of the Behring Sea. These restrictions have become permanent and are a hardship upon us, leaving us in such a position that it is only by the greatest economy that we are able to carry on our business without loss, to say nothing of the chances of our vessels being seized and confiscated for being within the limits of a very wide zone, however unintentional.

“From information we have received through American newspapers, as well as from other sources, we have reason to believe that the American government is now endeavouring to obtain the consent of the British government for further restrictions, and it is against any further restrictions we would ask you to assist us in protesting, for any further restrictions on our industry would compel us to abandon the business altogether, as it would be impossible for us to continue to fit our vessels out without incurring certain loss, and this industry, of so much value to British Columbia and Victoria in particular, would be lost to us for ever and our fleet of sealing vessels would be rendered useless.

Signed “R. SEABROOK, President.
 “RICHARD HALL, Secretary.
 “*The Victoria Sealers' Association.*”

REGULATIONS.

Under the heading “Proposals for changes in the Award Regulations,” the article in last year’s departmental report, dealt quite fully with the efforts of the United States government to bring about a revision of the regulations before the time set by the arbitrators as the term thereof, had expired.

Diplomatic correspondence on this branch of the subject proceeded, the United States government continuing to press for negotiations looking to a complete revision of the regulations which would include Russia and Japan and affect the Asiatic as well as the North American portion of the North Pacific Ocean.

Canada had throughout been very pronounced in opposition to a quadripartite convention with three nations owning seal rookeries arrayed on one side against one nation, whose interests in the sealing business was necessarily confined to the method of seal hunting known as pelagic sealing, the suppression of which was sought to be accomplished. She was also convinced that the Paris award left the sealing industry in a position of reasonable stability and protection, at least during the five years laid down as the term of the award regulations.

It was considered that the sealers had a right to enjoy unhampered the rights and privileges which had been vindicated by arbitration, just to extent that such arbitration and regulations had declared their business to be a legitimate calling.

Moreover, the Canadian government had been unable to see that the government of the United States, in its numerous and varied contentions and proposals, had offered any evidence that the legislation and other machinery provided by Her Majesty’s government for an application of the findings of the arbitrators, had in any way failed or that it had been otherwise so demonstrated; hence it was impossible for them to appreciate any reason for a departure from the award, either in the direction of increased severity or of premature revision of the regulations.

It is necessary to look at the question from more than one standpoint, and it is by no means justifiable to pre-suppose that any ultimate revision of the regulations must necessarily tend in the direction of further embarrassment of the pelagic sealers. From the standpoint of those engaged in that business, they have an equal right to look for a relaxation of certain restrictions imposed by the award, which they regard as arbitrary and undue, so long as their vocation continues to be classed among those which are countenanced and regulated by law.

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The position assumed, therefore, has been that the fullest measure of prohibition to be placed upon the sealing industry, should be gauged by the regulations prescribed by the Paris award, both as regards duration and extent. Up to the present time Her Majesty's government have not been induced to accede to the wishes of the United States government in this regard, and there is no reason for believing that they contemplate a revision of the regulations before the period named by the arbitration tribunal has expired.

SCIENTIFIC AND EXPERT INQUIRY INTO SEAL LIFE.

In view of the conflicting and indiscriminate contentions and statements, touching the effect of pelagic sealing, resulting from the two sources of information, and the annual examination of the seal islands and seal life by the naturalists of the United States government, the attention of Her Majesty's government and that of Canada, in 1896, turned to the advisability of obtaining some independent information touching seal life on both the United States and Russian seal islands.

In the event of a demand by the United States government, at the expiration of the term of the award regulations, for a revision thereof under the terms of the findings of the arbitrators, such a course was considered expedient to enable Her Majesty's government to approach any negotiations which may be instituted in a better position to judge how far, if at all, a revision may be necessary in the interests of the fishery.

To this end steps were taken to supplement existing information on every possible point.

Her Majesty's government appointed and sent from Great Britain Professor D'Arcy Thompson, as British agent to the Pribylov Islands (Alaskan), and Mr. Barrett Hamilton to a similar position on the Commander Islands (Russian). These scientists spent the season in an examination into seal life within their respective fields of inquiry, and will report direct to Her Majesty's government.

The Canadian government selected Mr. James M. Macoun, of the Geological Survey of Canada, who had already on two previous occasions, been engaged in inquiry into seal life on the Pribylov Islands, as their representative there during season of 1896. Mr. Macoun worked in concert with Professor Thompson, and the result of his inquiry and observations will be available in any negotiations which may arise having for their object a revision of the regulations.

It is gratifying to learn from Mr. Macoun's investigations that there is no ground for the popular belief sedulously cultivated by interested parties, that the seals are being exterminated in Behring Sea.

In order to render the inquiry into the conditions of seal life as full and comprehensive as possible, the Department of Marine and Fisheries detailed one of its officials Mr. Andrew Halkett, for the duty of special observations into the conditions and habits of seals at sea, on board of one of the sealing schooners operating in Behring Sea during the sealing season there, Mr. Halkett conducted his inquiries on the sealing schooner "Dora Siewerd" of Victoria, the result of which will be available when needed.

A large staff of scientists conducted similar researches into the natural history of the fur seal, on behalf of the United States government.

THE "COQUITLAM" CASE.

This case had, at the period of writing the last report, reached the Supreme Court of the United States, on the question of jurisdiction of the Court of Appeal from the District Court of Alaska. Judgment was rendered 18th May, 1896, upholding such jurisdiction. When the case reached the United States Court of Appeal, a decision was given reversing the decision of the court below and dismissing the libel against the steamer "Coquitlam."

THE CASES OF THE UNITED STATES SEALING SCHOONERS "LANINFA" AND "ALEXANDER."

During the year decisions were reached in the United States Court of Appeals, for the Ninth Circuit, in the above named cases to the effect that the Paris award regulations, in matters pertaining to sealing in Behring Sea, must be upheld as the supreme law of the land.

In view of the contentions of the United States government in connection with the Behring Sea question, these decisions may not be without interest. The cases were appeals in admiralty, from decrees of the District Court of Alaska, forfeiting the vessels upon the ground that they had been unlawfully engaged in killing seals in the waters of the territory of Alaska. The libel charged that the vessels and their crews "were engaged in killing fur seals within the limits of Alaska territory, and in the waters thereof, in violation of section 1956, of the Revised Statutes of the United States, and of other Acts of Congress, and of the proclamation issued by the President thereunder."

In reversing the decision of the court below, these findings involve an authoritative construction of section 1956 of the Revised Statutes of the United States in so far as the phrase "within the limits of Alaska territory, or the waters thereof," and the words, "dominion of the United States in the waters of Behring Sea," in the amendment thereto are concerned.

The judge decided that this language must be construed to mean the waters within three miles from the shores of Alaska.

While concluding thus the court disclaims deciding the question adversely to the political department of the government, explaining that while it is undoubtedly true, as has been decided by the Supreme Court, that in pending controversies doubtful questions which are undecided, must be met by the political department of the government. In the case under review there is no pending question left undetermined for the political department to decide. It was held to be settled, and that the award was to be construed as a treaty which had become final, and which, when accepted and agreed to, became the supreme law of the land, binding the courts equally with an Act of Congress.

Such being the latest expression of the sovereign will, it followed that, whatever may have been the previous contention of the United States government, it had receded therefrom since the rendition of the award by agreement to accept the same as a full, complete and final settlement of all questions referred to by the arbitrators, and from the further fact that the United States government had, since the award, passed "an Act to give effect to the award rendered by the tribunal of arbitration."

Following some remarks upon the interpretation of the statutes and their application to citizens and subjects of all nations, it is held that it necessarily follows that the citizens of the United States have the same right to rely upon the award as to their rights, as the subjects of England. Also that the Act of 6th April, 1894, contained no provisions which indicate any policy upon the part of the United States government, to enforce any rights against its own citizens, under the statute consistent with the contentions "from the beginning upon the important questions of its rights to protect its property and seal fisheries."

On the other hand it was held that the entire Act clearly shows that it is the policy of the United States government not to make any such distinction. The Act was passed enacting certain rules relative to the control of its own subjects, in the exercise of the right which, under the award of the arbitrators, the two countries had in common to kill seals outside the three mile limit.

The decree of the District Court was reversed and the cause remanded with instructions to the District Court to dismiss the libel.

Marine and Fisheries—Fisheries Branch.

BEHRING SEA CLAIMS COMMISSION.

In the report for last year, it was stated that a draft convention for the settlement of the Behring Sea claims had been agreed upon, and was awaiting ratification.

The following is the text of the treaty as finally ratified :

THE CLAIMS CONVENTION.

Convention between Great Britain and the United States, Signed February 8, 1896.

Whereas, by a treaty between Her Majesty the Queen of the United Kingdom of Great Britain and Ireland, and the United States of America, signed at Washington on February 29, 1892, the questions which had arisen between their respective governments concerning the jurisdictional rights of the United States in the waters of Behring Sea, and concerning also the preservation of the fur seal in, or habitually resorting to the said sea, and the rights of the citizens and subjects of either country as regards the taking of fur seal in or habitually resorting to, the said waters were submitted to a tribunal of arbitration as therein constituted ;

And, whereas, the high contracting parties having found themselves unable to agree upon a reference which should include the question of the liability of each for the injuries alleged to have been sustained by the other, or by its citizens, in connection with the claims presented and urged by it, did, by article VIII. of the said treaty, agree that either party might submit to the arbitrators any questions of fact involved in said claims and ask for a finding thereon, the question of the liability of either government on the facts found to be the subject of further negotiation ;

And, whereas, the agent of Great Britain did, in accordance with the provisions of said article VIII., submit to the tribunal of arbitration certain findings of fact which were agreed to, as proved by the agent of the United States, and the arbitrators did unanimously find the facts so set forth to be true, as appears by the award of the tribunal rendered on the 15th day of August, 1893 ;

And, whereas, in view of the said findings of fact and of the decision of the tribunal of arbitration concerning the jurisdictional rights of the United States in Behring Sea, and the right of protection or property of the United States in the fur seals frequenting the islands of the United States in Behring Sea, the government of the United States is desirous that, in so far as its liability is not already fixed and determined by the findings of fact and the decision of said tribunal of arbitration, the question of such liability should be definitely and fully settled and determined, and compensation made for any injuries for which, in the contemplation of the treaty aforesaid and the award and findings of the tribunal of arbitration, compensation may be due to Great Britain from the United States.

And, whereas, it is claimed by Great Britain, though not admitted by the United States, that prior to the said award certain other claims against the United States accrued in favour of Great Britain on account of seizures of or interference with the following named British sailing vessels, to wit: the "Wanderer," the "Winnifred," the "Henrietta," and the "Oscar and Hattie;" and it is for the mutual interest and convenience of both the high contracting parties that the liability of the United States, if any, and the amount of compensation to be paid, if any, in respect of such claims, and each of them should also be determined under the provisions of this convention ; all claims by Great Britain under article V. of the *modus vivendi* of April 18, 1892, for the abstention from fishing of British sealers during the pendency of said arbitration having been definitely waived before the tribunal of arbitration.

Her Majesty the Queen of the United Kingdom of Great Britain and Ireland, and the United States of America, to the end of concluding a convention for that purpose, have appointed as their respective plenipotentiaries :

Her Majesty the Queen of the United Kingdom of Great Britain and Ireland, the Right Honourable Sir Julian Pauncefote, G.C.B., G.C.M.G., Her Majesty's Ambassador Extraordinary and Plenipotentiary to the United States ; and the President of the United States, the Honourable Richard Olney, Secretary of State ;

Who, after having communicated to each other their respective full powers, which were found in due and proper form, have agreed to and concluded the following articles :—

ARTICLE 1.

The high contracting parties agree that all claims on account of injuries sustained by persons in whose behalf Great Britain is entitled to claim compensation from the United States, and arising by virtue of the treaty aforesaid, the award and the findings of the said tribunal of arbitration, as also the additional claims specified in the fifth paragraph of the preamble hereto, shall be referred to two commissioners, one of whom shall be appointed by Her Britannic Majesty, and the other by the President of the United States, and each of whom shall be learned in law.

Appended to this convention is a list of claims intended to be referred.

ARTICLE 2.

The two commissioners shall meet at Victoria, in the province of British Columbia, Canada, as soon as practicable after the exchange of the ratifications of this convention, and, after taking an oath that they will fairly and impartially investigate the claims referred to them and render a just decision thereon, they shall proceed jointly to the discharge of their duties.

The commission shall also sit at San Francisco, California, as well as Victoria, provided that either commissioner shall so request, if he shall be of opinion that the interests of justice shall so require for reasons to be recorded on the minute.

ARTICLE 3.

The said commissioners shall determine the liability of the United States, if any, in respect of each claim, and assess the amount of compensation, if any, to be paid on account thereof—so far as they shall be able to agree thereon—and their decision shall be accepted by the two governments as final.

They shall be authorized to hear and examine, on oath or affirmation, which each of said commissioners is hereby empowered to administer or receive, every question of fact not found by the tribunal of arbitration, and to receive all suitable authentic testimony concerning the same; and the government of the United States shall have the right to raise the question of its liability before the commissioners in any case where it shall be proved that the vessel was wholly or in part the actual property of a citizen of the United States.

The said commission when sitting at San Francisco or Victoria, shall have and exercise all such powers for the procurement or enforcement of testimony as may hereafter be provided by appropriate legislation.

ARTICLE 4.

The commissioners may appoint a secretary and a clerk or clerks to assist them in the transaction of the business of the commission.

ARTICLE 5.

In the cases, if any, in which the commissioners shall fail to agree, they shall transmit to each government a joint report stating in detail the points on which they differ, and the grounds on which their opinions have been formed; and any such difference shall be referred for final adjustment to an umpire to be appointed by the two governments jointly, or in case of disagreement, to be nominated by the president of the Swiss Confederation at the request of the two governments.

Marine and Fisheries—Fisheries Branch.

ARTICLE 6.

In case of the death, or incapacity to serve, from sickness or any other cause, of either of the two commissioners, or of the umpire, if any, his place shall be filled in the manner herein provided for the original appointment.

ARTICLE 7.

Each government shall provide for the remuneration of the commissioner appointed by it.

The remuneration of the umpire, if one should be appointed, and all contingent and incidental expenses of the commission or of the umpire shall be defrayed by the two governments in equal moieties.

ARTICLE 8.

The amount awarded to Great Britain under this convention on account of any claimant shall be paid by the government of the United States to the government of Her Britannic Majesty within six months after the amount thereof shall have been finally ascertained.

ARTICLE 9.

The present convention shall be duly ratified by Her Britannic Majesty, and by the President of the United States of America, by and with the advice and consent of the Senate thereof; and the ratifications shall be exchanged either at London or at Washington within six months from the date hereof, or earlier if possible.

In faith whereof, we, the respective plenipotentiaries, have signed this convention, and have hereunto affixed our seals.

Done in duplicate at Washington, the 8th day of February, 1896.

(L.S.) JULIAN PAUNCEFOTE.
(L.S.) RICHARD OLNEY.

APPENDIX OF CLAIMS.

Claims submitted to the Tribunal of Arbitration at Paris.

Name of Vessel.	Date of Seizure.	Approximate Distance from Land when seized.	United States Vessel making Seizures.
		Miles.	
Carolena.....	Aug. 1, 1886....	75	Corwin.
Thornton.....	do 1, 1886....	70	do
Onward.....	do 2, 1886....	115	do
Favourite.....	do 2, 1886....		Warned by Corwin in about same position as Onward.
Anna Beck.....	July 2, 1887....	66	Rush.
W. P. Sayward.....	do 9, 1887....	59	do
Dolphin.....	do 12, 1887....	40	do
Grace.....	do 17, 1887....	96	do
Alfred Adams.....	Aug. 10, 1887....	62	do
Ada.....	do 25, 1887....	15	Bear.
Triumph.....	do 4, 1887....		Warned by Rush not to enter Behring Sea.
Juanita.....	July 31, 1889....	66	Rush.
Pathfinder.....	do 27, 1889....	50	do
Triumph.....	do 11, 1889....		Ordered out of Behring Sea by Rush; query as to position when warned.
Black Diamond.....	do 11, 1889....	35	Rush.
Lily.....	Aug. 6, 1889....	66	do
Ariel.....	July 30, 1889....		Ordered out of Behring Sea by Rush.
Kate.....	Aug. 13, 1889....		do do
Minnie.....	July 15, 1889....	65	Rush.
Pathfinder.....	Mar. 27, 1890....	In Neah Bay..	Corwin.
Personal claims.....			1886
do.....			1887
Costs in "Sayward" case.....			

ADDITIONAL CLAIMS.

Wanderer.....	1887-89
Winnifred.....	1891
Henrietta.....	1892
Oscar and Hattie.....	1892

In the course of the negotiations preceding this convention, it was arranged between the contracting parties that certain other claims not specified in the schedule to the findings of fact should be submitted to the commission under the Behring Sea Convention for adjudication. Hence the additional claims.

The claims as filed before the Paris tribunal comprised a claim for the seizure of the schooner "Black Diamond" in the year 1889. In the year 1894, at the time of the above-mentioned negotiations a further claim for an interference with the same vessel in the year 1886 was agreed to be submitted to the commission to be appointed.

For the purposes of this convention, and to provide powers, machinery, &c., for the procurement and enforcement of testimony, as contemplated by article 3 of the treaty, legislation by the Canadian government and that of the United States was necessarily obtained.

Marine and Fisheries—Fisheries Branch.

The Dominion Act was as follows :—

59 VICTORIA, CHAP. 2.

An Act respecting the Behring Sea Claims Convention.

[Assented to 23rd April, 1896.]

Her Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows :—

1. The convention or treaty of the eighth day of February, one thousand eight hundred and ninety-six, which is set forth in the schedule to this Act, is hereby assented to.

2. The commissioners appointed or to be appointed pursuant to the said convention or treaty, or pursuant to the said convention or treaty as finally ratified by the high contracting parties, shall have all such powers, rights and privileges as are vested in the Supreme Court of British Columbia or the Exchequer Court of Canada, or in any judge of either of the said courts, on the occasion of any action or proceeding, in respect of the following matters :—

(i.) the enforcing the attendance of witnesses, and examining them on oath, affirmation or otherwise ;

(ii.) the compelling the production of documents and things ; and

(iii.) the punishing persons guilty of contempt ;

and a summons signed by the commissioners, or one of them, or by the secretary of the commissioners, may be substituted for and shall be equivalent to any formal process that can be issued in any such action or proceeding for enforcing the attendance of witnesses or compelling the production of documents and things.

2. A warrant of committal to prison issued for the purpose of enforcing the powers conferred by this section shall be signed by the commissioners, or by such secretary, and shall specify the prison to which the offender is to be committed, and shall not authorize the imprisonment of the offender for a period exceeding three months.

3. Every person who on examination on oath or affirmation before the commissioners wilfully gives false evidence shall be liable to the penalties for perjury.

4. Her Majesty the Queen, the government of the United States, claimants under the convention or treaty, and any person who may be so authorized by the commissioners, may appear before the commissioners, by counsel or solicitor.

The schedule, which is the claims convention, is not reprinted.

That of the United States was as follows :

(PUBLIC NO. 111.)

An Act to provide for the fulfilment of the stipulations of the treaty between the United States and Great Britain, signed at Washington on the eighth day of February eighteen hundred and ninety-six.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That the sum of seventy-five thousand dollars or so much thereof as may be necessary, is hereby appropriated, out of any money in the treasury not otherwise appropriated, to be expended under the direction of the Secretary of State, with the approval of the President of the United States, in fulfilling the stipulations of the treaty between the United States and Great Britain signed at Washington on the eighth day of February eighteen hundred and ninety-six. And the commission constituted by said treaty, when sitting at San Francisco shall have power to compel the attendance and testimony of witnesses by application to the Circuit Court of the United States for the ninth circuit, which said court is empowered and directed to make all orders and issue all processes necessary and appropriate to that end.

Approved May 7th, 1896.

The commissioners appointed under their convention were:—

On the part of Her Britannic Majesty, the Honourable George Edwin King, one of the Judges of the Supreme Court of Canada; and on the part of the United States government. The Honourable William L. Putnam, one of the Judges of the United States Federal Circuit Court.

The counsel before the commission were:

On behalf of Her Britannic Majesty's government;

The Honourable Frederick Peters, Q. C., Attorney General of Prince Edward Island, senior counsel; Frederic L. Beique, Esq., Q. C., of Montreal, associate counsel; and Ernest V. Bodwell, Esq., Barrister, of Victoria, B. C., junior counsel.

Associated with the above-named gentlemen was the Honourable Sir Charles Hibbert Tupper, K. C. M. G., who was specially retained by certain of the sealers interested.

On behalf of the United States government the Hon. Don. M. Dickinson, of the city of Detroit, senior counsel, and Robert Lansing, Esq., of Watertown, N. Y., junior counsel; associated with these gentlemen as counsel was Mr. Charles B. Warren, of Detroit, of the federal and state bar.

Mr. Chandler P. Anderson, of the city of New York, was appointed secretary to the commission, and two clerks were appointed on behalf of each government, one of each acting as official stenographers.

The government of British Columbia having kindly placed at the disposal of the commission the chambers of the legislative assembly in the city of Victoria, the tribunal formally opened on the 23rd November, 1896, and continued without intermission until 2nd February, 1897, when the last witness was examined,

This branch of the inquiry was devoted wholly to the presentation of the pleadings and the examination and cross-examination of witnesses in connection with the 26 claims before the commission for adjudication.

Article 2 of the convention provided for the sitting of the commission at San Francisco as well as at Victoria, and it was at first considered that it would be necessary to hold a session in San Francisco, but as the inquiry proceeded and the evidence developed, it was not deemed necessary to hold it there.

When the commission closed its Victoria session, it adjourned to the Windsor Hotel, Montreal, at 10.30 a.m. on the 16th June, 1897, at which date the written arguments and replies by both sides will be presented and arrangements made for the oral argument by counsel.

In order to afford some idea of the nature of the claims presented and the respective grounds of contention, the pleadings in respect of the first claim on the list, that of the schooner "Carolena," embracing the claim, the answer of the United States and the reply of Her Majesty's government are here embodied.

PLEADINGS.

In the Matter of the Claim of Her Britannic Majesty Arising out of the Seizure of the Schooner "Carolena."

CLAIM NO. 1.

(Filed November 24, 1896.)

1. The "Carolena" was a British schooner registered at the Port of Victoria, British Columbia.

2. On or about the 20th May, 1886, the "Carolena" sailed from Victoria, British Columbia, bounded on a sealing voyage to the North Pacific Ocean and Behring Sea.

Marine and Fisheries—Fisheries Branch.

Her master was James Ogilvie ; her mate was James Blake. She carried a crew of nine sailors and hunters, and was fully equipped for the said voyage, and for the hunting and capture of seals.

3. On the 1st day of August, 1886, whilst in the Behring Sea, in north latitude 55-50, west longitude 168-53, and distant about seventy miles from the nearest land, the "Carolena" being then lawfully engaged in the taking of seals at that place, was seized by the United States revenue cutter "Corwin."

4. The "Carolena" was towed by said cutter to Ounalaska and there dismantled, and such proceedings were afterwards had and taken in the United States District Court of Alaska, at the instance of the government of the United States of America, that the said schooner, her tackle, apparel, outfit and cargo were condemned for a violation of the municipal laws of the United States of America relating to seal fishing in the waters of Alaska, and detained under such condemnation until after the month of December, 1887, when the return of the said schooner was offered but not accepted on the ground that the vessel had been practically wrecked in the meantime.

5. By reason of the premises further prosecution of the said sealing voyage during the year 1886 was wholly prevented, and the owner of said schooner was also prevented from using her for the purposes of seal hunting during the year 1887, as he otherwise would have done ; and finally the said schooner, her tackle, apparel, outfit and cargo, were wholly lost to those interested in the same, and other loss, damage and expense were suffered and incurred by the persons so interested.

6. Under the facts as found in the award of the Paris Tribunal of Arbitration, the said seizure, condemnation and detention were without any warrant or right according to the principles of international law, and Her Britannic Majesty claims that full and complete compensation should be made by the government of the United States of America to the government of Her Britannic Majesty for all loss thereby sustained.

7. The claim made for the loss arising out of the premises is the sum of \$30,000 and interest thereon from the date of loss at the rate of seven per centum per annum.

8. In addition to the above, a further amount is claimed for the improper arrest, imprisonment and detention by the United States authorities of James Ogilvie and James Blake, as master and mate respectively of the said schooner.

9. James Ogilvie, on the arrival of the schooner at Ounalaska, was placed under arrest, taken to Sitka, and there charged before the United States District Court of Alaska with a violation of the municipal laws of the United States of America relating to seal fishing in the waters of Alaska. Before the trial he was suffered to wander into the woods, where he was found dead.

10. James Blake, on the arrival of the "Carolena" at Ounalaska, was placed under arrest, taken to Sitka, and there charged before the said court with a similar violation of the municipal laws of the United States of America relating to seal fishing in the waters of Alaska, and on such charge was found guilty and condemned to pay a fine of \$300 and to be imprisoned at Sitka for the space of thirty days, which term of imprisonment he underwent.

11. At the expiration of such term of imprisonment the said James Blake was released, but was then wholly without means of subsistence, and no provision was made by the said authorities for his return to his home. The said James Blake subsequently found his way back to Victoria after incurring great hardship and loss in so doing.

12. Under the above-mentioned finding of facts, the arrest, imprisonment and detention of the said James Ogilvie, and the arrest, imprisonment, detention and condemnation of the said James Blake were illegal, and Her Britannic Majesty claims that full and complete compensation should be made in the premises by the government of the United States of America to the government of Her Britannic Majesty.

13. The claim made for the wrongs aforesaid to James Ogilvie is the sum of \$2,500, with interest from 1st August, 1886, at seven per centum per annum.

14. The claim made for the wrongs aforesaid to James Blake is \$2,500 with interest from the 1st August, 1886, at the rate of seven per centum per annum.

ANSWER OF THE UNITED STATES.

(Filed November 28, 1896.)

1. They admit that on or about August 1st, 1886, at a distance of about seventy-five miles from the nearest land, the said vessel, the "Carolena," was seized by the United States revenue cutter "Corwin," and that said seizure was made in Behring Sea and was ratified and adopted by the government of the United States.

But it is averred on the part of the United States, that the said seizure was made in good faith, by officers of the United States, within the line of their duty under the authority and mandate of the municipal laws of the United States, for a violation of the statutes of the United States, and such seizure was ratified and adopted in good faith by the government of the United States as for a violation of their said statutes.

2. The United States aver that, before at the time of, and after the seizure of the said vessel, her apparel, outfit and cargo, were wholly or in part the actual property of a citizen or citizens of the United States, and further that at the times aforesaid the beneficial interest in the whole or a part of the said vessel, her apparel, outfit, and cargo, were possessed and owned by a citizen or citizens of the United States and that her said voyage was entered upon and prosecuted, in whole or in part, for the benefit of a citizen or citizens of the United States.

3. As to some of the statements of detail and fact in paragraphs numbered 2, 3, 4 and 5 in the said claim of Her Britannic Majesty, the representatives of the United States have no sufficient knowledge, and as to such of them as may be held material the United States invite and require authentic and suitable proofs before the high commissioners.

4. As to paragraph numbered 5 in said claim, the United States will submit to the high commissioners and will insist that they are not liable for damages for the detention of such vessel when the seizure, as is alleged and shown in said claim, resulted in the total loss to the owners of the vessel, her outfit, apparel and cargo, as of the time of said seizure; and that in any event the damages therein suggested and claimed are of the nature of prospective profits and speculative damages, so uncertain as to form no legal, equitable or suitable basis for a finding of fact upon which an assessment thereof can be predicated.

5. The United States will further insist that, so far as a proper claim for damages for total loss is concerned, the statement of the loss alleged in paragraph 7 as having arisen out of the said seizure is grossly excessive.

6. As to the further amount claimed for the alleged improper arrest, imprisonment and detention of James Ogilvie and James Blake, persons employed upon said vessel at the time of her seizure, the United States admit the arrest as stated, but deny the imprisonment and statements of fact incident thereto as detailed in the statement of the British claim; and they aver that such arrests and all subsequent proceedings thereon by the officials of the United States were made, entered upon, and had, in good faith, under the mandate, and authority of the municipal laws of the United States, for a violation of the statutes of the United States; and they aver that the only damages to be considered, in case of any liability on the part of the United States for such arrests and detentions, are those for actual pecuniary loss and are not in their nature punitive or aggravated damages.

7. The United States do not admit any liability on this claim.

REPLY OF HER BRITANNIC MAJESTY.

(Filed December 1, 1896.)

1. Her Britannic Majesty joins issue on paragraphs 1, 4, 5 and 6 of the reply of the United States, except in so far as they contain admissions.

2. In further answer to the second part of said paragraph 1, Her Britannic Majesty submits that the same constitutes no defence to Her Majesty's claim, or any part thereof.

Marine and Fisheries—Fisheries Branch.

3. As to paragraph 2, Her Britannic Majesty says that the above-named schooner was found by the Tribunal of Arbitration at Paris to be a British vessel, and submits that it is not open to the commissioners, acting under the Behring Sea Claims Convention to inquire as to her ownership ; the said finding of facts being conclusive so far as this commission is concerned.

4. And in the alternative and in further answer to said paragraph 2, Her Britannic Majesty submits that even if such inquiry can be entered upon, it should be limited to the question of the actual ownership of the said vessel only, and that as between nations, and should not in any event extend as to the beneficial interest in the whole or a part of the vessel, her apparel, outfit and cargo ; or as to whether her voyage was entered upon and prosecuted in whole or in part for the benefit of a citizen or citizens of the United States.

5. In further answer to said paragraph 2, Her Britannic Majesty denies each and every of the allegations of facts therein contained.

6. Her Britannic Majesty further submits that, according to the principles of international law, the practice obtaining among nations, and the terms of the Behring Sea Claims Convention, the allegations contained in the said reply, even if proved, do not constitute any defence to the claim for compensation set forth in the said statement of claim.

Respectfully submitted.

R. N. VENNING.

APPENDIX No. 14.

SCHEDULE of Fishery Officers in the Dominion of Canada, as revised to
December, 1896.NOTE.—Names in *italics* receive no salary. (Of.) means Officers, (W.) Wardens, (I.) Inspectors and (G.) Guardians.

PROVINCE OF ONTARIO.

Name of Overseer.	P. O. Address.	Extent of Jurisdiction.
Sheppard, O. B. ....(1).	Toronto	Province of Ontario.
Dunn, Capt. E.	Owen Sound	Having jurisdiction over Georgian Bay and the Great Lakes.
MacGregor, Capt. A. M.	Goderich	do do the whole province of Ontario.
Kyle, Morrison.....	Rat Portage	Lake of the Woods and other waters of Rainy River district.
Cross, S. W.	Port Arthur.....	The whole district of Algoma.
<i>Pim, Chas. Jas.</i>	Caribou Island.....	Lake Superior around Caribou Island.
Elliott, Thos. H.	Sault Ste. Marie..	From the Otter Head, Lake Superior to French River, Algoma,
Macdonald, J. K.	Toronto	Lake Kagawong, Manitoulin Island.
<i>Boyd, N. M.</i>	Kagawong	do do
<i>Lamorandière, P. R. de.</i>	Killarney	Georgian Bay, from Little Current to French River.
<i>Barron, Ed., jr.</i>	French River.....	do from Killarney to Byng Inlet.
<i>Lamondin, Joseph.</i>	Byng Inlet.....	do Gladstone Island to Sophia Rock.
<i>Huff, Thomas W.</i>	Jones' Island.....	do part of Parry Sound Harbour.
<i>White, C. L.</i>	Snug Harbour	do vicinity of Point au Baril.
<i>Lawson, A. A.</i>	Red Rock, ParrySd	do vicinity of Parry Sound.
<i>King, John.</i>	Penetanguishene..	Part of Murray Township, Muskoka District.
Smith, Frank J.	Midland.....	Georgian Bay, from French River to Point Marks.
<i>Marchildon, Thos.</i>	Lafontaine	do do around Christian, Hope and Beckwith Islands.
Edmonstone, Robt ..	Ballaclava	do do from Allanwood to Colpo's Bay.
Lennox, Isaac.....	Warton	do do from Colpo's Bay to Cape Hurd.
<i>Boyd, W. S.</i>	North Keppel	do do around Griffith Island.
Briggs, Chas.....	Paisley	Lake Huron, from Cape Hurd to Southampton, inclusive.
Ball, H. W.	Goderich	do do from Southampton to Goderich, inclusive.
Quarry, H. B.	Parkhill	do do from Goderich to Blue Point.
Pollock, J. C.	Forest	do do and St. Clair River, Blue Point to Baby's Point.
Raymond, C. W.	Mitchell's Bay	Lake St. Clair, from Little Lake to its head.
Boismier, Joseph....	Sandwich.....	do do from Dover East to the mouth of Detroit River, and from thence to its outlet.
Stewart, John	Point Pelee Island.	Lake Erie, around Point Pelee Island and adjacent islands.
<i>Bartlett, Horace H.</i>	North Harbour Id.	do do North Harbour and Middle Sister Islands.
Lamarche, Peter.....	Wheatley	Lake Erie, fronting on the county of Essex.
<i>Malott, E. A.</i>	Kingsville	do do do Essex.
Laird, Jas. K.	Blenheim	do do do Kent and inland waters
Freeland, Wm	St. Thomas	do do do Elgin.
Sharp, David	Port Ryerse	Lake Erie, fronting on the counties of Norfolk, Haldimand, as far as South Cayuga.
Couper, Archibald ..	Dunnville.....	Lake Erie, from South Cayuga to Moulton Bay and Grand River, from mouth to division lines, townships of Canborough and North Cayuga.
Farrell, John	Cayuga	Grand River, from and including North Cayuga to Brantford.
Kerr, Fred	Hamilton	Having jurisdiction over all Ontario, but district proper comprises Lake Ontario, from Burlington Beach, to Niagara River and Lake Erie to Low Banks.
Sargent, Wm.....	Bronte	Lake Ontario, from Burlington Beach to Port Credit.
Stobo, Isaac.....	Scarboro'	do do fronting county of York.
<i>Hall, Thos.</i>	Lloydtown.....	Hall's Lake, York County.
Stanley, James	Brighton	Lake Ontario, fronting on the counties of Northumberland and Durham and tributaries thereof.
Eagleson, A. R.	Cold Spring	Western part of Rice Lake from Harwood and Rainy Point westward.
White, Zaccheus	Harwood.....	Eastern part of Rice Lake from Harwood and Rainy Point eastward, and that part of Trent River, west of Hastings

Marine and Fisheries—Fisheries Branch.

SCHEDULE of Fishery Officers, &c.—Continued.

PROVINCE OF ONTARIO—Continued.

Name of Overseer.	P. O. Address.	Extent of Jurisdiction.
Perry, Chas.	Whitby	Lake Ontario, fronting on the county of Ontario South.
Clarke, W. P.	Belleville.....	Bay of Quinté, from Mill Point to head waters of said bay in the township of Murray.
Redmond, Joseph, jr.	Picton.....	Lake Ontario, fronting on the county of Prince Edward.
Sills, E. H.	Napanee.....	do counties of Lennox and Addington, and upper part of Amherst Island.
Finkle, R. R.	Bath.....	Lake Ontario, fronting Earnestown township in Lennox and Addington, and the lower part of Amherst Island.
Crosby, A. H.	Belleville.....	Head of Bay of Quinté from Three Brothers' Island, near Kingston, to Trenton.
McGlynn, Jas.	Wolfe Island	Lake Ontario, around Wolfe, Horse-shoe and Pigeon Islands.
Ward, Wm.	Toronto.....	The waters around Toronto Island, including Toronto and Ashbridge Bays and River Don.
Purdy, John	Kingston.....	Lake Ontario, fronting on the township of Storrington, Pittsburg and Kingston, county Frontenac.
Cox, John.....	Howe Island.....	Lake Ontario and River St. Lawrence, around Howe Island.
Acton, Nassau.....	Gananoque	River St. Lawrence, from Wolfe Island to Jack Straw Light-house, Admiralty Islands; also part of Gananoque River.
Wallace, J. G.	Ivy Lea	River St. Lawrence, from Gananoque to Rockport.
Davis, John H.	Gananoque.....	do Sheriff's Point to Head of Grenadier Id.
Poole, Robt.	Poole's Resort	do from Rockport to Prescott.
Mooney, John	Maitland.....	do from Brockville to Cornwall.
Boyd, Robt. P.	Lyn.....	do extending 3 miles above and 3 miles below Cole's Shoal Lighthouse.
McDonald, Donald J.	Alexandria. . . .	do the counties of Stormont and Glengarry.
Miron, Olivier	Alfred.....	South Nation River, county of Prescott.
Hyndman, James O.	South Mountain ..	do and the counties of Dundas and Glengarry.
Boucher, W. W.	Ottawa	Ottawa River and its tributaries, from Ottawa to Fitzroy townships, county of Carleton.
Riddle, Matthew.....	Mohr's Corners. . .	Ottawa River, from Fitzroy to McNab, including Lake des Chats.
Hicks, H.	Arnprior.....	Ottawa River, from McNab to Horton and Lake des Chats.
Russell, M. L.	Renfrew.....	Bonnechère River and tributaries, in the county of Renfrew.
Gallagher, Hugh.....	Lake Clear, Renfrew.	Townships Sebastopol, Brudenell, Radcliffe, Lyndoch and Gratton, in Renfrew.
Douglas, Geo.	Snake River.....	Muskat Lake and Snake River, in Renfrew.
Richardson, J. S.	Sturgeon Falls.....	Lake Nipissing, Sturgeon, Mattawa River, French River and tributaries.
Bastedo, David E.	Bracebridge.....	Townships of Macaulay, McLean, Ridout in N. R. Ontario Co., and Franklin, Bennett and Stephenson in Muskoka.
Castle, Henry.....	Gravenhurst.....	Lakes Muskoka, Skeleton, Rousseau and Joseph.
Green, Jediah	Stirling.....	Townships of Huntingdon, Hungerford, Sydney, Thurlow and Tyendinaga, County Hastings.
Steele, George R.	Lorimer Lake.....	Townships in Parry Sound of Cowper, Foley, Christie, McDougall, McKellar, Ferguson, Carling, Shawanaga, Burpee, Hagerman, Harrison, Burton and Mackenzie.
Forsyth, Edmund.....	Loring.....	Townships of Walbridge, Brown, Wilson's Mills, Mowat, Blair, McKonkey and Hardy, in Parry Sound.
Lockhart, Wm.	Denville.....	Townships of Croft, Chapman, Strong, Joly, Laurier, Machar, Lount, Ferrie, Mills, Pringle, Gurd and Himsworth, in Parry Sound.
Clarke, Geo.	Orillia.....	Lakes Simcoe and Couchiching, also Rivers Severn and Holland.
McDermott, Wm.	Beeton.....	South Riding of the county of Simcoe.
McFayden, H.	Durham.....	The head waters of Saugeen River and tributaries.
		North branch of Sydenham River, from junction with main river, to its sources.
Crotty, John.....	Bothwell.....	River Thames, from Lewisville to Wardsville.
McCann, Peter.....	London.....	do from Wardsville to London.
Peltier, Theo.	Dover South.....	do from Lewisville to its mouth.
Croome, W. P.	Mount Vernon.....	Grand River and its tributaries, from Brantford upwards.
		North Riding of the county of Wellington.
Coleman, David.....	Alton.....	The whole county of Cardwell.
Graham, Joseph	Claude.....	River Credit and tributaries.
Blakely, Alex.	Port Credit.....	do from Norval to its mouth, in the county of Peel.
Simmons, Nelson	Myersburg.....	Trent River, in Northumberland and Hastings.
Martin, Myron F.	Raglan.....	Lake Scugog, from Seagrave to Port Perry, township of Reach, Ontario County.

SCHEDULE of Fishery Officers, &c.—Continued.

PROVINCE OF ONTARIO—Concluded.

Name of Overseer.	P. O. Address.	Extent of Jurisdiction.
Bradshaw, Arch	Lindsay	Lake Scugog, waters of Victoria County.
Bowen, J. C	Marmoras	Townships of Marmoras, Madoc, Elzever, Rawdon, Huntingdon, Hungerford, Sydney, Thurlow, Tyendinaga and Belmont.
Fitzgerald, George W.	Lakefield	The county of Peterborough within the townships of Harvey, Burleigh, Dummer, Douro, Smith and Ennismore, also Otonabee River from Peterborough to Rice Lake.
Breeze, David	Peterborough	Otonabee River, from Peterborough to Rice Lake, county of Peterborough.
Gainforth, Wm	Haliburton	Gull and Burnt Rivers and tributaries, with Drag, Eagle, Moose, Redstone and Crooked Lakes in Peterborough.
Sweet, B. H.	Bancroft	Inland waters of Hastings County, lying north of townships of Lake, Tudor and Grimsthorpe.
Purcell, H. R	Enterprise	Townships of Camden, Portland, Loughboro' Sheffield and Kennebec, in Addington.
Gilbert, Robt. A.	McLaren Depot.	Townships of Palmerston, Clarendon, North Canonto, South Canonto and Miller, in Addington.
Lake, George	Tichbourne	That part of Frontenac north of Loughboro' Lake.
Boddy, Samuel	Athens	Beverley, Bass, Little, Wiltse and Mud Lakes, in Leeds.
Flood, Ant. J.	Delta	Upper and Lower Beverley Lakes and tributaries to Morton and Lyndhurst and Griffin Lake, in the county of Leeds.
Moorehead, John	Long Point	From Lyndhurst to the division line, between Leeds and Lansdowne, in the county of Leeds.
Greer, James	Outlet	Gananoque River from Marble Rock to township of Lansdowne, county of Leeds.
Hicks, Wm	Athens	Charleston Lake, in the county of Leeds.
Jeacle, George	Westport	Rideau, Upper Rideau, Openicon, Otty, and neighbouring lakes, county of Leeds.
Ross, Jas. H. (G.)	Smith's Falls	Rideau River, Burritt's Rapids to Smith's Falls.
Deacon, Eph.	Bolingbroke	River Tay and tributaries and Fall Bay River, in Lanark.
Moore, John	Carleton Place	Mississippi River and Lake, in the county of Lanark.
Campbell, R. O.	Burritt's Rapids	Rideau River and tributaries, from Ottawa to Burritt's Rapids, including Jock River, in Carleton.
McCuaig, R. C. W.	Ottawa	Province of Ontario.

NOTE.—The following Customs Officers have also been appointed Fishery Officers for Georgian Bay :—

Wubb, S. A.	Preventive officer.	French River.
Potvin, P.	Acting customs officer.	Byng Inlet.
Galna, John.	Landing-waiter.	Parry Sound.
Parkhill, W. J.	Sub-collector	Midland.
Clarke, Geo.	do	Penetanguishene.
Hogg, W. A.	Landing-waiter.	Collingwood.
Cameron, A. Mc. K.	Sub-collector.	Meaford.

PROVINCE OF QUEBEC.

Hon. Peter Mitchell, (I.) Montreal, Province of Quebec and Maritime Provinces.

Lavoie, Nap. (Of.)	L'Islet	Lower St. Lawrence River and Gulf.
Wakeham, Wm. (Of.)	Gaspé Basin	Lower St. Lawrence River and Gulf.
Gregory, J. U. (Agt.)	Quebec	Having jurisdiction in the whole province of Quebec.
Smith, Joseph	Cedar Hall	Lake and River Metapedia, in the county of Bonaventure.
Brown, Chas.	Escuminac	Restigouche River and its tributaries in the Cos. of Restigouche and Victoria, N.B., and Rimouski and Bonaventure, P.Q.
Green, James.	Maguasha	Bay des Chaleurs, Co. Bonaventure, coast from Maguasha to Grand Caspédia River, inclusive.
Forest, George	Bonaventure River	Bay des Chaleurs, Co. Bonaventure, coast from Grand Caspédia River to Paspebiac.
Chapados, F. X.	L'Anse au Gascon.	Bay des Chaleurs, Co. Bonaventure, coast from Paspebiac to Point Macquereau.

Marine and Fisheries—Fisheries Branch.

SCHEDULE of Fishery Officers, &c.—Continued.

PROVINCE OF QUEBEC—Continued.

Name of Overseer.	P. O. Address.	Extent of Jurisdiction.
Keays, John.....	Pabos.....	County of Gaspé, Point Macquereau to corner of the Beach.
Boulet, Godfroy.....	Cape aux Os.....	County of Gaspé from corner of the Beach to Cape Rosier.
Chevrier, J. A.....	Amherst, M. I.....	County of Gaspé from Cape Rosier to Fame Point.
*Joncas, P. L.....	House Harbour, Magdalen Islands	Gulf of St. Lawrence around the Magdalen Islands.
Letourneau, Louis.....	Montlouis.....	Magdalen Islands, except Amherst and Entry Islands.
Bouchard, Didace.....	Ste. Anne des Monts.....	River St. Lawrence, county of Gaspé, from Fame Point to Duchesnay township.
Pelletier, Olivier.....	do.....	River St. Lawrence, county of Gaspé, parishes of Duchesnay, Christie, Tourelle and Cap Chatte.
Joncas, Johnny.....	Matane.....	River Ste. Anne des Monts, county of Gaspé.
Grondin, L. S. E.....	Rimouski.....	River St. Lawrence, county of Rimouski, from Cap Chatte to River Blanche, including River Matane.
Martin, H.....	do.....	River St. Lawrence, county of Rimouski, from River Blanche to Rimouski.
Levesque, Nap.....	Isle Verte.....	River St. Lawrence, from Rimouski to Temiscouata county.
Pelletier, Xavier.....	Ste. Anne de la Pocatière.....	River St. Lawrence, fronting on the county of Temiscouata.
Beaubien, Octave V.....	Montmagny.....	River St. Lawrence, fronting on the county of Kamouraska.
Huot, L. P.....	St. Roch de Québec	River St. Lawrence, fronting on the counties L'Islet, Mont-
Bhéreur, U.....	Malbaie.....	magny, Bellechasse and Lévis.
Côté, Henri.....(W)	Baie St. Paul.....	River St. Lawrence, around the Island of Orleans.
Simard, Jos.....(W)	Ste. Agnès.....	North Shore of the River St. Lawrence, fronting on the
Catellier, L. N.....	Tadoussac.....	county of Charlevoix.
Comeau, N. A.....	Godbout.....	Lakes in rear of Murray Bay and Bay St. Paul.
Mignault, T.....	Montmagny.....	do
Duberger, Geo.....	Pointe-à-Pic, Char- levoix.....	Waters of counties of Chicoutimi and Saguenay.
Gaudin, Geo.....	Cape Cove, Gaspé.	Gulf of St. Lawrence, county of Saguenay from Manicouagan
Legouvie, John (W.)....	Lobster Cove, — Gaspé.....	to Baie des Rochers, (<i>Godbout Division</i>).
Whitely, W. H.....	St. John's, Nfld...	Gulf of St. Lawrence, county of Saguenay from Baie des
Veilleux, V. (W.).....	St. Ephreim de Tring	Rochers to Point St. Charles, Moisie District.
Lemay, David.....	New Ireland.....	Gulf of St. Lawrence, county of Saguenay from Sheldrake
McCaw, John.....	Sherbrooke.....	River to Esquimaux Point, (<i>Mingan Division</i>).
Dupuy, Louis.....	do.....	Gulf of St. Lawrence, on the county of Saguenay from
McLeod, Allan.....	Echo Vale.....	Esquimaux Point to <i>Natashquan River</i> .
Carr, Guy.....	Compton Station..	Gulf of St. Lawrence, county of Saguenay and extending
Beach, N. A.....	Georgeville.....	from Cape Whittle to Checatica, (<i>St. Augustine Division</i>).
Ball, Hugel.....	Tuck's Landing...	Gulf of St. Lawrence, county of Saguenay, from Checatica to
Phelps, Sylvester E. W..	Bolton Centre.....	Blanc Sablons, (<i>Bonne Esperance Division</i> .)
Sturtevant, Sydney.....	Knowlton.....	The inland waters of the county of Beauce.
Manson, Jeremiah M.....	Potton.....	Lakes Trout, William, Black, St. Joseph and county of
Needham, Ernest E.....	Bolton Glen.....	Mégantic.
Luke, P. E.....	Philipsburg.....	Lakes in counties of Sherbrooke and Stanstead, also Lakes
Finlay, Jas.....	St. Johns East.....	Brompton and Aylmer, in the counties of Richmond and
Dion, J. O.....	Chambly Canton..	Wolfe.
.....	.....	Counties of Richmond and Wolfe.
.....	.....	About 10 miles of the waters of Lakes Mégantic and Spider
.....	.....	with the tributaries in the county of Compton.
.....	.....	County of Compton and Lake Massawippi, and tributaries in
.....	.....	county of Stanstead.
.....	.....	The east side of Lake Memphremagog, in the Co. of Stanstead.
.....	.....	The west side of Lake Memphremagog, in the county of Brome.
.....	.....	Township of Bolton, east and west, in the county of Brome.
.....	.....	Brome Lake, county of Brome.
.....	.....	Township of Potton, county of Brome.
.....	.....	Township of east and west Bolton, county of Brome.
.....	.....	Missisquoi Bay and Pike River, in the county of Missisquoi.
.....	.....	Richelieu River, from St. Johns to Lake Champlain.
.....	.....	Richelieu River, from Sorel to Richelieu Village.
.....	.....	River St. Lawrence, counties of Beauharnois, also part of
.....	.....	Châteauguay and Trout Rivers.
.....	.....	River St. Lawrence, counties of Châteauguay and Laprairie,
.....	.....	including Châteauguay River.
Morris, John.....	St. Lambert.....	River St. Lawrence, the counties of Chambly and Laprairie
Robitaille, Chas.....	St. Sulpice.....	and city of Montreal.
		St. Lawrence River, counties of L'Assomption and Verchères,
		including inland waters.

* Collector of customs; specially connected with the fishing bounty.

SCHEDULE of Fishery Officers, &c.—Continued.

PROVINCE OF QUEBEC—Concluded.

Name of Overseer.	P. O. Address.	Extent of Jurisdiction.
McMillan, John D.	Dundee.	That part of St. Lawrence River known as Lake St. Francis, fronting on the county of Huntingdon, including inland waters.
Mongeau, Paul	Sorel.	River St. Lawrence, fronting on the county of Richelieu.
Shooner, Denis.	Pierreville.	Lake St. Peter, county of Yamaska, and the upper part of River St. Francis, within said county.
Piché, L. N.	Drummondville.	River St. Francis, in the county of Yamaska to Richmond.
Chabonneau, Joseph	St. Césaire.	Yamaska River and its tributaries from West Farnham to St. Hugues, including Black River.
Boisvert, Geo.	Bécancour.	River St. Lawrence and Lake St. Peter, county of Nicolet.
Vadebonceur, Chas.	Three Rivers.	do fronting on and including the county of St. Maurice and Three Rivers.
Caron, Gabriel	Louiseville.	River St. Lawrence and Lake St. Peter, counties of Maskinongé and Berthier.
Mooney, Dan.	St. Théodore.	Inland waters of the county of Montcalm.
Filiatrault, Damien.	Ste. Rose, Laval	The Rivers Jésus and des Prairies, comprising about 50 miles
Belisle, Jos.	Ste Agathe des Monts.	County Terrebonne.
Dunberry, David.	Lachine Rapids.	River St. Lawrence, fronting on Jacques Cartier County.
Montpetit, Julien.	Isle Perrot.	do surrounding Isle Perrot.
Boivin, Jos.	River Beaudet.	do fronting on the county of Soulanges.
Jones, R. W.	St. Andrew's East.	Lower Ottawa River, from Oka to Carillon, and North River, from its mouth to Lachute.
Quesnel, Arthur	Rigaud.	Ottawa River, from Point Fortune to Como.
Vinet, Victor.	Vandreuil	Ottawa River, from Como to Point Cascades.
Chenier, P. Dosithé.	Hull.	Both sides of the Ottawa River, fronting on the counties of Ottawa and Russell, and Prescott in Ontario.
Joynt, Robt. (W.).	Joynt	The Bernard, Long and Mahon Lakes, county of Ottawa.
Weisener, Eniel.	Blanche	Townships of Mulgrave and Lathbury, Ottawa county.
Mohr, Erwin	South Onslow	North side of Ottawa River, fronting on the county of Pontiac, from county line to River Coulonge.
Coghlan, J. T.	Chapeau	Ottawa River, county of Pontiac, from Fort Coulonge to Des Joachims.

PROVINCE OF NOVA SCOTIA.

Bertram, A. C. (I.)	North Sydney	District No. 1.—Cape Breton Island.
Hockin, Robt. (I.)	Pictou	District No. 2.—Cumberland, Colchester, Pictou, Antigonish, Guysboro, Halifax and Hants counties.
Ford, L. S. (I.)	Milton	District No. 3.—Lunenburg, Queen's, Shelburne, Yarmouth, Digby, Annapolis and King's counties.
	<i>Annapolis County.</i>	
Bailey, W. M.	Round Hill	The whole county of Annapolis.
	<i>Antigonish County.</i>	
Aylmer, J. R. (W.)	Pomquet Forks, Antigonish.	Vicinity of Pomquet Forks, including part of Pomquet and Black Rivers.
Cameron, Lochlin (W.)	Fraser's River, Antigonish.	From McWilliam's Bridge to Fraser's Bridge.
Chisholm, Hugh (W.)	Lower South River, Antigonish.	Antigonish Harbour to St. Andrew's Bridge.
Chisholm, Donald (W.)	Salt Springs	From Trotter's Mill Brook to Thompson's dam.
Dexter, John (W.)	Antigonish	From Harbour to Trotter's Mill Brook, including West River and Bailey's Brook.
Fraser, Duncan (W.)	St. Joseph	Pinkeytown Bridge to Stewart's Mills.
McDonald, Allan (W.)	James River	James River.
McDougall, Arch'd (W.)	McNair's Cove, Cape George.	From Bun's Cove, Cape George, to Crebbing Head, St George's Bay.
McInnes, Donald (W.)	Addington Forks	Vicinity of Addington Forks.

Marine and Fisheries—Fisheries Branch.

SCHEDULE of Fishery Officers, &c.—*Continued.*

PROVINCE OF NOVA SCOTIA—*Continued.*

Name of Overseer.	P. O. Address.	Extent of Jurisdiction.
<i>Cape Breton County.</i>		
Quinan, Francis.....	Sydney	No. 1—Northern division.
Hickey, Richard.....	North Sydney .. .	No. 2—Western division.
Burke, William.....	Mira Ferry	No. 3—Eastern division.
McDonald, Alexander..	East Bay	No. 4—Southern division.
<i>Colchester County.</i>		
Gass, Robt	Tatamagouche....	Tatamagouche Bay, Waugh and French Rivers.
Davidson, J. W.....	Bass River.....	The county of Colchester.
Pollock, R. J.....	Lower Stewiacke..	do
<i>Cumberland County.</i>		
Fowler, Elijah.....	Parrsboro'	County of Cumberland.
Bland, George	Wallace Bridge....	do
Wills, A. M.....	Pugwash	do
<i>Digby County.</i>		
Schreve, T. C.....	Digby	The whole county of Digby.
<i>Guysboro' County.</i>		
Davis, Joseph.....	Guysborough.....	County of Guysborough.
McQuarrie, Allan .. .	Sherbrooke	do
<i>Halifax County.</i>		
Bartlett, John H.....	Terrance Bay. . . .	County of Halifax.
Gaston, Robert.....	Pope's Harbour...	do
Rowlings, Geo.....	Musquodoboit Hr.	do
<i>Hants County.</i>		
Mosher, Jas. R.....	Kempt Shore.....	County of Hants, West Hants.
<i>Inverness County.</i>		
McLean, D. F.....	Port Hood.....	No. 1—Western division.
McEachern, Peter .. .	Glendale.....	No. 2—Southern division.
McKeen, Lewis.....	Mabou	No. 3—Mabou division.
Coady, James.....	S. W. Margaree... .	No. 4—Eastern division.
Ross, David	N. E. Margaree... .	No. 5—Northern division.
Aucoin, Wm	Eastern Harbour..	No. 6—Part of Northern division.
<i>King's County.</i>		
Bishop, C. E. (W).....	Horton	Gaspereau River.
Brown, Philip (W.) .. .	Blomidon	Vicinity of Blomidon.
Miller, James S.....	Canning	The whole of King's county.
Murphy, L. A. (W).....	Gaspereau	Part of Gaspereau River.
McIntyre, W. (W).....	Aylesford.....	Annapolis River.
Reid, R. F.....	Wolfeville.....	The whole of King's county.
Thorpe, J. W. (W).....	Hall's Harbour .. .	Halls Point to Cape Split.
Robinson, Chas	Lakeville.....	Cornwallis River and Tributaries, jurisdiction in whole county
<i>Lunenburg County.</i>		
Evans, David.....	Chester	The whole county of Lunenburg.
Solomon, W. M.....	W. LaHave Ferry..	do do
<i>Pictou County.</i>		
McPhie, Allan.....	Avondale.....	Eastern division.
McQueen, J. D.....	Little Harbour....	Southern division.
Pritchard, A. O.....	New Glasgow.....	Central division.
Sutherland, Robt.....	River John.....	Western division.

SCHEDULE of Fishery Officers, &c.—*Continued.*PROVINCE OF NOVA SCOTIA—*Concluded.*

Name of Overseer.	P. O. Address.	Extent of Jurisdiction.
	<i>Queen's County.</i>	
Freeman, J. N.	Liverpool	The whole of Queen's county.
	<i>Richmond Co.</i>	
Boyle, Dougald R.	Arichat West	No. 1. Isle Madame and Arichat Division.
Cameron, Duncan	St. Peters	No. 2. Western division.
Brymer, Arthur	Lower L'Ardoise	No. 3. Eastern division.
	<i>Shelburne Co.</i>	
Hines, Geo. K.	Shelburne	The whole of Shelburne county.
Goudey, E. S.	Barrington	From Clyde River to Yarmouth county.
	<i>Victoria Co.</i>	
Campbell, Chas. L.	New Campbellton	No. 2. Middle division.
McCharles, Danl.	Middle River	No. 3. Southern division.
Hellen, Wm.	Cape North	The whole of Victoria county.
	<i>Yarmouth Co.</i>	
Hatfield, Abram M.	Arcadia	The whole of Yarmouth county.

PROVINCE OF NEW BRUNSWICK.

Pratt, J. H. (I).	St. Andrews	District No. 1. The county of Charlotte.
Chapman, Robt. A. (I).	Moncton	District No. 2. Restigouche, Gloucester, Northumberland, Kent, Westmorland and Albert counties.
Miles, H. S. (I).	Oromocto	District No. 3. St. John, King's, Queen's, Sunbury, York, Carleton and Victoria counties.
Harding, F. J. (Agt).	St. John	The whole province.
	<i>Albert Co.</i>	
Stewart, Suthd.	Alma	The whole county of Albert.
	<i>Charlotte Co.</i>	
Brown, Barth.	Campobello	Vicinity of Campobello and West Isles.
Campbell, D. F.	St. Andrews	Inner Bay, Passamaquoddy.
Mathewson, John	St. George	Parishes of St. George, Pennfield and Lepreau.
Martin, Frederick.	Grand Manan Harbour	Around Grand Manan Island.
McLaughlin, W. B.	Grand Manan	Grand Manan Island and spawning grounds.
Todd, Frank.	St. Stephens	The whole of Charlotte county.
	<i>Gloucester County.</i>	
Aché, Adolphe (W).	Shippegan	Vicinity of Shippegan.
Albert, Xavier D.	Caraquet	Caraquet herring banks.
Calnan, John, jr. (W.)	Bathurst	Tête-à-Gauche River.
Gibbs, Valentine (W.)	Pokemouche	Vicinity of Pokemouche.
Hache, Jos. L.	Caraquet	Caraquet and Shippegan oyster beds.
Hickson, James	Bathurst	Bay des Chaleurs from Mill Stream to Grindstone Point and Nipissiguit River.
Landry, Arcade.	Shippegan	Shippegan district.
Marks, William	Miscou	County of Gloucester.
Robichaud, Olivier (W.)	Ferguson's Point	Bariau Point to Green Point and Tracadie Rivers.
Sweeney, William.	Green Point	From Belledune to Mill Stream.
Thériault, James D.	Grand Anse	Grand Anse to Point Mizenette.
Walsh, William.	Pokemouche	District of Pokemouche.
Whelton, Michael (W.)	Pokeshaw	Vicinity of Pokeshaw.

Marine and Fisheries—Fisheries Branch.

SCHEDULE of Fishery Officers, &c. — *Continued.*

PROVINCE OF NEW BRUNSWICK—*Continued.*

Name of Overseer.	P. O. Address.	Extent of Jurisdiction.
<i>Kent County.</i>		
Després, Thos	Cocagne	Parish of Dundas.
Leblanc, Olivier J. O.	Buctouche	Parishes of Wellington and St. Mary.
Hannah, Wm. J.	Richibucto	The whole county of Kent.
Leblanc, A. T.	Legerville	Parishes of Harcourt and Huskisson.
Richard, Pierre L.	St. Louis	Parish of St. Louis.
Beaty, John	Kouchibouguac	Parishes of Carleton and Acadieville.
<i>King's County.</i>		
Brown, James	Hammond Vale	Lakes in Hammond Parish.
Belyea, Ludlow	Brown's Flat	Parishes of Westfield, Greenwich and Kingston.
Fenwick, Edwin (W.)	Studholm	Millstream.
Grey, Justus H.	Springfield	Parish of Springfield.
Heine, W. H.	Norton Station	Kennebecasis River and Darling's Lake.
Nolan, James W.	Smith's Creek	Parishes of Havelock, Waterford, Sussex and Hammond.
Pearson, Isaac R. (W.)	English Settlement	Washademoak Lake and tributaries.
<i>Northumberland Co</i>		
Robichaud, Ferdinand	Neguac	Part Miramichi Bay fronting on Alnwick and inland waters.
Williston, J. G.	Bay du Vin	South part Miramichi Bay to Point au Quart.
Abbott, Lemuel	Chatham	Miramichi River to Newcastle.
Hogan, Patrick	Newcastle	N.W. Branch Miramichi River and tributaries.
Boyes, Robert E	Blackville	S.W. Branch Miramichi River and tributaries.
<i>Queen's County.</i>		
Case, Mayes	Wickham	The whole of Queen's county.
Warden, A. C	Johnston	Washademoak Lake, Canaan and Salmon Rivers and tributaries
<i>Restigouche County</i>		
McLean, Donald	Charlo	Baie des Chaleurs, Belledune to Dalhousie.
Brown, Chas.	Maguasha, P.Q.	From Dalhousie to Tide Head.
<i>Sunbury County.</i>		
Griffith, Chas. (W.)	Sheffield	County of Sunbury.
<i>St. John County.</i>		
Cochrane, John	I.C.R. Station, St. John	St. John city and vicinity.
O'Brien, Joseph	Carleton, St. John	St. John county.
<i>Victoria County.</i>		
Ryan, Thos. D.	Grand Falls	The whole county of Victoria.
Martin, Jos.	Baker Lake	Baker and other lakes not more than 4 miles from Baker Lake
<i>Westmorland Co.</i>		
Cormier, D. T	Pré d'en haut	Dorchester Parish and Petitcodiac River.
Goodwin, Robt.	Bay Verte	Parishes of Sackville and Westmoreland.
Deacon, W. B	Shediac	Parishes of Salisbury, Moncton, Shediac and that part of Botsford to Big Shemogue Harbour.
<i>York County.</i>		
Orr, Robt.	Fredericton	The whole county of York.

SCHEDULE of Fishery Officers, &c.—*Continued.*

PROVINCE OF PRINCE EDWARD ISLAND.

Name of Overseer.	P. O. Address.	Extent of Jurisdiction.
Lord, A. (Agt.).....	Charlottetown	Prince Edward Island.
Perry, S. F.....	Tignish	do do
Davison, John.....	Bedeque	The county of Prince.
Nolan, Dan.....	Souris.....	County of King's.
Hobkirk, W. C.....	Charlottetown	County of Queen's.

PROVINCE OF MANITOBA.

Tupper, R. Latouche (I.)	Selkirk	The province of Manitoba.
Gardner, Rich.....	do	do do
Martineau, H.....	The Narrows, Lake Manitoba	Lakes Manitoba, Ebb and Flow, Dog and tributaries.
Gunn, Robt	Winnipeg	Within his district as forest ranger.
Stevenson, E. F.....	do	In his district as Crown timber agent.

NORTH-WEST TERRITORIES.

Davidson, G. S. (I.)....	Qu'Appelle	All the North-west Territories.
Foster, John.....	Silton	The Silton District.
Matheson, W. D.....	Edmonton	District of Edmonton.
Lucas, S. B.....	Holbrooke	do of Peace Hills, Alberta.
McKenzie, R. S.....	Stobart	do of Prince Albert, Saskatchewan.
Thompson, J. R.....	Calgary	do vicinity of Calgary.
Cook, R. S.....	Prince Albert.....	do of Prince Albert.
Aikman, Jno. H.....	Care of the Com- missioner of Do- minion Lands, Winnipeg.	Each in his district as homestead inspector.
Rogers, John.....		
Park, R. S.....		
Allison, John.....		
Allison, W. H.....		

PROVINCE OF BRITISH COLUMBIA.

McNab, John (I.).....	New Westminster.	The province of British Columbia.
McKay, J. W.....	Kamloops	District of Yale, B.C.
Meason, W. L.....	William's Lake	Kootenay R., from Clinton to Barkerville.
Philips, Michael.....	Kootenay	do district.
Higginson, T. S.....	New Westminster.	In his district as Crown timber agent.
Ellison, Price.....	Vernon	O'Kanagan lake and river.
Gaudin, Capt. James.....	Victoria	Having jurisdiction in the whole province.
Walbran, Capt. J. T.....	do	do do do
Woods, W. F.....	Kamloops.....	Vicinity of Kamloops.

Marine and Fisheries—Fisheries Branch.

SCHEDULE of Fishery Officers, &c.—Continued.

FISH CULTURE.

Name.	Rank.	P. O. Address.
Kenefick, John.....	Officer in charge of Government Fish Hatchery.....	Newcastle, Ont.
Parker, Wm.....	do do.....	Sandwich, Ont.
Walker, John.....	do do.....	Ottawa, Ont.
Finlayson, Alex.....	Asst. officer in charge of Government Fish Hatchery.....	Magog, Que.
Catellier, L. N.....	Officer in charge of Government Fish Hatchery.....	Tadoussac, Que.
Davis, Henry.....	do do.....	Gaspé Basin, Que.
Mowat, Alex.....	do do.....	Campbellton, N.B.
McCluskey, Chas.....	do do.....	Grand Falls, N.B.
Sheasgreen, Isaac.....	do do.....	South Esk, Miramichi, N.B.
Ogden, A.....	do do.....	Bedford Basin, N.S.
do.....	do Government Lobster Hatchery.....	Pictou, N.S.
Dunlop, W. J.....	Asst. officer in charge of Government Fish Hatchery.....	Sydney, C.B., N.S.
McNab, John.....	Officer in charge of Government Fish Hatchery.....	New Westminster, B.C.
Tupper, LaTouche, R.....	do do.....	Selkirk, Man.
Kemp, Ernest.....	do Oyster culture.....	Ottawa, Ont.

All captains of the Fisheries Protection Service are also fishery officers, with power of a justice of the peace for all purposes of the Fisheries Act. During the season of 1896 they were as follows:—

- Commander O. G. V.. Spain, of the cruiser "Acadia."
- Capt. S. Belanger, of the cruiser "La Canadienne."
- Capt. A. Finlayson, of the cruiser "Stanley."
- Capt. J. H. Pratt, of the cruiser "Curlew."
- Capt. Geo. M. May, of the cruiser "Constance."
- Capt. H. McKenzie, of the cruisers "Vigilant" and "Osprey."
- Capt. W. H. Kent, of the cruiser "Kingfisher."
- Capt. C. T. Knowlton, of the cruiser "Aberdeen."
- Capt. Ed. Dunn, of the cruiser "Petrel," for Ontario.
- Capt. G. W. Pearson, of the ss. "Dolphin," for Ontario.

RECAPITULATION OF FISHERY OFFICERS.

Provinces.	Number of Officers.
Ontario.....	114
Quebec.....	75
Nova Scotia.....	62
New Brunswick.....	55
Prince Edward Island.....	5
Manitoba.....	5
North-west Territories.....	12
British Columbia.....	9
Officers and crews of the fisheries protection vessels.....	178
Fishery guardians employed during the season of 1896.....	200
Total.....	715

SPECIAL REPORTS

ON

- I.—Natural History of the Lobster, with special reference to the Canadian Lobster Industry
- II.—A concise account of Fishes' Eggs
- III.—The place of Carp in Fish Culture

BY

PROFESSOR E. E. PRINCE, B.A., F.L.S

Commissioner of Fisheries

1896

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

PRINTED BY S. E. DAWSON, PRINTER TO THE QUEEN'S MOST
EXCELLENT MAJESTY

1897

Marine and Fisheries—Supplement No. 1.

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I.

NOTES ON THE NATURAL HISTORY OF THE LOBSTER,
WITH SPECIAL REFERENCE TO THE CANADIAN
LOBSTER INDUSTRY.

BY PROFESSOR EDWARD E. PRINCE, COMMISSIONER AND GENERAL INSPECTOR OF
FISHERIES FOR CANADA.

Introductory.

Three years ago in my first report as Dominion Commissioner of Fisheries, which I submitted to the Minister of Marine and Fisheries, I ventured to say that "of all the valuable inhabitants of our inshore waters there is not one about which we have so little reliable information as the lobster. A thorough research upon its habits, propagation, life-history and migrations, would be of the utmost value, and would afford a basis for wise legislation."

Since then certain scientific investigators, notably Professor Herrick, of Adelbert College, U.S., have made advances in the direction indicated, but much remains to be done before it can be said that the natural history of the lobster has been satisfactorily outlined. Amongst fishermen, lobster packers and others interested in the lobster fisheries a desire has arisen for information about the habits and life-history of the lobster, and to supply this desire the following account, divested of scientific technicalities, has been prepared.

A large amount of the injury done in the past, and now being done by parties engaged in lobster fishing and packing is due to lack of knowledge. Many points yet remain to be ascertained regarding the lobster; but a summary of existing knowledge on the subject cannot fail to be of practical value.

Incredible abundance of lobsters formerly.

The Atlantic shores of Canada are perhaps the most remarkable lobster grounds in the world. Their extent and the abundant supplies of lobsters which, during the last twenty-five years they have produced, are not to be paralleled elsewhere. Not many years ago it was no uncommon spectacle to see, after a storm, miles of the shore strewn, between tide-marks with lobsters. In some localities in New Brunswick and Quebec lobsters in wind-rows four or five feet high were cast up by the waves and left stranded and dead along considerable lengths of the coast. As many as one thousand dead lobsters have been counted along two rods of shore and in some years, as in 1873, the destruction of lobsters in this way, especially along the Shippegan shore, Gloucester county, New Brunswick, was memorable.

Lobsters were so common that their value was not appreciated. Not only so, but extremely erroneous views prevailed as to the inexhaustibility of the Canadian lobster supply, and the peculiarities of the lobster's habits, migrations and distribution. It is only very recently that the possibility of the depletion of these crustaceans was realized by the fishing population and packers.

Diminishing supply in recent years.

An eminent United States authority in reference to the New England lobster industry remarks :—

“The statement that the lobster fishery once carried on extensively along the New England coast, has about become a thing of the past, and that the catch here is now scarcely sufficient to supply one-fifth of the demand of Boston alone for this crustacean, may well occasion dismay among the lovers of one of our most delicious and popular food specialities, as well as among those who formerly derived handsome returns from the pursuit of the lobster fishing industry on our coast. There seems to be no doubt that the exhaustion of the lobster supply is due to the greediness of the lobstermen who have levied excessive drafts on their resources without giving due heed to the work of replenishing them. This state of things demonstrates anew the importance of the protection of our fisheries by legal enactments and the rigid enforcement of such legislation.”

The Department of Marine and Fisheries, realizing the great and increasing value of the lobster fisheries of Canada, attempted with more or less success to preserve them from injury and extinction. It may be that various circumstances have interfered with a strict and fair enforcement of the protective regulations framed ; but it is generally admitted that our lobster fishery might have already succumbed, had no legal restriction existed.

Increased value of lobsters.

Sweden 200 years ago enacted laws to protect its lobster fisheries, the earliest lobster regulations being enacted in 1686, and the Scandinavian lobster supply has outlasted that of all other European countries. Many considerations might be adduced to show that, unless overfishing and illegal capture be prevented, the lobster must inevitably become extinct in Canada as it has become practically in many other countries. Lobsters are admittedly becoming more and more scarce, while the demand and the market price continue to increase. A live lobster of 11 inches in length which ten years ago could not be sold for more than 1 or 2 cents will bring to the fishermen, especially early in the year 10 to 20 cents. A case of canned lobsters which sold in 1887 for \$4 or \$5, can now readily be sold for \$8 or \$9.

Causes of depletion.

Among other reasons worthy of mention are its limited geographical range, its extremely local habits and migrations, its perils when shelling, the dangers that threaten the lobster's eggs, and the delicate character of the young fry for many months of their life. The enemies of the lobster are legion, and man adds infinitely to its dangers by spreading baited traps over the grounds which it haunts when it comes in from deeper water to hatch its young. The principal fishing season covers the very months when the parents are hatching out their broods of fry.

Geographical range of the lobster.

The lobster is an inshore creature and does not wander far out to sea. Its geographical range along the Atlantic shore is very limited, as no lobsters are found north of Chateau Bay in Labrador or south of Delaware Breakwater. A specimen is recorded as far south as Cape Hatteras, N.C., as taken by the United States Fish Commission Steamer “Albatross” in 1884, and this appears to be the most southerly record of its occurrence. The vast waters off Northern Labrador, Hudson's Bay and the Arctic circle appear to be destitute of this valuable crustacean, nor do the prolific shores of British Columbia yield any lobsters. Each particular bay or inshore area within the range above referred to may be said to have its own local supply of lobsters. Such localities, when once cleaned out, are not replenished in the way they would be, did schools of lobsters constantly move over extensive areas. Certain bays could be named which once abounded with lobsters, but reckless and illegal fishing cleaned them out and lobsters from the localities have not migrated in to take their vacant place.

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Decrease in other countries.

In England, Scotland and Ireland as well as along the Atlantic coast of the United States grounds have been overfished, which were once prolific and valuable, and the lobster fisheries in those areas have practically ceased. The *New York Fishing Gazette*, February 26, 1897, significantly publishes the following intimation:—

“It is believed that there will be no lobsters packed on the coast of Maine during the coming season. The principal packing will be done in the British Provinces.”

In the Dominion of Canada there remains the last great lobster fishery of the world, and it is not too much to say that this fishery has reached a critical stage.

Small size of lobsters in the markets.

The signs of exhaustion are unmistakable. Small immature lobsters, 5 to 8 or 9 inches long, which a few years ago were rejected with contempt are now eagerly taken, and form in some districts the staple article upon which the lobster canneries depend. Instead of two or three lobsters sufficing to fill a 1 lb. can, not less than five, six, seven or even ten lobsters are now required.

Ten years ago the average size of lobsters was of 10 inches (2 lbs. weight), while thirty years ago an old fisherman has testified that 13 inches ($3\frac{1}{2}$ lbs.) was the average.

Increased amount of lobster gear.

In order to keep up the catch each season the quantity of gear is being increased year by year all around the coast. Yet the average number of lobsters taken per trap has been steadily diminishing.

A prominent packer in Prince Edward Island publicly stated that in a certain cannery with which he was acquainted, the number of cans packed as compared with the number of traps fished from that factory showed this startling decrease:—during a period of six seasons at that factory the average number of 1 lb cans to each trap fished was in 1891, 24; in 1892 it was $16\frac{1}{2}$; in 1893 it was $13\frac{1}{2}$; in 1894 it was $12\frac{1}{2}$; in 1895 it was $7\frac{1}{2}$, and in 1896 it was $5\frac{1}{2}$.

The capture and packing of lobsters inferior in size and quality cannot continue, and the taking of “berried” females and even soft shell lobsters indicates the desperate efforts now being made to keep up the aggregate pack. In prolific inshore waters such as those of Newfoundland these strenuous attempts are viewed with the gravest fears by those qualified, by knowledge and business experience to judge. The best authority on United States fishing matters made a few weeks ago this announcement:—

Newfoundland lobster-packers propose to enter into the packing of this fish more largely than ever the coming season, and many new men will operate small factories in various parts of the island. This, in view of the fact that the ground all about the island is being overfished, would indicate that unless some restrictions other than those now in force are placed upon the fishery, the lobster in Newfoundland will soon be extinct.

Local distribution of lobsters.

Fishermen have discovered that lobsters can be caught in deeper water than was formerly fished; but their occurrence in deeper water merely shows that the lobsters when they forsake the inshore shallow areas resort to these greater depths. Instead of moving, as many still think, over great portions of the coast, the lobsters, as the fact stated shows, migrate from deeper water into shallower and back again. No doubt the great schools pass the winter at depths of 40 or 50 fathoms; but during the warm summer months they move into shallow water, 2 to 10 fathoms, where the females ripen their eggs and hatch them out.

Habits of lobster.

When moving at leisure the lobster walks nimbly along on the tips of its toes holding its nipping claws slightly raised in front, waving its long feelers aloft, while the

short second pair is held straight to the front like rigid bayonets, and turning its protruding stalked eyes in every direction. The tail is held spread out behind so as not to touch the ground.

When alarmed or in danger instead of proceeding forward, it swims backward by the convulsive and powerful strokes of its tail. It shoots along at the rate of twenty-five or thirty feet per second ; but rapid swimming is so exhausting to the lobster that it is physically unable to continue this violent method of progression very long. Moreover, when swimming the lobster cannot see where it is going ; it only sees the danger from which it is fleeing ; but observers have noted with astonishment how accurately it directs its course. A lobster, it is said, will at times bound tail foremost out of the narrow entrance of a lobster-trap in which it finds itself confined. The very young lobster uses its feathery feet for swimming, as will be described on a later page, and progresses rapidly head foremost quite in contrast to the habit of swimming backward in the adult.

The lobster is most active at night and shuns excess of light. It is impatient of heat or extreme cold, and under such conditions becomes sick and inactive ; but in water of a temperature of 40° to 50° F. it is most vigorous and healthy. The heart and principal blood-vessels of the lobster as well as the main venous sinuses lie in the back of the creature, hence exposure to the hot rays of the sun is rapidly fatal. Lobsters confined in inshore ponds and in floating cars die in great numbers from heat and exposure for the physiological reason just stated.

Food and Growth.

Lobsters may be almost said to be omnivorous, they are certainly not particular in their diet and greedily devour fish alive, dead, or even putrid, seaweed, eelgrass (*Zostera*) shrimps, starfish, indeed anything in the shape of edible material. At times they turn cannibal and will devour each other, while they are fond of tearing off and eating the bunches of eggs attached to the female lobster in a "berried condition." Just as the owl or kingfisher rejects the bones and indigestible portions of fish or animals which they have eaten, so the lobster ejects from its mouth the hard parts of the creatures which it has devoured. Such pieces cannot pass down the intestine, which is a slender and delicate tube lying along the fleshy jointed tail of the lobster. The lobster has a keen sense of smell which is believed to be located on the under surface of the outer limb of each of the small pair of feelers (the antennulæ). No doubt it is mainly by the sense of smell that it is led into the baited cage or trap used in the lobster fishery. There is certainly no just reason for regarding putrid bait as more attractive than fresh bait. It is possible that semi-decayed fish may have a certain amount of luminosity or phosphorescence, which affects the lobster's sense of vision ; but the Norwegians have for centuries proved by practice that pieces of fresh flounder placed as bait in their cane traps form the best possible bait.

Structure of the shell.

The dense armour of hard limy material which encases the lobster permits only of limited growth so that the shell must be cast off repeatedly, as the lobster increases in size, season after season. This growth is most rapid in the very young or infant stages, hence moulting is then most frequent, as will be shown on a later page in the account of the life of the larval lobster. A lobster cannot continue to wear the same shell any more than a growing youth could continue to wear a small boy's suit after he has become a man. The shell consists of four layers :—(1) An outside horny layer, which shows no definite structure. Professor Herrick calls it the enamel layer. (2) A thicker canalculated layer, crowded with lime salts, and coloured with pigment. Dr. Carpenter called it the "areolar" layer. (3) A very thick, non-coloured, laminated layer, recalling the structure of dentine in a tooth. It is Carpenter's "tubular" layer, and is the gleaming white part of the shell, which is so noticeable at the broken edge when a lobster shell is fractured. It is this layer which is absent in the case of *Phyllosoma*, and the glass crabs, *Portunus*, and others. (4) A very thin lamellar layer which is not calcified.

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The inside lining is formed by a soft layer consisting of epithelial cells. These cells build up the shell, and become greatly enlarged and cylindrical, when actively secreting a new shell.

All four layers are pierced by delicate canals, viz. : the skin-gland ducts, the hair-pores, and the tegumental gland tubes. Inside the shell, of course, lie the great masses of white flesh or muscles ; but there is an intervening space between the shell and the muscles which is occupied by loose connective tissue, large blood-spaces, and the great glands, called by Professor Herrick "tegumental" glands.

Shelling or moulting.

The shell undergoes peculiar changes when the "shelling" period arrives. Some of the salts, which impart hardness to it, begin to disappear in such places as the middle of the great shield covering the head and thorax, and along each side of the snout and other parts. This change gives the elasticity required to allow of the shell being more easily thrown off. A thin skin forms underneath the shell, and the lobster then shows very evident signs of the painful process about to begin. A lobster about to moult loses its bright colour, acquires a loose lax appearance, and becomes very uneasy and shy. It seeks the shelter of rocky clefts, or if these be not at hand, immerses itself in a soft sandy bottom, lying sidewise. It bends upon itself so that the skin connecting the shield and the tail bursts. There are no violent convulsions such as some writers have described. The muscles of the limbs tug vigorously, and the great claws, soft and pliable as indian rubber, are withdrawn like the hand from a glove. The creature pushes itself through the gaping slit, the head being pulled out leaving the tail to be drawn out last of all. The newly shelled lobster has a limp and collapsed appearance, but its colours are extremely fresh and bright. Water is so rapidly absorbed through the soft new shell that the lobster enlarges and swells up with surprising rapidity. The empty cast-off shell resembles a dull dingy live lobster, as it is rarely split or broken although extremely brittle. At the end of a month the shell is not really hard ; but still has a pliable leathery character. Many observers have declared that within twenty-four hours, or at most within a week the shell is perfectly hard. This is not so. A lobster is really not completely hard for seven or eight weeks after moulting. The process of shelling takes place every year, especially during the summer months, for which two reasons can be adduced. The water is warmer then, and the soft and sensitive lobster at that time escapes the peril of extreme cold. A vast number of females hatch their young in the warmer months, and, after hatching, they invariably cast off the shell, partly no doubt to get rid of the clinging empty eggs, and their attachments, which become foul ; but chiefly, as already indicated, owing to the growth of the animal inside its covering whereby the old shell becomes too small for it. Actual observations on the shelling process are very meagre, indeed those of my friend the late George Brooke are almost the only continuous observations on record. His studies were carried on in Scotland for about sixteen months, viz., from July 1st, 1883, to November 19th, 1884, during which time he found that four moultings took place, the size at each moult being:— $6\frac{1}{8}$ inches, 8 inches, $8\frac{1}{8}$ inches and $9\frac{5}{8}$ inches, a total increase of $2\frac{7}{8}$ inches. The dates, when the shelling process was effected were, July 1st and December 25th, in the first year, and July 25th and November 19th, in the second year. Professor Herrick justifiably calculates that, under natural conditions, a 6 inch lobster would attain a length of 9 or 10 inches in two years and that a 10 inch lobster is probably four and a half or five years old. Of course during its more rapid growth in infancy, the shell is cast off much more frequently. During the first six or eight weeks after hatching the young lobster moults not less than five or six times.

Features of male and female lobster.

Before describing in detail the breeding habits, the production of eggs and hatching of the young, a few words may be here said regarding the external features of the male and female lobsters. A comparison of a large number of specimens has shown that the male is more slender than the female and he possesses larger and stronger claws. The

body of the female is not only broader, but the side plates or flaps at the margin of each tail ring are deepened in order to provide a larger space under the tail for the reception of the bunches of eggs. The first pair of legs in the lobster are the "nipping claws" or large forceps, and there are four pairs of true walking limbs. Behind the walking legs there are five pairs of smaller limbs called "swimmerets." In the male the first pair of swimmerets are transformed into stout rods each consisting of two joints, while at the inner edge of the basal joint of the fourth or last pair of walking legs a minute opening may be noted, on close examination, which is the aperture of the seminal duct. In the female, on the other hand, the first pair of swimmerets consists of a slender feathery rod, composed of one long joint and twelve or thirteen very small joints. The second pair of walking legs show a couple of small openings (oviducal apertures) at the base similar to those in the male; but in the interspace between the third pair of walking limbs is placed the V-shaped sperm pouch. It is a very sensitive organ studded with small sensory hairs, and in it the male deposits a thick gummy matter which acquires a somewhat solid character after a short time. A most reliable distinguishing external feature in the two sexes is the position of the small sex apertures. In the female they are at the base of the second pair of walking legs, and in the male at the base of the fourth, or last pair.

Spermaries of the Male.

It is necessary to describe the structure of the egg-forming and sperm-producing organs before the peculiar features seen in the breeding of lobsters can be understood. The latter organs or spermaries can be seen upon cutting open the back of a male lobster. A pair of slender much corrugated tubes appears passing down the back, and placed immediately above the massive green liver. They rudely resemble the letter H as the two tubes are connected by a slender bridge, immediately behind which connection there passes off on either side a duct. Each duct swells to form a sperm vesicle before terminating in the small external opening or sperm aperture, already described as occurring at the base of each of the last pair of walking legs.

Ovaries of Female.

In the female, the ovaries where the eggs are formed have also the character of a pair of tubes passing along the back behind the eyes and immediately under the shield or shell forming the forepart of the back of the lobster. When in a mature condition they extend along two-thirds of the length of the body from the fourth or fifth ring of the jointed tail almost to the eye-sockets. They exhibit much variation in colour as they approach the ripe stage, recalling the green, pink and yellow ovaries of certain fish such as *Cyclopterus*, for the ovaries of the female lobster may be either of a cream yellow, a pale flesh tint, or a light olive green colour. When the lobster is boiled, the eggs contained in the ovaries, if fairly ripe, turn to an intense red colour and are known as coral. In some great markets (as for instance London) lobsters containing coral are prized for culinary purposes especially for lobster sauces, etc., and this demand for ripe females has no doubt had much to do with the depletion of lobsters in Britain.

Deposition of eggs.

At the spawning time the eggs enlarge and become loose in the ovary. They then glide down the oviducal tubes, their passage being facilitated by a fluid, which is secreted at that time by the swollen cells lining the oviduct and they are rapidly ejected from the two orifices, already described as occurring at the bases of the second pair of walking legs. Each egg is globular or rather spheroidal, about $\frac{1}{16}$ inch in diameter. They are received in the space inclosed by the incurved tail of the lobster, and become glued to the five pairs of feathery swimmerets so that they hang like crowded bunches of grapes. The liquid glue is secreted by the glands in the skin or rather shell, in the tail region, and it hardens on exposure to water. The eggs are dark green, almost black; the colour being due to the yolk which is visible through the transparent shell

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or chorion. Unless they are vivified the eggs come to nothing; but the further changes in the progress of the fertilized eggs will be briefly described below.

Pairing Process.

In order that the sperms emitted from these two small openings, in the male lobster, shall be transferred to the female, pairing must take place. No doubt the peculiar first pair of swimmerets are utilised in pairing; but full and accurate observations regarding the pairing of lobsters remain yet to be made. Sufficient information is afforded by the structure of the organs described in the foregoing account, and by what is known in many other creatures of the same subkingdom (*Arthropoda*) to establish the fact. That pairing takes place admits of no doubt. It must, in many respects, resemble the pairing of spiders, in which creatures, we know that the male takes a quantity of sperms from underside of its body, and by means of its pointed second pair of limbs (the pedipalps) transfers these sperms to the special receptacle of its mate. The sperms of the lobster differ from those of most animals, because they are apparently motionless and are able to retain their vitality for a long period of time. In most animals the sperms exhibit wonderful activity for a very short time when they lose their activity and vitality. The lobster's sperms may be described as star-like in form and massed together in a gelatinous capsule (distinguished as a spermatophor). Probably the first pair of swimmerets, which in the male are of very peculiar shape, convey the spermatophors to the female. They are received, no doubt, when lying in a reverse position, and the female stores them in the triangular sperm-receptacle. In the animal kingdom, as a rule, pairing takes place just before or coincidently with the spawning time, and the eggs are at once and directly vivified or fertilized. But in the lobster the conditions are peculiar and wholly different. The male does not directly fertilize the eggs; but the motionless sperms, transferred to the female at the pairing time, are stored up by the female until required. If pairing occurs in the fall when lobsters are found to migrate inshore in great numbers (say in October or November and several months after the hatching period is over) the sperms emitted by the male at that time must be carried by the female for from six to nine months when the female deposits her eggs in spring or summer, April to July seems to be the main time on our shores, then extruded eggs come into contact with the stored up sperms which are now poured out. By the contact of the eggs and the sperms the eggs are at once vivified.

Cleavage of the egg.

Changes immediately commence within each egg. The dark coloured yolk divides up into segments during the first two or three days. This is what is called the cleavage of the egg, and at its conclusion it has the appearance of a thimble-berry or bramble-berry. A thin skin forms inside the egg-shell, and both unite to form a double capsule. It has been frequently noticed that when a young embryo lobster is artificially removed from the shell, the antennæ or horns are found attached to this inner layer of the capsule and are often torn off with the shell.

The embryo within the egg.

During the first ten to fifteen days, while one side of the yolk remains dark, the other side becomes clear and shows a little creature like a spider lying on its back inside the egg. This is the embryo lobster.

The formation of this embryo, embracing the process of cleavage just described, may be rapid, under a high temperature, or very slow if the temperature of the surrounding water be very low.

Hatching period.

There can be no doubt that lobsters, which extrude their eggs in April, May and June, accomplish the hatching of their fry in a few weeks, whereas late spawners, during

the months of September, October and November, probably do not hatch their young for six or eight months. This accounts for the fact noticed by Dr. Fullerton, that a female lobster in the middle of November was found carrying eggs which were in the stage, that in the case of other female lobsters was not reached until about the middle of May. Prof. Herrick, it is true, quotes a case of the hatching out of eggs in the latter part of January under a temperature of 36° F., which had been removed from a female at Christmas. Such facts support the assertion that lobsters may hatch during every month in the year. "I am satisfied," said an experienced fisherman in Prince Edward Island, "that lobsters spawn all the year around." Yet certain months, June, July and August embrace the principal part of the year during which most female lobsters are in Canada found carrying berries. The Department of Marine and Fisheries has been able to confirm this after conducting artificial lobster hatching at Pictou, N. S., for the last five years, the supplies of eggs being mainly obtained from May 15th to early in July or late in June, and the fry as a rule hatching out in from seven to fourteen or twenty-one days. Some very mature eggs hatch within twenty-four hours after being received at the hatchery.

The course followed in artificial hatching in the department's establishment is briefly described below.

Method of artificial hatching in Canada.

After the eggs are received from the lobster canneries usually at the rate of 1½ millions per day, they are placed in glass hatching jars through which pure sea-water constantly passes, and this circulation keeps them in motion. The hatching jars are upright cylindrical vases, with a central glass tube supplying water which passes up through the jar and escapes by a conical tip at the top of the jar.

About the middle of June the earliest lobster fry hatch out, and are carried by the circulating stream into a capacious reception trough, which receives the waste water.

When the hatching-out begins the assistants are kept busy night and day attending to the eggs and fry to see that they do not collect and clog together, as they soon die under such circumstances.

When the time for distribution comes the fry are placed in barrels of sea-water open at the top, and conveyed out to sea on a small steam tug.

They are not simply thrown overboard; but from a low steamer are scattered by means of small tin dippers, or passed through a hose, one inch in diameter and about 8 feet long, provided with a funnel shaped box at the top; they are scattered about one million to the mile over a distance of 60 miles. The bottom is rock and kelp, and the fry are distributed not less than 3 miles from shore.

The number of eggs placed in the hatching jars is about 65 millions each season and the eggs are so healthy that at no time have more than a hundred dead eggs been found in all the jars.

Female lobsters are found from 6 inches to 8 inches in length bearing eggs, but the larger lobsters carry proportionately far more eggs.

Since the Bay View hatchery, Pictou, N.S., was opened, over 500,000,000 of fry have been hatched, the numbers being as below for the following years, viz:—

1891.....	7,000,000
1892.....	63,500,000.
1893.....	153,600,000
1894.....	160,000,000
1895.....	100,000,000

Before emerging from the egg, the advanced embryo lobster is shielded very effectively from harm. Thus there are (1) the shell of the lobster, (2) a temporary larval skin, which fits around the shell like a glove, (3) the egg-shell or primary chorion: (4)

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the secondary egg-membrane which is outside. The chorion is formed in the oviduct and is attached only at the stalk to the secondary, outside shell, the latter is thick and translucent and secreted by the cement glands. Both shells split, like a bean, into two halves at the time of hatching and out comes the larva tail foremost. It is very unlike the lobster in form and habits. It rises to the surface of the sea and appears to frequent the upper waters for over two months, as Professor G. O. Sars, the famous Norse naturalist long ago conjectured, during which time it undergoes a series of changes described as follows in which seven stages may be distinguished.

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 $\frac{1}{3}$ 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 under side 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 about half an inch long (9.50 to 11 mm.)

(3.) During the third week the principal change is the development of the nipper-claws or chelæ. 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 coloration. 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 inconspicuous than in its younger stages when its glassy translucency is more marked, yet it is really a small insignificant object $\frac{1}{2}$ inch to $\frac{3}{4}$ 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 (pleuron) 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 $\frac{1}{2}$ 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 stages 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. Cannibalism is frequent, and the method adopted of attacking each other is very striking as the young lobster barely a few weeks old invariably selects the most vulnerable point, viz.: the opening behind the head-shield. The stronger larva springs upon the back of the weaker and savagely bites him at the point named. 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. I have myself received specimens of some of the stages described 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 my specimens the only actual record in Canadian waters which I can find is that of Mr. J. F. Whiteaves, of the Geological Survey, who eighteen 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. The late Dr. Honeyman (of Halifax, N.S.) is recorded to have computed the following table of growth:—

Young reddish transparent lobster	6 weeks old is $\frac{1}{2}$ inch in length.
Small, but perfect lobster	16 do is 1 inch to $1\frac{1}{2}$ inch.
Larger hard shelled lobster	1 year old is 4 inch to $4\frac{1}{2}$ inch.

* I owe some very fine specimens of stage 5 to Commander Spain, R.N., Head of the Fisheries Protection Service. They were obtained by Capt. Knowlton, D.G.S., "Kingfisher." Mr. C.A. Stayner of Halifax, also kindly gave me specimens of a still younger stage (say stage 3).

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I have not been able to ascertain on what grounds this computation was made, though some of the details given are very remarkable and of extreme interest, dating back as they do ten or fifteen years. The post-larval growth of the lobster it must be confessed is even now largely a matter of conjecture: but some data exist. Professor Herrick succeeded in keeping one specimen alive, which hatched out on May 27th and lived until September 11th, a period of 107 days, in which period it increased about three times its original size.

Growth and Maturity.

We have seen that the adult lobster has been proved by actual observations to grow about $2\frac{1}{2}$ inches in sixteen and a half months, and the larval lobster has been demonstrated to grow in three and a half months no less than half an inch and these facts go to show that in four or five years it is quite possible for the mature size to be reached and at that age no doubt many females carry spawn.

They continue to grow for a period of many years as is proved by the capture occasionally of gigantic specimens. These are more rare than formerly, but this season (1897) a fine specimen was taken off the Jersey coast, which measured three and one-half feet in length, two feet round the body, feelers one and one-half feet long, small legs one foot long, felt claw two feet long and ten inches wide, tail fourteen inches from end of tail to body.

Size of spawners and number of eggs.

Professor Herrick arrived at the conclusion that very few spawn before reaching a length of 9 inches; but so many "berried" specimens $7\frac{1}{4}$ to 8 inches in length have reached me from various parts of the Canadian coast that a considerable proportion of females would appear to carry spawn at 8 inches and under. The ratio of reproductiveness, is however, so low in these small female lobsters that the abundance of lobsters in any locality must depend upon the larger females. A 7 inch lobster will produce 5,000 eggs, whereas when one inch larger the number of eggs carried is just about double that quantity. A 10 inch lobster carries as a rule 18,000 or 20,000 eggs; but when 14 inches long the number of eggs is 40,000, and at 16 inches the number is estimated at no less than 80,000 eggs. Variations are not infrequent and a 10 inch lobster may produce only 12,000 or 14,000 eggs; but on other hand one specimen of this size is recorded which carried 21,000 eggs.

Lobster's fertility compared with oysters, fishes, etc.

These figures might appear large did we not know, by comparison with other marine creatures of economic importance, that the lobster is perhaps the least productive numerically of all. A herring deposits double the number of eggs produced on an average by the lobster; a mackerel four times as many, a cod four hundred times and a Canadian oyster four thousand times as many. No wonder that no lobster fishery in any country has been able for many years to withstand the tremendous annual drain implied by a large market. The lobster fishery of Canada it is estimated annually destroys between sixty and one hundred millions of lobsters, a considerable proportion of these being females about to spawn, or recently spawned. It is indeed astonishing that our lobster grounds have been able to hold out so long with this gigantic destruction going on year after year.

Waste of eggs during fishing season.

The destruction does not end merely with the annual loss of many millions of parent lobsters, for the loss of the spawn about to be laid, or already deposited and scraped from the lobsters before being landed cannot be ignored. In the department's report for 1890, the late Lieut. Gordon laid stress, and rightly so, on this waste of eggs, which is so readily overlooked, and he referred to certain means which might effect (to quote from his report p. 18) "the saving of the ova, the destruction of which now, perhaps,

more than anything else, militates against the speedy restoration of the fishery. To show that this is no idle statement the case of a cannery putting up 2,000 cases, or 96,000 lbs., may be taken; these require say half a million lobsters to put up, and my inquiries show that probably 1 in 5 are "berried" lobsters—say 100,000. Now, take even one-half of this, and say that 50,000 "berried" lobsters, each carrying about 20,000 exuded ova, were destroyed in putting up the 2,000 cases, we have no less than 1,000,000,000 ova destroyed; and if this rule be applied to the 220,000 cases which constituted the product of the fishery for the year 1889, we have a number of 110,000,000,000 as the wanton destruction of ova which it is possible to save—at any rate, in some small measure; for even a saving of 1 per cent of such a total represents a number the magnitude of which figures fail to bring home to the mind."

Theory of Biennial Spawning.

Closely connected with the interesting questions respecting the reproductive capacity of the lobster, and the probable interval elapsing before it reaches maturity and reproduces, is the further question as to the frequency of spawning.

A very erroneous opinion was in circulation some years ago that the female lobster spawns once in two years. Curiously enough this notion first put forward by parties wholly untrained and unqualified to frame a reliable judgment has received countenance recently from men of scientific standing. Professor Garman, and more recently Professor Herrick, have favoured the idea, and Dr. Fullarton has also adopted it in his recent Scottish paper on Lobster Development, though the evidence when analysed instead of establishing biennial spawning all points the other way. Herrick indeed himself found in "paper shell" lobsters in July that just after the brood had hatched and the moulting was over the eggs in the ovaries were no less than half the size of mature ova. Ehrenbaum inferred that the female lobster spawns every fourth year, and the evidence on which this new view is based would just as conclusively prove that the lobster spawns quadrennially. My own embryological studies upon a variety of marine fishes and other creatures have established beyond question in my mind that the growth of the ovarian ovum may be astonishingly hastened after the dispersion superficially of the nucleoli over the surface of the nucleus or germinal vesicle.

In the female *Gostrosteus*, ova developed and ripened in the months of July, August and September, when the conditions were most favourable, in periods of from 60 to 80 days, and passed through stages which later in the year occupied no less than 220 to 240 days. Yet Prof. Herrick does not hesitate to affirm concerning this supposed biennial spawning that to prove it requires only the dissection of a female with eggs ready to hatch in June, July or August, and it will be found that "the ovarian eggs have had, in all these cases, from ten months to a year's growth"—the very point in fact being assumed which requires proof. Further on in his excellent memoir he adds: "That the spawning periods are thus two years apart is a valid inference drawn from the study of the anatomy of these organs."

We have, indeed, available the fullest scientific proof that a Decapod, closely allied to the lobster, spawns not once in two years, but twice in one year, thus the shrimp, *Crangon vulgaris* spawns in April and May as well as in early November. A valid inference would be that the lobster spawns not less frequently than once a year. Dr. Fullarton in adopting Herrick's view says: "From an examination of the ovaries of lobsters which had shortly before hatched a brood, and others periodically between that time and the following January, it is certain that lobsters do not breed annually." As I have shown a mere anatomical examination of the ovaries is insufficient to establish any such conclusion, and an embryologist familiar with the various stages of egg-maturation, in different animal types, is bound to pronounce any such inference as unwarranted collateral evidence is all unfavourable to the theory of biennial spawning.

Annual spawning of lobsters.

When Professor Herrick again affirms in these words: "When the external eggs are ready to hatch the ovarian ova have had nearly a year's growth," an experienced

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embryologist could accept this opinion with difficulty. My own observations for which Canada offers opportunities incomparably greater than those of any other country, lead me to the view that lobsters as a rule spawn annually, and that a female lobster which has hatched her brood early in the season does in many cases produce a second crop of eggs late in the fall which are carried all winter. The details of my examination of a large number of specimens supporting this view cannot be given here; but will be published in due course elsewhere.

There is certainly little justification physiological or anatomical for holding with Fullarton that in no case "lobsters that had just hatched a brood, had eggs in the ovary which could become fully ripe under a good many months." The oftquoted case of the lobster in Rothesay Aquarium, Scotland, which was carrying ova when placed in the tanks in August, 1886, and did not complete the hatching of the same until August, 1887, though larvæ hatched out as early as April, 1887, proves only that the conditions were abnormal and unfavourable. The fact that the brood were hatching for a period of five months, April to August, from eggs which were extruded the summer before fully demonstrates the abnormality of this special case. The fact that the lobster spawns annually is evidenced by (1.) The fairly uniform proportion of "berried" females taken season after season.

(2.) The occurrence of the berried conditions in all sizes of females from 7 inches to 18 inches. It might be expected that females of certain specified sizes would never or rarely be found with eggs were biennial spawning a fact.

(3.) Exact researches upon allied decapod crustaceans prove the greater frequency of spawning.

(4.) The rapid growth of ovarian eggs so familiar to embryologists is unfavourable to the biennial theory.

Enemies and diseases of the lobsters.

As with other valuable inhabitants of the sea the lobster's enemies are legion. In its earliest days the young swimming larvæ are sadly decimated during the first eight or ten weeks of their life, when as we have seen they range from $\frac{1}{8}$ inch to $\frac{3}{8}$ inch in length. Physical and chemical impurities also kill them. Later they are more hardy; but intense cold and excessive heat are equally fatal. Adult lobsters confined in floating cars are found to die in great numbers when the sun's rays are powerful. I have examined such cars and found a large proportion in a sick and dying condition.

Almost every predaceous fish in the sea devours the lobster. The mackerel feeds largely on the larval lobster, while the cod, haddock, pollack, sea bass, skate, etc., eat it when it attains a larger size; but to add to its dangers and enemies I have found in Nova Scotia that crows are most destructive, for when the tide goes down these birds destroy the lobsters left amongst rocks and sea-weed. They pierce the shield of the lobster where the heart and main blood vessels are situated and the crustacean is at once rendered helpless and is devoured by its assailant. The flocks of crows busy amongst the rocks inshore must destroy large quantities of this valuable crustacean. Boeckh has described a curious habit in the Scandinavian crows. They seize the lobster and fly up into the air with it and let it fall, breaking its hard shell into fragments and exposing the delicate masses of flesh in the claws and tail.

The lobster suffers from few diseases or parasitic affections. A large Gregarine (*G. giganteum*) abounds in the intestine as Van Beneden found, and a peculiar Trematode worm occurs in the liver. Prof. Herrick remarks that no specific disease characterizes this crustacean, though Mr. Rathbun has described a tumoid protruberance on the outside of the carapace which was attributed to a wound. As a matter of fact an internal disease does, in rare instances, affect the lobster, and Professor McIntosh, many years ago, described a tumour which originated in the wall of the grinding stomach and pushed its way through the carapace behind the eyes. The tumour enlarged and finally resulted in the death of the lobster, which was a very large and old specimen.

The lobster has more than the usual quota of perils to face, and man's systematic destruction has not merely added to them, but overbalanced them all. It is probably

in early larval life that the decimation of the lobster chiefly takes place, for there are few fishes in the sea that will not eagerly devour the young as they flit in cloudy masses through the water.

The influences fatal, or at least hurtful, to the lobster in mature life have been already pointed out; but there is one to be added, viz., fresh water. Lobsters avoid localities where fresh water streams run in unmingled with salt water. In shipping live lobsters packed in ice, the fresh water trickling down from the melting ice is most harmful and ultimately fatal.

Shipping of live lobsters.

With proper precautions, however, lobsters may be carried alive and healthy over great distances. Early this century some loyal Nova Scotians shipped in a sailing vessel several barrels of lobsters to King George III. They reached London safely and alive. In 1862, some tubs of sea-water containing live lobsters were sent from Maine, U.S., *via* Halifax, to the Emperor Napoleon III., and a few years ago the Otago Acclimatisation Society, Dunedin, New Zealand, succeeded in carrying live lobsters from England. In the first attempt only twelve were sent; three died during the first week though the rest survived, fed well during the voyage, and at the end of the 54 days' sail were planted in a healthy condition at the Antipodes. The Society was encouraged by this success to arrange for a second shipment; but all died on account of the detention of the ship for a month by a broken shaft at sea. The extensive exportation of live lobsters is in Canada a comparatively new thing, and is growing rapidly. What its effect upon the lobster supply will be, remains to be seen.

For many years very large exportations of live lobsters have been made from Norway averaging in value \$150,000 per annum, the number actually taken in the fishery ranging from 800,000 to 1,000,000 lobsters, and most of them destined for the English market.

The method of packing and shipping them may be described as follows:—The boxes generally used have the following outside dimensions: Length, 39 inches; breadth, 19 inches; and height, 15 inches. If ice is used they are made 4 inches lower. Each box contains from 100 to 120 lobsters. Sometimes smaller boxes are used, with the following dimensions: Length, 24 inches; breadth, 19; height, 13. Between the boards there are suitable openings to admit fresh air.

In summer there is placed at the bottom of the box a layer of ice two or three inches thick, and on this a frame, so that the lobsters are not disturbed in their position even if the ice melts. On this frame there is first spread a thin layer of fresh heather (long, thin grass) or straw, on which the lobsters are laid carefully, back downward, the tail being bent forward and across the box, with the claws turned inside towards the centre. When the box is full some heather or straw is spread over the lobsters and the box is closed. Heather is preferable to straw, as the latter spoils on account of the moisture caused by the ice, and the lobsters cannot well endure any bad odour. For this reason it is not advisable to use dry sea-weeds, which formerly were often employed. Old sail-cloth dipped in sea-water forms an excellent cover, as it keeps moist and cool for a long time. If ice cannot be had, heather soaked in sea-water may be used, dry fresh straw, or sail-cloth. During the cooler season only heather or straw should be placed at the top and bottom of the box.

In winter the sides of the box may be lined on the inside with paper, so as to protect the lobsters against the cold, but there should not be any paper either at the top or bottom, as the lobsters would be stifled, owing to the lack of air. When the lobsters have not been kept prisoners for more than eight days, they will, when packed in boxes in the manner described above, keep for four days. The fresher the lobsters the better they are able to stand the fatigue of the voyage.

The boxes are placed on the deck in such a position that the water from the melting ice does not reach the lobsters, which cannot well endure fresh water, and so that the lobsters are protected against rain, as rain-water is very apt to injure them. Lobsters which during transportation have been exposed to the rain, when placed in tanks generally lose their claws. The persons who ship lobsters usually see to it that

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the boxes are placed in proper position on board the steamer. It always appears best to place the boxes containing lobsters on the forepart of the steamer, so that the lobsters may get the benefit of the spray from the waves.

Necessity of judicious protection.

Whether the canning of lobsters in the Dominion or their shipment alive to the great markets will have supremacy in the future it is impossible to say. Excessive and unrestricted fishing carried on for either industry, or both, must have the same result viz. : sure and certain extermination.

This calamity has already happened in the United States. As has recently been stated in a leading United States fishery journal:—"Canadian fishermen are awakening to the possibility of a famine in lobsters, and the Fisheries Department is calling meetings, at which Professor Prince will confer with the fishermen and representative men in the industry, who will present their views on close seasons and other regulations affecting the lobster industry. It is a very serious question, and should be given attention at once. The United States Fish Commission should co-operate with the Canadian, as our lobsters are growing more scarce yearly. This industry was very profitable along the Maine and Massachusetts coasts in former years, but now is anything but remunerative."

That Canadian fishermen and cannors realize the grave possibility has been shown by the recent conferences held in the Maritime Provinces, the first of the series being attended by the Hon. the Minister of Marine and Fisheries. In accordance with the wishes of the Hon. L. H. Davies, the further meetings held were attended by the Commissioner of Fisheries. A Nova Scotia journal (the *Pictou Advocate*) briefly summarized the situation in these words:—

"The attendance at and interest manifested in the meetings held throughout the province lately by Prof. Prince show that our people recognize the great importance of the lobster industry. To preserve it on a permanent basis is a matter of the greatest possible importance. "You can not have your cake and eat it" is true in regard to this question. As other countries have lost the wealth which follows successful fishing, so also will these Maritime Provinces if those most interested in its permanency, the fishermen, along the coasts are not impressed with the importance of fostering it in every way. The idea of Hon. Mr. Davies of local discussions and expressions of opinion from those interested is a splendid one, and we trust will lead to the framing of a good law which will benefit and protect the industry."

Canada has an object lesson before her in the depleted United States lobster fisheries in reference to which Dr. Lavoie, Fishery Officer for the Gulf of St. Lawrence division, wrote in 1876:—

"*The ruin of the lobster fishery on the shores of the United States ought to warn and at the same time teach us a lesson which we should take advantage of; that is to regulate with as little delay as possible, the mode of carrying on this fishery, if we would not suffer the same results.*"

The *New York Fishing Gazette* recently gave expression to similar sagacious warnings, and a quotation from that acknowledged authority may fitly conclude these notes. The quotation is extracted from an article referring to the growing scarcity of the lobster in Canadian waters. "In these waters, it may be said, are the *remains* of the *only remaining lobster fishery of the world*. That this is so is not due to the exercise of greater care in its preservation than was bestowed upon those other lobster fisheries that are now unprofitable; but rather to the fact that it has existed as a fishery of importance only a few years, or since the packing of lobsters ceased on the coast of Maine. Practically the same methods have been pursued. The packing interests have been in the hands, in a manner, of those who controlled the industry when it flourished in New England. The manner of prosecuting the fishery has been similar to that in vogue here, and its operation is being followed by results almost identical. The difference between the Maine fishery that was, and the Canadian fishery that is, lies in the fact that in the case of the former the gravity of the situation escaped the attention of the authorities until it was too late to apply the needed remedies. In the latter case, investigations—some-

what tardily begun—are being pushed with vigour while there is yet life left in the industry. It remains to be seen whether those in charge of these investigations and the correctives that will have to be applied will profit by the mistakes that were made here.”

The further observations of the same journal in regard to the market for 1896 and 1897 are of the gravest import: “It is nearly certain,” says this authority, “that the markets here will be dependent wholly upon the output of the Canadian packers. The high prices that ruled during the last season curtailed the consumption both here and abroad, and yet in spite of this the demand was sufficient to absorb everything in first hands long before the close of the packing season, and for several months the market has been virtually bare, the small stock remaining being held firmly by jobbers.

As this is practically the situation at present, those engaging in the packing industry may be reasonably certain of finding a ready market with prices well in the lead of those prevailing at last year’s opening. Some of the larger packers of lobsters, indeed, have made prices on the 1897 pack which range from 35 to 37½ cents above the opening figures of last year. Notwithstanding these prices, which are the highest that have been quoted for many years, it is reported that the bulk of the contemplated pack of the brands so far offered has been placed. It is not expected that the output of any of these brands will be larger than was the case in 1896; indeed, there are reasons for believing that the number of cases packed during the coming season will be the smallest in the history of the business.”

II.

A CONCISE ACCOUNT OF FISHES' EGGS.

BY PROFESSOR E. E. PRINCE, DOMINION COMMISSIONER OF FISHERIES FOR CANADA.

It has long been apparent to fishery authorities everywhere, that the preservation of existing fisheries by appropriate regulations is an impossible task, and the restoration of depleted or destroyed fisheries by protective measures, is hopeless, unless based upon accurate knowledge of fish life. Many fishery laws would never have been framed, and numberless suggestions would never have been made, had any real knowledge whatever existed in regard to the eggs and habits of fishes, the periods of spawning, and the sites selected for the breeding grounds.

Proposals are continually made for the establishment of government hatcheries for the culture of fishes the nature of whose eggs and fry render futile any attempts at artificial propagation. But so long as dense ignorance prevailed respecting the character of fishes' eggs, the times of spawning, and the locations chosen by the parent fish, and the time occupied in developing the young fry, the enactment of close seasons, and other legal restrictions, was as likely to be wrong and mischievous, as right and salutary. Even to those versed in the knowledge of fishes in our seas and inland waters, and familiar with their habits, the actual facts in regard to the spawning periods, and the nature of the ova, were for the most part unknown. The attempt to hatch and rear species which had decreased in numbers was practically impossible if the eggs and natural spawning habits of such fish were not known. That the causes of the depletion of certain fisheries and the disappearance of valuable kinds of fish are in many cases due to peculiarities in the eggs or spawning habits, or the nature of the young fry, admits of no doubt and were the facts scientifically ascertained such injurious causes might be removed. Prior to 1862, a law for the protection of spawning herring was enforced in certain areas in Scotland. All the fishermen interested were most anxious for its enforcement but as Lord Playfair has frequently pointed out the Royal Commission on herring fisheries, which first sat in 1862, established one or two facts of the greatest importance to great fisheries, for instance, that restrictive laws framed by man in ignorance of the laws of nature, were excessively destructive to the interests of fishermen instead of being favourable to them. When the commission first began to examine this subject, they found different laws prevailing on the east coast of Scotland to those which prevailed on the west. On the east coast there were no restrictive laws, and fishermen were encouraged to catch fish, even full fish containing ova, for curing purposes. Each of these fish had on an average 50,000 eggs, and the enormous number that were taken in this state would seem to indicate a process of extermination; but the fisheries of the east coast, without restrictive laws, increased, and did not diminish. On proceeding to the west coast of Scotland, however, in the inner waters of the Firth of Clyde, they found restrictive laws prevailing. For several months no herrings were allowed to be taken, there being a close time for herrings for the purpose of protecting them. As they went further into the open waters out of the Firth of Clyde along the islands up to near the Highlands, those restrictive laws still prevailed; but there was a relaxation as to the period when the close time ended. A very curious result was made apparent, and a most unexpected one. At the periods of close time, the herrings came to the banks to spawn, and were followed by their natural enemies in great number, among which might be named the cod and the ling, which consumed them in great numbers. There were innumerable fish which lived upon the young fry and the full-grown herring; the cod, ling, dog-fish and conger, fed on the full-grown herring; while the flat-fish and crabs eat the spawn, and there were innumerable other fish which eat herring-fry. At the time when they found them on their spawning banks, these fish had an appetite for nothing else but herring, and this

result followed, that the fishermen of cod and ling could catch nothing, because they would only take herring bait at the time, and the close time prevented the fishermen getting any herring-bait for catching these fish. The consequence was, that the laws invented for the protection of the herring became laws for their destruction, because their natural enemies, which could not be caught because of the want of bait, multiplied exceedingly, and devoured the very herrings which the laws intended to protect. That was the result of interfering with the laws of nature by an indiscreet law passed by Parliament. The lesson which might be drawn, was that though Parliament might make laws for keeping order and safety amongst fishermen; that the balance of nature in the sea should not be unduly interfered with, where the balance of animal life depends upon unknown factors. Of these unknown factors none were more vital than the nature of the spawn and the character of the early life-history of fishes. Since Dr. Lord Playfair's declaration just referred to science has largely removed our ignorance.

Again, for many years prior to 1884, Scottish fishermen urged that the use of steam trawls, a kind of large beam dredge, should be prohibited by law, for the reason that it was supposed to destroy immense quantities of spawn on the floor of the sea, and was thus regarded as seriously endangering the supplies of most valuable fish. We now know that no such extensive destruction of spawn could possibly take place, as the fish chiefly taken on the Scottish coast do not deposit their eggs at the bottom of the sea. The herring, it is true, does so; but it was not claimed that the herring were showing signs of diminution. The complaint had reference mainly to the cod, haddock, turbot and flat-fishes. A still more glaring example of the folly of fisheries legislation based upon ignorance is that of a certain bay in Kerry on the west coast of Ireland, where trawling was at one time forbidden by law because of the alleged abundance there of turbot spawn. This spawn, it was stated, lay in extensive soft patches all over the bottom of the bay. After the prohibition had been strictly carried out, some of the alleged turbot spawn was submitted to a scientific authority, who, at once, discovered that it was not spawn at all; but a worthless kind of sponge, which was positively injurious to fish spawn and young fry on account of its poisonous exhalations. Under this law a source of danger and injury to the fisheries had been ignorantly protected and encouraged. A well-known fishery expert at the Plymouth Laboratory, England, in reference to these erroneous views held by men usually regarded as practical men, has pointed out that "other things are frequently mistaken by fishermen for floating spawn. For instance, in early summer off the coast of Cornwall, there are frequently seen great quantities of a pinkish scum, which is found to consist of small round globules. This stuff has been brought in as mackerel spawn. It is not the spawn of fish at all, the little globules being a lowly organised member of the animal kingdom, which never develops into anything different. It is called *Noctiluca*."

Such great advances have been made in our knowledge of the eggs of fishes, especially those of economic value in our seas and inland waters, that the continued prevalence of erroneous opinions, even among fishermen and persons connected with fishing industries, is a matter of surprise. It is, moreover, no uncommon thing for intelligent persons to apply to the Department of Marine and Fisheries for spawn, or for the young fry of fishes, the eggs and young of which have never yet been seen by any one, and it is still more common for similar applications to be made for fry which, on account of peculiar features in the nature of the spawn, it is impossible, or very unprofitable, to deal with in fish culture-establishments. It is well known that in zoological gardens and menageries it is perfectly easy to breed and rear lions, while no case is on record of elephants under domestication producing young. The peculiar features characteristic of any species, be it animal, bird or fish, must be taken into account before the artificial culture of such species can be taken in hand.

Adhesive eggs, such as those of the black bass, maskinonge, sturgeon, &c., are most unsatisfactory for treatment by methods of artificial culture. With extra precautions and care a small percentage of their eggs can be hatched; but to obtain the best results the separate, non-adhesive kind of eggs only, should be hatched artificially. As the late Professor J. A. Ryder said (Bulletin U. S. Fish Comm., 1888) "our experience with adhesive eggs of all kinds has always shown that it is difficult to prevent the

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lodgement and rapidly fatal germination of the spores of *Saprolegnia* or *Achyla*, i.e., aquatic fungi or moulds, found in all fresh waters upon dead as well as living eggs. So rapidly do these fungi grow that in a very short time their ravages will extend over an entire tray of adhesive eggs. The eggs are destroyed by the fungus sending filaments into their substance, while the mesh of the mycelium also affords lodgment for dirt, so that the two together effectually shut off the possibility of oxygenating the ova, so that they are smothered."

The eggs of the numerous order of bony fishes (Teleostei) which, it may be said, includes almost every kind of fish of market value, such as the cod, herring, salmon, lake white-fish, halibut, &c., may be readily arranged in a limited number of groups, each group distinguished by marked peculiarities. There are two very distinct types of eggs under which these groups fall: (1) buoyant or pelagic eggs, which possess the power of floating in water; and (2), demersal or non-pelagic eggs, which sink to the bottom when deposited. It is not too much to say that most fishes in the sea, so far as our present knowledge shows, produce floating ova, which are borne about in the surface waters of the sea in clouds as multitudinous as snow flakes in the winter air, until the young fish develops and bursts from each egg at the time of hatching.

Though our seas have for ages formed a vast nursery for the floating ova and young fry, the amazing fact was unknown and unsuspected, and fishermen, in common with the public generally imagined, that fishes spawned on the bottom of the sea, or selected special banks, or sheltered rocky shores on which to place their eggs. Thomas Pennant, one of the most diligent and painstaking of the older British naturalists says, for instance, of the cod (British Zoology, 1769, Vol. III, page 141.) "In our seas they begin to spawn in January, and deposit their eggs on rough ground, among rocks. Some continue in roe until the beginning of April."

Dr. Eugène Canu aptly says, in his recent memoir entitled, "Ponte, Oeufs, et Larves des Poissons Osseux, Utiles et Comestibles." (Ann. Stat. Agric. Boulogne-sur-Mer. 1893):—"Contrairement aux croyances répandues dans le monde des pêcheries, la plupart des poissons osseux comestibles donnent des œufs flottants, dispersés à la surface de la mer à quelque distance des côtes et que certaines espèces produisent seules ce qui était attribué à la généralité, à savoir, des œufs tombant au fond de l'eau en raison de leur poids ou fixés aux corps submergés (hareng, éperlan, etc.)"

The pelagic or the demersal character of the egg in any particular species of fish is altogether independent of its zoological affinities. The most surprising diversity obtains in this respect, and we cannot foretell the nature of the eggs of any kind of fish from the general character of the ova known to be produced by the group to which it zoologically belongs. The general laws which hold true in the case of the eggs and young of birds, or of insects, do not hold true of fishes. The herring and many of the herring tribe (*Clupeidae*), for example, produce small adhesive eggs which cling to rocks, &c., at the bottom of the sea, yet the sprat (*Clupea sprattus*) and the pilchard (*Clupea pilchardus*) produce the most delicate and buoyant of all floating eggs. The skulpins (*Cotti*), as a rule, deposit spongy masses of non-floating eggs, yet Alex. Agassiz described the egg of one species of *Cottus* as floating. So widespread again, is the pelagic character of the eggs of flat fishes, such as the halibut, turbot, sole, &c., that it was a surprise to naturalists to find that the winter flounder (*Pseudo-pleuronectes americanus*) has adhesive eggs, which sink to the bottom of the water, and cling in adherent masses.

The nearest relative of the winter flounder, viz., the common flounder (*Paralichthys dentatus*) of our Atlantic shores, produces floating eggs. The Cunner (*Ctenolabrus adspersus*) has a very transparent pelagic ovum about $\frac{1}{7}$ of an inch in diameter, whereas the allied species, *Labrus maculatus*, the Ballan Wrasse, deposits dense, heavy eggs in a nest in rock pools. The discovery that the eggs of such fishes as the cod and mackerel were possessed of such buoyancy as to compel them to swim near the sea's surface is due to Professor G. O. Sars, the eminent Norwegian zoologist, and what Sars, early in the sixties (1864) proved of the cod, mackerel and gurnard, was established later by Professor McIntosh, of St. Andrews, Scotland, in the case of the sole and flat fishes, as well as of the ling, whiting and other important species used for food.

Of the two types of fishes' eggs, the demersal and the pelagic or floating type, there are many varieties ; but it is possible to group them under a number of heads, and thus concisely enumerate, in brief compass, most of them.

A vast number of fishes' eggs are spherical like peas, or small shot, consisting essentially of a ball of soft yolk, capped by a more or less transparent sheet of germinal matter, the whole being inclosed in a translucent capsule or shell. The shell is often very tough, but usually sufficiently thin to permit a careful observer, with the aid of a lens or a microscope, to make out the main features of the early germ, and, later, the larval fish inside the egg. Those who practise fish culture are able, on account of this feature in the egg capsule, to see the progress of the developing fish. It is usual, indeed, to speak of a certain stage as the "eyed egg," because the black eyes of the larva are so readily visible through the shell. The shell in the cod, haddock and mackerel is exceptionally thin, no more, in fact, than $\frac{1}{3000}$ of an inch thick (.0078 or .0084 mm.), whereas in the shad it is about twice as thick, and in the trout and salmon at least five or six times thicker. Many eggs exhibit remarkable shining and coloured oil-globules. In the salmon they give the warm orange tint to the egg ; but in the whitefish the oil globules are pale and nearly colourless, hence the eggs exhibit no tint. The eggs of the sticklebacks are golden yellow, and those of the lump-fish (*Cyclopterus*) vary very much, and may be either yellow, greenish, or even light pink in colour, these colours being due apparently to tinted matter scattered in the yolk. The eggs of the sturgeon are either of a dull green or of light or very dark brown colour, due to the grains of colouring matter which are crowded all over the surface of the yolk, and are especially numerous and dense in the germinal area. The olive-green colour of the eggs of certain Siluroids or cat-fishes is due to the colour of the yolk substance, as is probably also the case with the pale green egg of the striped bass (*Roccus lineatus*) and the rich yellow eggs of the pipe-fish (*Siphostoma*).

The nature of the yolk varies greatly and may be of the consistency of syrup, clear and translucent, or coarsely granular as in the carp tribe, or broken up into segments or lumps, like the separate grains in a pomegranate, a condition well marked in the shad, pilchard and sea herring. In the eggs of the sole, anchovy, blue fish (*Temnodon*) and others, there is a partial segmentation of the yolk, which is confined to the surface of the yolk. Other interesting features might be referred to, but they are, to the ordinary observer, of minor importance, and are of less practical moment in connection with the fisheries.

Turning then to the various types referred to, it may be premised that the following grouping of fish under their several distinctive heads, must be regarded merely as a provisional and convenient classification which may require modification or extension with the advancement of our knowledge regarding the ova and early life history of fishes. The sharks, rays, lampreys and other fishes, not of prime importance from an economic point of view, are excluded ; but the eggs of those Teleostean or Bony fishes which are of principal value in the markets, and of moment, therefore, in connection with the fishes are all embraced in the seventeen separate divisions enumerated below. Of these seventeen groups or types of eggs, no less than seven are pelagic and characterized by the special features which belong to floating or buoyant kinds. So many fishes produce eggs of this character deposited in the open sea within a fathom or two of the surface that, in the brief summary here given, they may be placed first in order.

Pelagic or Floating Fish-Eggs.

(1.) Eggs, such as those deposited in the sea by cod, haddock, halibut, plaice and sprat, and other valuable commercial fishes, are spherical in form, with an extremely thin shell or capsule, clear translucent ball of yolk, and no large oil globules. They float separate from each other in the surface waters of the sea, and from their delicate structure, buoyancy and colourless transparency, they may not inaptly be compared to minute soap-bubbles wafted hither and thither by every current or movement in the surrounding water. They are always of minute size and so difficult to see in the water, that they are practically invisible. A practised eye can discover them if the water be very smooth, but they are most readily obtained for examination

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in a floating tow-net or bag of fine mosquito netting. They vary greatly in size from the minute egg of the Dragonet (*Callionymus*) about $\frac{1}{50}$ of an inch in diameter (0.56 to 0.60 mm.) to that of the halibut, which possesses the largest floating fish egg up to the present time discovered, and measuring in diameter no less than $\frac{1}{4}$ or $\frac{1}{3}$ of an inch (3.07 to 3.8 mm.) The cod's egg is about $\frac{1}{7}$ inch (1.4 or 1.5 mm.), the sand dab's egg (*Pleuronectes maculatus*) measures $\frac{1}{4}$ inch while the cunner's egg (*Ctenolabrus adspersus*) is about $\frac{1}{8}$ inch in diameter.

(2.) Eggs, similar to those embraced in the last group in all particulars, except in the possession of a large oil globule, rarely with one or two smaller globules adjacent. This so-called oil globule is so striking a feature that many eggs of this type can be readily discerned with the naked eye. Otherwise they are colourless, delicate and transparent and would be practically invisible when floating in sea-water. The most important of these eggs is that of the mackerel which measures a fraction over $\frac{1}{20}$ of an inch in diameter (1.23 mm.), while the oil globule is very large, viz., about one quarter of the diameter of the egg. The Silver Hake (*Merluccius*) produces eggs $\frac{1}{25}$ inch in diameter (the oil globule about $\frac{1}{100}$ of an inch across), while the sea cusk or torsk (*Brosmius brosme*) the turbot (*Rhombus maximus*) the Gurnard (*Trigla*), the Spanish Mackerel (*Scomberomorus*) and the File fish (*Elacate*) may be instanced as species whose eggs contain a single bright globule of oily matter. The globule may in some cases be tinted viz., a reddish brown in the torsk and a dull pink in the gurnard's egg.

(3.) Eggs in which the characteristic feature is the presence of small oil globules distributed all over the surface of the yolk ball, or collected in scattered groups. In other respects, by their smooth transparent shell, clear yolk, and extreme lightness or buoyancy, this type of ovum is not distinguishable from the two preceding groups. The appearance presented by the so-called oil globules is very distinctive.

The most important commercial species of fish that may be instanced is the English sole (*Solea vulgaris*), the globules in which are extremely small, silvery, and collected together in separate groups upon the surface of the yolk. The egg of the Weever-fish (*Trachinus vipera*) is also studded with small glistening globules scattered over the yolk, while Alexander Agassiz long ago described a floating egg which he regarded as produced by an American species of Skulpin (*Cottus*), exhibiting similar globules of a greenish tint. Other species of Skulpin (*Cottus*), it may be mentioned, are known to have wholly different eggs, destitute of the power of floating, possessed of tough and thick capsules or shells, and strongly adhesive to each other.

(4.) Floating eggs without oil globules, which present on the outside of the shell projecting hairs, knobs or other external structures. Comparatively few fishes produce eggs of this character, but they are sufficiently noteworthy to entitle them to be regarded as a very marked distinctive type. The Silver Gar (*Belone*), as Hæckel long ago discovered, produces eggs about $\frac{1}{8}$ inch in diameter, which are covered with long hairs or filaments, many of them half an inch in length. The eggs of the flying fish (*Exocoetus*) and of the Saury pike (*Scomberesox*) exhibit the same striking peculiarity. The late Professor Ryder held the view that by these hairs the eggs were able to cling to floating objects in the sea, and be thus transported through the water and incubation favoured. They also become attached to each other and collect in entangled groups, instead of floating isolated far apart. The theory that these filamentous tendrils have for their object the attachment of the eggs to foreign objects is open to question. At times they no doubt accidentally come into contact with stake nets and other fixed objects inshore—the floating egg-ribbons of the Angler Fish frequently do that, but the presence of similar fine filaments projecting from the shell of certain rooted eggs in tidal pools indicates rather a protective function. The ova of the Dragonet (*Callionymus*) present externally an erect honey-comb structure, produced by delicate intersecting projections of the shell extending over the whole surface of the egg, and resulting in a hexagonal pattern. Like the coat of soft mucus which envelops many eggs, these hairs and projections on the outside of the shell may deter certain natural enemies from eating them.

(5.) To this division belong pelagic eggs provided with external projections, but unlike those already mentioned, exhibit one or more oil globules. Raffæle has described an egg showing these features measuring about $\frac{1}{16}$ inch in diameter and having conical pro-

jections studding the whole of the egg capsule. The oil globule is rather more than $\frac{1}{100}$ inch across, and the structure of the ovum is exceedingly delicate and striking. The discoverer regards it as the egg of *Macrurus*, belonging to a family of fishes closely allied to the cod (the *Gadidæ*).

(6.) Floating eggs imbedded in gelatinous ribbons or strings, such as are produced by the angler (*Lophius*). E. van Beneden, many years ago, obtained floating eggs which resembled in all essential features the eggs grouped under division 2, being spherical in form, extremely delicate in structure, and possessing a large oil globule, but characterized by this striking additional feature, that the eggs were imbedded in a floating mass of clear jelly. Van Beneden's eggs were attributed to some species of the family *Gadidæ*; but the most familiar, and in many respects the most remarkable example of this group, is that of the egg-bands of the Angler or Goosefish already alluded to. Each egg, individually, is a small sphere ($\frac{1}{11}$ inch in diameter) and provided with a shining oil globule of a pinkish-brown colour, and $\frac{1}{30}$ inch in diameter. Many thousands of them are produced by the female *Lophius*, agglutinated together in a mucous band, thirty or forty feet long in some cases, and 6 to 10 inches wide. One ribbon of eggs is recorded over 90 feet in length. This ponderous ribbon, a soft slippery mass, floats in the open sea secure from every predacious foe. Observers have described it as recalling a band of pale purplish crape; but the specimens, obtained when entangled in inshore fish pounds, which I have had the opportunity of studying, appeared like flat bands of colourless glistening jelly, with a delicate hexagonal pattern internally, due to the gelatinous capsules of adjacent eggs pressing upon each other. No animal known to the naturalist could readily swallow this formidable slippery mass, and the envelope of the egg-ribbon is so tough and tenacious that, as Dr. T. H. Bean reported when he secured a mass of these eggs in 1887 "we were obliged to cut it with a knife. The eggs," he added, "are in honey-comb-like cells," a condition really due to the mutual pressure of adjacent eggs all provided with a thick mucous envelope. Eggs of this type are most effectually protected, and the young fry, on hatching out, are well provided for coping with the perils which beset newly liberated larval fishes, as I described in the Ninth Annual Report of the Scottish Fishery Board, 1891. In consequence *Lophius* is an abundant and widely distributed species.

(7.) Eggs of an elongated or oval shape form a somewhat restricted and uncommon type of floating ova. Many of the spherical fish-eggs embraced under the foregoing divisions at times are ellipsoidal; but the normal form is a more or less perfect sphere. The anchovy (*Engraulis*) produces eggs of a marked elongated oval form, which has been characterized as sausage-shaped. Each egg is about $\frac{1}{20}$ inch from end to end, and about $\frac{1}{30}$ inch transverse diameter. In structure it is extremely delicate and transparent, destitute of oil globules with faint lines of yolk segmentation, in the early living stages. The young fish on bursting from the egg is extremely elongated, and shows the characteristic features of the clupeoid or herring form being destitute of colouring matter.

Demersal or Non-floating Eggs.

Passing from pelagic or floating eggs to demersal or non-buoyant eggs we find that there may be distinguished no less than nine groups.

(8.) The first group consists of eggs which are free, non-adhesive or very slightly so, spherical and usually of considerable size. They lack the extreme translucency and delicacy of the floating eggs described above. Indeed compared with the almost invisible and insignificant pelagic ova, the eggs of salmon, or smelt, lumpfish or herring are coarse and heavy and can be readily handled if due care be exercised. Floating eggs can in most cases not be touched or lifted out of the water without injury and usually death. The eggs of the salmon (about $\frac{1}{4}$ inch in diameter) are typical, and an abundance of reddish oil globules in the yolk imparts to them their characteristic colour. The eggs of the brook trout ($\frac{3}{16}$ inch in diameter) are very similar and those of the great lake-trout about $\frac{1}{2}$ of an inch in diameter are much paler. The eggs of the whitefish exhibit no tint at all. On account of their wholly non-adhesive character they are hidden by the parent fish in crevices in honey-comb rock, in gravel, coarse sand and the

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like. When newly deposited they are smooth and slippery to the touch, and are lightly carried by the water into crevices at the bottom, and thus secure safe protection though many fall a prey to enemies, which pelagic eggs entirely escape. On several occasions I have tried to secure newly deposited eggs, say of British Columbia salmon, immediately after the female had laid them. I found it almost impossible to seize any with forceps or the hand as the slippery eggs eluded the grasp, and in the swift current they flew from one crevice to another as though endowed with life. So far as known few fishes in the sea produce eggs of this type. The larger and lesser Sandeel or Sand Launce (*Anmodytes*) do so, though the eggs for a time are slightly adhesive, and are hidden in loose sand or gravel between tide marks. The eggs of the shad are deposited in shallow water some distance up rivers where the water is fresh. They are of comparatively large size for a clupeoid, viz. : $\frac{1}{4}$ or $\frac{1}{2}$ inch in diameter, fairly translucent, and with a very small yolk-ball which occupies only a part of the spacious chamber inside the egg-capsule. When newly deposited shad eggs often cling together, by reason of a slight adhesiveness, in layers one egg deep. The striped bass *Roccus lineatus*, one of the most valuable of food fishes, enters estuaries in spring and deposits its eggs toward the head of tide on a sandy or gravelly bottom. They are $\frac{1}{4}$ of an inch in diameter and of a pale green tint when first laid. The first record regarding the eggs of this species appears to be that of Mr. Marcettus, who in the report of the Maryland Fish Commission, United States, 1880, states that Mr. Hamlin, on May 6th, 1879, obtained them and noticed that they were larger than herring's eggs and increased in size after fertilization, losing their green colour and opacity and assuming a transparency which rendered them almost invisible, only the oil globule arresting attention by its glistening appearance. They are deposited by the parent fish apparently in fresh-water above the limits of the inflowing tidal sea water, in some important Canadian rivers. Prof. J. A. Ryder, surmised that they also may be deposited in salt water in some localities, and in the Miramichi River, New Brunswick, it is claimed that the main spawning grounds coincide with or are lower down than the principal winter haunts of the fish, and in that case the eggs are placed in brackish water. That the eggs of any species of fish can thus be deposited indifferently in fresh and in brackish water is contrary to exact observations on the physical effect of such diverse conditions upon ova, and further investigations are needed regarding the actual spawning habits of the striped bass. A considerable quantity of eggs (not less than two or three millions) is produced by a single spawner.

(9.) Separate, non-adhesive eggs provided with numerous long filaments like the ova of the sand smelt or Atherine (*Atherina hepsetus*, L.) which are very large, not less than $\frac{1}{10}$ in diameter, although the full grown fish is only five or six inches in length. Upon one side of the yolk ball there is a wreath of small oil globules; but the most distinguishing feature is the tangled mass of wavy filaments projecting from the external surface of the egg capsule. The egg is attached to sea weeds, corallines, and even to star fishes and sea-urchins, by means of these filaments.

(10.) Globular eggs sufficiently adhesive, when deposited, to cling to the bottom, or to adjacent objects under water, but never adhering together in large spongy masses. The Capelin deposits free adhesive eggs of this character. The eggs of the Gaspereau or alewife, a clupeoid which ascends rivers in May for spawning, deposits clear, glassy eggs, smaller than those of the shad and destitute of oil globules. Dr. J. B. Gilpin recorded the opinion that the spawning beds might be in lakes of some depth. "Although the salmon and trout are often seen spawning, I never met any one," he says, "who has seen the Gaspereaux in the act. So I suppose he spawns in deep water as we know he loves the deep lakes with clear sandy margins." Fields over-flowed in the spring are, however, often chosen, and as the eggs hatch in three or four days, the schools of fry usually reach the river channel before the floods subside. The female fish produces 60,000 to 100,000 eggs.

A similar egg is produced by the pike-perch (pickrel or doré), which readily adheres to adjacent objects when newly deposited. Each egg measures $\frac{1}{15}$ inch in diameter, and a yellow or reddish globule of oil is seated in the yolk. The eggs of the sturgeon, about $\frac{1}{10}$ inch in diameter, are enveloped in a tenacious gummy substance,

and no doubt, when deposited naturally they encrust the interstices of rocky ledges, gravel, stones, &c. Including their coat of mucus they measure over $\frac{1}{4}$ inch (3 mm.) in diameter. No observer appears to have discovered them on the spawning grounds, and lumps of sturgeon spawn are not known; but when artificially manipulated they readily form huge irregular masses and long ropes of an extremely adherent nature. Fishermen or others would certainly obtain such masses of sturgeon spawn did they occur in our lakes and rivers, but the eggs appear to be not found naturally adhering to each other. The tenacious matter hardens in about thirty minutes, and Prof. Ryder has recorded, "after that has occurred it is scarcely possible to detach them without injury to their delicate thin envelopes and their soft viscid contents. The sticky coating of the eggs finally remains as a grayish white, tough, slightly elastic covering enveloping the egg-membrane proper, and varies in thickness at different points on the surface of the ova."

If allowed to harden in round or irregular masses the inner eggs die rapidly from suffocation, and in our lakes and rivers the sturgeons' ova are probably deposited in thin layers. Indeed, it is found in handling freshly laid sturgeon ova that if a basin or tray be inclined only for a moment the eggs flow to that side and a coating of a single layer is formed upon the surface to which they have been so briefly exposed. They hatch in four or five days, but it is probable that a very large percentage perish annually on the spawning grounds.

(11.) This division includes eggs, which closely resemble in their tenacious character and general features, the last described yet a distinguishing point about them is the fact that they form clumps or irregular groups, rather than layers. The eggs are so attached to each other and to stones, weeds, shells and other débris, that they form a loose spongy mass, through which water freely percolates. Demersal eggs thus irregularly cemented together, exhibit the utmost variety of form, colour and distribution. They may be pale and translucent like the herrings eggs about the size of No. 7 shot or more dense and as large as peas (slightly less than a quarter of an inch in diameter, viz., 6 mm.), like those of the wolf-fish (*Anarrhichas*.) The lump fish *Cyclopterus*, whose eggs are $\frac{1}{10}$ inch in diameter, and those of the frost-fish or tom-cod (*Gadus tomcod* Walb), measuring rather less than $\frac{1}{30}$ inch in diameter, belong to this group. The eggs of the tom-cod have a conspicuous oil globule, and the thick adhesive shell is coated with an mucous cement enabling them to cling to sea-weeds, and stones inshore and below low-water mark.

(12.) Eggs of spherical shape and clothed in a distinct layer of soft mucous matter, which causes them to adhere to plants and foreign objects. Most of them contain numerous oil globules, and they are the type of ovum produced by some of our most familiar freshwater fishes such as the pike, maskinonge, white perch (*Roccus americanus*), the suckers (Catostomidæ) and many allied Cyprinidæ. The tenacity of the mucous coat is such that as one observer has said of the small adhesive ova of the white perch, they "may be hatched on threads which have been drawn through the freshly extended spawn, the threads being suspended in a hatching jar, through which water is kept flowing." The eggs in this group are frequently found to be deposited singly upon plants, submerged roots of trees, branches &c., and the adhesive coat instead of hardening under the action of water remains as a soft protective coat, which prevents many predacious animals from eating them.

One of the carp family viz., *Rhodeus amarus*, Bloch, by means of a long ovipositor, like a protrusible tube, places its eggs inside the open shell of pond-mussels. The familiar gold-fish deposits its eggs ($\frac{1}{10}$ inch in diameter) on weeds.

(13.) Eggs similar to the last are produced by the black bass of our lakes and rivers and the allied river sun-fishes (Centrarchidæ), the bearded catfishes and other common fresh-water species. The eggs with their soft mucous coat cling together in masses and are generally placed in a nest of more or less perfect construction. They become attached by this viscid envelope of jelly to pebbles, twigs and weeds of which a kind of nest is usually constructed by the parent fish.

Mr. C. F. Holt, who described this nest in the case of the black bass (*Micropterus*), says:—

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The places selected are in nearly still water, near the shore, and in water from one to two feet in depth.

The beds are circular in form, from eighteen inches to three feet in diameter, and are formed by cleaning from the bottom all sediment, sand, &c., leaving a bed of clean pebbles. This is the joint work of both male and female fish. The bed having been prepared, the female then moves slowly over it, depositing her ova, and the male impregnates them as fast as laid. The eggs, which are very small, are glued fast to the pebbles. The impregnation is almost absolutely perfect. In the past three years I have examined a large number of beds, by carefully removing one or more of the pebbles covered with eggs, and examining them with a microscope, and have never yet found more than one per cent of unimpregnated eggs.

After the eggs are impregnated the male leaves to the female the whole care of the eggs and the young brood. She now passes constantly backwards and forwards over the bed, the motion of her fin and tail keeping the eggs clean, which the fact of their being glued fast permits her to do without washing them away.

The catfishes (*Ameiurus* and others) construct a similar nest, over which the parent fish keep guard. The eggs, $\frac{1}{8}$ to $\frac{1}{4}$ -inch in diameter, and of a dull whitish, sometimes greenish colour are aerated by the male during the six or eight days occupied in incubation. The male hovers around the viscid mass agitating the water constantly with the pectoral, ventral and anal fins. The female fish remains near but takes no part in the work of protection. A recent writer in the "American Angler" refers to the nest in these terms:—

In laying their eggs, the parent catfishes select a spot where the water is quiet, if possible, protected by aquatic plants, and there they make a nest, perhaps eight inches by six, including the spawn.

The nest has a soft outer envelope, and over it the male hovers, forcing fresh water through the mass by rapid vibrations of his fins, until after about a week they are hatched.

The late Professor Ryder estimated in a nest of the kind just described that there were probably 2,000 ova covering a space eight inches by four inches. In each egg it has been found that the outside viscid layer is separated from an inner and extremely thin shell or capsule by a considerable space across which strands of elastic substance extend. This remarkable separation of the shell adds to the hardy nature of the egg by providing a cushion for resisting violence or injury. In the sea catfish (*Elurichthys*) the capsule is simple and unlike that just described.

(14.) A further and most interesting type of adhesive egg is that exemplified by the yellow perch (*Perca flavescens*). Each egg is globular and possesses a triple egg-shell, viz., a thin, delicate, innermost membrane, surrounded by a very thick, soft layer, stretched radially in a most remarkable way, and inclosed externally by a thin viscid layer. The eggs adhere together in the form of a band, like the egg-ribbon of the Angler (*Lophius*), except that instead of being flattened it has a bellows or folded angular arrangement, up the middle of which there passes a space allowing of aeration. These jelly-like bands, in which the eggs are massed like the cells in a honey comb, are heavy and often lie in the bottom of still water like a long hollow frill in a circular or semicircular form. They are 2 or 3 inches across and 12 to 30 inches long. Each egg exhibits a large oil globule, and when free from its jelly ribbon measures about $\frac{1}{4}$ of an inch in diameter.

Mr. G. P. Dunbar described the eggs of the Bill fish (*Lepidosteus*) as suspended in long ropes of thick jelly several inches in diameter and hung to old snags, roots of trees, &c.

(15.) Stalked or rooted eggs form a distinct group, and while all exhibit the common feature of a fibrous plate or facet of attachment, they vary in shape and structural details in the utmost degree. Thus the egg of the smelt (*Osmerus eperlanus*) is globular, but exhibits upon one side a coneshaped attachment or root, really formed by the splitting and inversion of the external adhesive membrane. J. T. Cunningham carefully studied the features of this peculiar conical attachment in a series of eggs, and his observations may be here quoted —

"They all possessed a kind of membranous appendage, and there were two or three which were suspended from the surface of the stones by means of this membrane, the

distal end of which had become attached at the moment of extrusion. In the free eggs no power of adhesion any longer existed. It was obvious enough that the membranous appendage is the so-called suspensory filament mentioned in the existing literature. But the word filament is a very inappropriate term. The membrane is flexible, and in the form of a hollow truncated cone, the sides of which are thrown into irregular folds; the narrow end of the cone is continuous with the envelope of the egg; the attachment between the enveloping and the suspensory membrane thus forms a ring on the surface of the former. Examination of the eggs in this condition does not afford evidence of the origin of the suspensory membrane. All that could be seen was that the suspensory membrane was dotted all over with pores of considerable size, and that the enveloping membrane was perforated everywhere by finer pores more closely crowded. The enveloping membrane is thus a *zona radiata*.

"Examination of the eggs freshly pressed from the female gave the complete explanation of all the facts. These eggs were nearly, and some of them quite, mature. They are inclosed in a thick *zona radiata*, which is differentiated into two layers, the outer of which is somewhat thinner than the internal. In the *zona radiata externa* the pores are larger and farther apart than in the *interna*. The external *zona* separates very readily from the internal, and, rupturing at one portion of the ovum, peels off, becoming turned inside out in the process, and, remaining attached over a small circular area, forms the suspensory membrane. Slight pressure and rolling of the eggs by means of a cover-glass is sufficient to cause the rupture of the external *zona*, and the two membranes can be examined in all stages of separation.

"If it be true that the ova of *Osmerus eperlanus* are during development, fixed to solid objects, it is in the highest degree improbable that the ova of *Osmerus mordax* are pelagic; but the adhesive nature of the eggs of the British smelt is beyond all question."

The speckled goby (*Gobius minutus*) has a pear-shaped egg, the black goby (*Gobius niger*) has an almond-shaped egg like a very minute oat-grain with a narrow stalk or root, while the general surface of the moderately thin egg shell is beset by wavy filaments of extreme fineness and on that account difficult to distinguish, even under magnifying lens. The pretty *Gobius ruthensparri* produces a small pear-shaped egg, not larger than the head of a pin, with the free end of the egg pointed and not blunt as is the egg of *Gobius minutus*. A curious egg is that of the small double-spotted sucking fish (*Lepadogaster bimaculatus*) which is oval or egg-shaped but much flattened upon one side. On the flattened side a fringe of long hairs occurs, the purpose of which is to attach the egg to foreign objects, such as the inside of empty sea-shells. A single large colourless globule occurs in the fine y granular yolk. In 1885 an egg of this character was described by Professor Ryder. Its length was $\frac{1}{8}$ inch, about the same as that of *Lepadogaster*, which is a species occurring in tidal rock-pools, but Ryder speaks of his specimens as eggs of a fresh-water fish, probably a river sunfish or a cyprinoid, and they were procured attached to a piece of leather at Havre de Grace, Maryland, early in the month of May.

(16.) A group of demersal eggs, sufficiently well-marked, is formed of comparatively large demersal ova adhering in small irregular lumps, in the midst of which considerable interspaces and chambers occur. In their loose spongy character these masses differ from the more compact layers, and lumps deposited by fish like the herring. The most important feature in these eggs is the fact that they are laid in nests. These nests may be neatly built rounded masses of weeds bound together by tenacious threads produced by the male fish, or may be merely loose mounds of gravel and pebbles. The sea stickleback (*Gastrosteus spinachia* L.) builds a nest of seaweeds two to eight inches across, and places in pocket-like cavities, these bunches of eggs, each egg about $\frac{1}{12}$ inch in diameter, and of a bright amber tint. The fresh water species (*G. aculeatus*) forms a mound-like nest about half the size of a small lemon, composed of weeds and small twigs bound together by strong threads of animal matter. The eggs are rather smaller than those of the marine species, and the separate lumps contain fifteen to twenty eggs and probably a total of two or three hundred eggs in each nest, agglutinated together as firmly as the ova of the herring. The ballan wrasse and other species are also credited with the construction of a nest; and these fishes usually are very solicitous

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of the welfare of the fry when they emerge from the egg. Few fishes, however, exhibit much solicitude for their young, the eggs and fry being generally left to the tender mercies of their common mother, the sea.

The Chinese Gourami (*Osphromenus*), which has long been artificially bred and cultivated in Asiatic waters, and is stated to have excellent culinary qualities, builds a similar nest. An observer has described in detail the building of this structure and the following particulars may be here given:—

“In one of the corners of the pond, among the plants which grow there, the gouramis attach their nest, which is of a nearly spherical form, and composed of plants and mud, and considerably resembles in form those of some birds.

The nests, of course, vary in size in proportion to the fishes, but the usual size is somewhat less than a man's hand in length (about 5 or six inches). The fishes are employed some five or six days or a week in building, and their task is rendered easier, when the pairing-season has arrived, by placing in the water, almost at the surface, branches of bamboo (*Bambusa arundinacea*), to which are attached bundles of fine dog's-tooth grass. The gouramis take this grass, and with it form their nests in the branches of submerged bamboo, in a manner analogous to that with which the common silk-worm avails itself of the branch which is presented for it to make its nest on. When the nest is completed, the female deposits her eggs, which in a moderate-sized individual amount to about 800 to 1,000. After the eggs have been deposited and fecundated, and while they are hatching, the parents remain near, jealously guarding them, and rushing with vehement fury at any ordinary intruder near their domains, and thus they continue to guard the young for a time after they are hatched.”

Of the nests composed of stones and pebbles, the nest of the Black-nosed Dace (*Rhinichthys atronasus*) may be selected as an example. It is recorded that the male and female fishes combine their efforts and after selecting a shallow depression one and a half or two feet across, they carry small stones and drop them upon the chosen site until a layer is formed. The female then deposits a layer of eggs upon the pebbles, and in this way a layer of eggs and a layer of pebbles are alternately formed until the depression is filled up, and a dome-shaped pile or nest results.

Chaetobranchus, a species allied to the Wrasses, builds a nest in which the eggs are protected, and the Gunnel (*Centronotus*) or Shore Butter-fish is said to deposit a small mass of eggs, not larger than a walnut in bulk, and the parent fish curls around the mass which is partly inclosed in a hole or depression, and thus keeps watch until the young hatch out.

(17.) A very remarkable group of fishes' eggs consists of those which are carried about by one of the parents until the young fry hatch out. The marine pipe-fishes afford interesting examples. The small sea-horse (*Hippocampus*) carries the eggs in a ventral pouch, the ova being arranged in regular rows down the front of the body, however, in *Nerophis* and *Syngnathus*, and covered by a somewhat transparent growth of the skin. The Indian *Solenostoma* shelters the ova between the ventral fins, an extension of the integument adding to the completeness of the egg-pouch for the reception and incubation of the eggs, which duty is performed by the female whereas in the three preceding species it is the male that does so. In the female *Aspredo* of Guiana, a fish allied to the North American catfishes, the eggs are found attached to the under surface of the female fish, extending from the chin to the tail. Even the fins have been found sprinkled with eggs, which are $\frac{1}{5}$ to $\frac{1}{12}$ inch in diameter, and protected by a cup of skin which becomes spongy and forms stalked capsules. Related species in Indian waters, *Arius*, for example, carry their eggs in the mouth and gills. The male performs the duty, and as the eggs are large, $\frac{1}{5}$ to $\frac{1}{2}$ inch in diameter, the breathing and feeding operations are seriously incommoded, though the palatine denticles aid in surmounting the difficulty. Some South American species, according to Steindachner, have a similar habit. The common marine pipefish (*Siphostoma*) develops a pocket in the skin behind the rudimentary anal fin, and a thick viscid mucus is formed, in which the lemon yellow eggs, $\frac{1}{8}$ inch in diameter, are imbedded.

The foregoing sketch, while it does not profess to be completely exhaustive, comprehends most of the types of eggs which have been described by scientific observers in

recent years. There remain excluded, however, certain fishes which never deposit eggs. One of these, the viviparous blenny (*Zoarces*), is not at all uncommon on our coasts, and has gained its name from its remarkable habit of producing living young. The eggs of this species—which, by-the-by, is in some parts wrongly called the eel pout—are retained within the body of the female, and there the young develop and reach a length of about two inches before they issue from the parent. Another form is the Norway haddock (*Sebastes*), but its young on extrusion are small. Some of the shark tribe are also viviparous ; but the peculiarity is one very uncommon amongst bony fishes.

Certain small marine fishes, the Embiotocidæ, the shore sun fishes which occur in marine rock pools, and some of the Scorpaenidæ produce, like *Sebastes norvegicus* above mentioned, three to twenty young about five months after the act of fertilization. The cave fishes (*Amblyopsidæ*) are also viviparous ; but this feature is a far from common one.

Continued researches by diligent scientific workers will add to our knowledge of fishes' eggs, and much remains to be done in this field of study. But the above seventeen groups comprise all the essential types which experts have distinguished.

III.

THE PLACE OF CARP IN FISH-CULTURE.

BY PROFESSOR EDWARD E. PRINCE, COMMISSIONER OF FISHERIES FOR CANADA.

Fishery authorities are very far from being agreed concerning the merits of the German carp. The mediæval monks of England esteemed it highly, and after its introduction into English waters from the continent of Europe, in 1514 by Leonard Marchal, a carp pond was considered a necessary adjunct to every monastic establishment. German carp appear to have been brought across the Atlantic in 1870, and were first planted by Mr. Poffe, a Californian pisciculturist in his ponds in Sonoma. Six years later the United States Fish Commission followed this step up, but without success as the fish died in transit; but in 1877, a successful shipment was made, and since that time carp propagation has been very extensively carried out. There has, however, been no unanimity in regard to the claims of carp to attention, and the wisdom of their introduction into the waters of this continent has been seriously questioned. These waters were already peopled by the closely allied family of suckers and carp-mullets, the various species of which, though not highly esteemed as food, are superior in edible qualities to the foreign carp.

In the report of the Department of Marine and Fisheries for 1895, I briefly indicated my views upon this matter in the following words:—

“One word of warning is necessary in view of a common opinion that German carp and other coarse fish merit the attention of fish culturists. In pure and prolific waters, such as those of Canada, abounding in trout, salmon, and all the highest grades of fish, it is claimed these lower inferior kinds are a positive curse and injury if introduced. They increase fast and survive under the most unfavourable conditions; but their propagation in Canadian waters is little short of a crime, and entails the destruction of food upon which the finer indigenous kinds live, and the crowding out of the splendid fish native to our rivers and lakes.

“Even of the higher kinds, the Salmonidæ, there are species and varieties which should be regarded with disfavour, especially those from the continent of Europe. German and Austrian trout, full of the germs of disease, should not be hastily introduced.”

I see no reason for modifying this unfavourable view, and after fully considering all its bearings, as an expert, it appears to me to be injudicious and erroneous to adopt the policy of peopling our waters with fish having the qualities and habits of German carp. Inquiries respecting carp-culture and applications for the eggs and fry of carp constantly reach the department, and a concise statement of the points, favourable and unfavourable, which have been raised by fishery authorities, and a brief reference to the claims of German carp to the attention of Canadian fish-culturists, appear to be very opportune.

Unlike the principal fish native to the waters of the Dominion, German carp are not essentially sweet and wholesome, but require, as all carp culturists are aware, to be transferred after capture to clear running water to rid them of their characteristic muddy flavour. Carp require to be seasoned and stuffed and subjected to more or less elaborate cooking methods before being served up at the table. The salmon, trout, whitefish, bass and other finny inhabitants of our lakes and rivers require no such elaborate treatment—an undeniable proof of their superiority. The wandering habits of the carp also detract from its desirability. It is impossible to retain them within reasonable limitations, if by any means they obtain freedom for migration. Our native fish, such as the salmon, the lake trout, whitefish, pickerel, etc., have definite courses. Year after year they follow practically the same line of migration, though winds and

storms may cause them to deviate to some extent; yet they unfailingly make for their accustomed spawning grounds and resort, season after season, to their recognized feeding localities. Fishermen are so well aware of this that it is possible to set nets (gillnets, pound nets, traps, etc.), directly in the track which they are accustomed to follow. Certain points are known to be better than others for intercepting the fish, and some net-locations are, therefore, far more valuable than others. It is not so with the carp, which wander from one side of a lake or river to the other in the most erratic, uncertain way, and wander into every sheltered creek or muddy inlet. Localities in which they have never been planted may thus become crowded with these wandering intruders. On Lake Erie and in the St. Clair waters, Canadian fishermen complain of the abundance of these inferior fish, which were planted in localities distant from these areas, but have so widely spread that in some seasons the nets set for better kinds make large captures of these less valuable fish. They spawn everywhere, and it is probable that they spawn more than once each season. They increase with remarkable rapidity and crowd out the native species. "It is my experience," wrote Roger North, one of the earliest of British pisciculturists, "that most waters, the first year after having lain dry a summer, do breed, and that numerously, especially carps, which I have known increase to such an incredible fry, that I have been troubled how to dispose of them."

Of their rapid growth, a recent United States writer has said:—

"The growth of this fish is even more remarkable than was at first supposed. Recently, in letting the water off of a pond constructed by the late Dr. Geo. R. Dennis, in which, just a year ago, he placed some carp about an inch long, it was found that six carp taken out weighed and averaged a little over three pounds each. About a month ago a carp was caught, which escaped from the pond of Dr. I. L. Adkins, and which had been placed there two years ago not more than an inch long. When weighed it carried the scales down at six pounds. And so numberless examples might be given of cases where the growth is shown to have been from twelve to fifteen inches in one year, and the weight to have been from comparatively nothing to two and even three pounds in the same length of time."

Notwithstanding the serious objections to the planting of carp, either indicated above or more fully stated on a subsequent page, it must be admitted respecting the carp:—

- (1.) That it has a certain market value in the United States markets, and is regarded by some persons as a fish possessed of edible qualities.
- (2.) That there are inferior waters well adapted for carp-culture.
- (3.) That the fish are hatched and reared with comparatively little difficulty.
- (4.) That they are very prolific and grow rapidly on very coarse food.
- (5.) That some anglers have found carp-fishing to be an enjoyable pastime.

It cannot be questioned that carp-culture may be commendable in some countries and in the sluggish waters of Central Europe, of Germany, Austria and other lands, carp are cultivated with as much care and industry as fowls or ducks, but while there are enthusiasts like the late Professor Spencer Baird, who held that in the future the carp would come to be regarded as of high importance as a commercial fish, yet the general trend of public opinion has not been strongly in its favour. Professor Baird, it is true, mentioned especially the waters of the Southern States, and in these remarks it is, of course, to be borne in mind that the waters of Canada are alone kept in view, and the criticisms here set forth apply, therefore, to proposals only for extensive planting of German carp in the Dominion.

In England the carp has never been highly esteemed for its food qualities, and in Scotland and Ireland it is practically unknown. In the United States on account no doubt of the large German population in some of the great manufacturing centres, the demand for German carp has in some seasons been quite considerable and examples like the following may be quoted in proof of its economic value though not in full accordance with other views published upon this point:—

"Many carp have been caught near Easton and eaten by the citizens of that community, and in every instance they have been pronounced a fine food fish. Your commissioners are particularly gratified to note an increase of interest on the part of the

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people in this fish. They have been advised that the citizens of Queen Anne county have, in many instances, purchased a supply for their ponds from Richard Hollyday, of that county, who was one of the first citizens in the state to build ponds and embark into carp-culture. Another year or two will prove that this venture will be as profitable to him as his wheat, corn or peach crop, in proportion to the labour, time and money spent upon it (Maryland Fish Commissioner's Report., 1883).

There is no doubt, however, that the culinary merits of German carp have been exaggerated, and that the authorities who heralded its introduction, with high hopes, have slowly realized that these hopes were not entirely fulfilled.

As to their qualities as table fish, there are contrary opinions. Some hold that they are a superior table fish, and others count them poor and insipid. Probably their quality largely depends upon the care that has been expended in rearing them. A chicken brought upon short commons is poor meat indeed. The same animal, properly fed and nourished, is a luxury that all delight in. Doubtless a poor, half-fed, half-grown, neglected and bony carp will not make an attractive dish; but if raised according to the manner of his native country, he may be fat, flaky, and possibly delicious. It is certain that in Germany they are rated a standard fish, and are in more general use than any other. A gentleman who has seen much of them in that country has recorded the fact that hotel keepers like them because they are cheap and their customers eat so little.

Some states after spending considerable sums of public money on carp-culture have resolved to discontinue it, and in certain cases have decided to devote such money in the future to the work of extirpating and destroying these fish. The Canadian *Fishing Gazette* (Selkirk Record), in December, 1895, published the following comments on the matter:—

“A few years ago many people in the United States and Canada went crazy over the introduction of carp. Hatcheries all over the Union raised and distributed them, and the Canadian hatcheries were blamed for not giving the fry to the public. The Fish Commission's report of the state of New Jersey will show what carp are. It is a blessing they were kept from Canadian waters, and there ought to be a heavy fine for any one planting them in Canada. A dispensation has been granted to fishermen to take carp out of the streams by net under the watchful eye of the wardens, who have seen that no food fish were appropriated out of season. The carp is regarded as an enemy of food fish and a general piscatorial nuisance. The commissioners officially say that the introduction of carp has been attended by nothing but evil results, and that of the most aggravating kind, as this fish destroys the clearness of the water and eats the spawn of valuable fish. The law against the liberating of carp has not been enacted too soon, and the wardens are watching that none are being put into the streams. Other states are seeking, but new Jersey has experimented and decided against the foreigner, who seems to thrive in Jersey waters.”

The state of Ohio, like that of New Jersey, has concluded to deal with the carp question vigorously, but not without protests from journals such as the New York *Fishing Gazette*, which, towards the close of last year, remarked:—“The Fish and Game Commission of Ohio propose among other things to wage unceasing war against the carp, in spite of the fact that this species of fish has become recognized as one of the most valuable food fishes taken in fresh water. The reason given for this move against the fish is that it preys upon the young fry of other species of fresh water fishes. Just as if those same other fishes do not devour the smaller fry of their own species. It is not known how the fishermen who have in times past made their living in the carp fishery regard the proposed move of the commission. It is to be hoped, however, that they will not allow the destruction to proceed without first making a vigorous protest against such action. There is one thing in their favour, too, and that is that the carp will need a lot of destroying before it becomes extinct.”

While it cannot be denied that carp have a certain value in those markets where inferior kinds of fish are in demand, the fact nevertheless remains that Canadian waters are perfectly adapted for all the higher grades of fish. These superior kinds not only have a claim to preference on economic grounds as articles of food, but also in most cases on grounds of sport. Fish, like salmon trout, black bass and others which add to

their excellent table qualities, the finest characteristics of game fish are entitled to principal consideration and the culture of carp, if in any inimical to these sporting, fish should be discountenanced. The famous angling authority, Mr. W. C. Harris, editor of the *American Angler*, N. Y., U.S.A., refers in the following trenchant manner to the question of the introduction of German carp :—

“Under no circumstances place carp in your waters. They are worthless both as edible and rod fishes. They are also destructive of the spawn of other fishes, and if your streams or ponds are frequented by wild fowl the carp will soon drive them away by eating the sprouts of all vegetable growth upon which wild fowl feed. If you have the carp already with you, seine, catch, kill and poison them out. The United States Government has spent thousands upon thousands of dollars to introduce them, and the sportsmen of the country would be willing to be taxed an equal amount that the carp might be exterminated.”

Perhaps it is a fortunate circumstance that in Canada many of our waters are not the most suitable for this fish. It may be said as Superintendent Nevins, of Madison, Wisconsin, U.S., wrote of the Wisconsin waters :—

“Our streams are either too rapid or too cold for them to permit a speedy growth, even though other conditions were favourable. It is useless to undertake to grow carp where there are other fish. The carp must be cultivated in ponds expressly built for them, and those of different ages must be kept by themselves.

The water that is preferred by them is such as is preferred by frogs. In water that is stagnant and has plenty of vegetation they will thrive and do well, or they can be fed the same as hogs with cabbage, potato peelings or boiled corn.

The California Fish Commission (1894) while admitting that carp had proved disappointing as an addition to western food resources, yet adduced an ingenious plea that they would prove good food for better kinds of fish :—

“The development of the carp, which, like the catfish, do not take, with our people, the rank accorded them in the eastern markets, has been large. Of these fish 66,100 pounds were marketed in 1892, having a value of \$2,204. They probably never will figure largely in the value of our fish products, but they have proved of the greatest value as a food to striped bass.”

The hardy nature of German carp has been urged in its favour, although some competent authorities have declared it to be easily and detrimentally affected by extremes of temperature. Experiments have proved that few kinds of fishes are so tenacious of life, and that changes which would prove fatal to better species have in their case proved harmless. They have been frozen rigid and thawed out again, they have been subjected to temperature almost as high as boiling point, and in every case they survived. In the tepid waters of Hawaii the foreign carp have flourished, and in the absence of better fish, have become of market value. When taken out of the water they will live for long periods if wrapped in damp cloths or cool moss. In Germany and Holland it has long been the practice to fatten carp upon bread and milk, the fish being suspended in nets in cool cellars and kept damp. In form they are coarse and far from graceful, yet on account of their lack of timidity and their hardy character they are very suitable for exhibition purposes in ponds or aquaria. They live and grow rapidly under cramped and unfavourable conditions. A United States authority, connected with one of the State Fish Commissions, reported that : “for several years they had bred quite a number in the fountain, which served the purpose of affording pleasure and amusement to visitors, as well as increasing the supply. Sometime in July the park policeman, who fed them daily, meeting the writer in the street, said : ‘There is quite a number of young fish in the basin I wish you would come over and see them ; I believe they are young carp.’ I replied that that was impossible, as there was but one large fish there, and that a male, but would go over and see them. Judge of my surprise when I found thousands of young carp there from one and a half to two inches in length, the product of carp then only one year old. The young will now aggregate many times more in weight than the original fish, and of extraordinary size for their age, five to six inches in length. The carp were taken out and loaned to the Inter-State Industrial Exposition at Chicago, where they now are. Since the above mentioned

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experience we have not been so ready to doubt the statements of quite a number who have repeatedly written us that their carp had spawned at the age of one year."

In spite of their hardy character, their tenacity of life, facility in feeding and rearing, and, at times, their ready sale amongst certain classes of the community who are not fastidious in their tastes, it is doubtful if there is justification for introducing these fish into Canadian waters not at present inhabited by them. The following considerations are certainly of weight and should be given attention by all who are interested in fish-culture.

(1.) The waters of Canada being as a rule pure, cold and in every way adopted for our native fish, and the superior edible species such as the introduced English brook-trout, the Loch Leven trout, &c., it is the less necessary or desirable to cultivate inferior kinds especially as the so called coarse fish native to our waters (suckers, pike &c.,) are admittedly superior in quality to German carp.

(2.) German carp are nomadic in their habits, and wander apparently aimlessly into all accessible waters, hence if introduced into any streams or ponds adjacent to and connected with others, these fish will rapidly spread over the whole system. Salmon, trout, whitefish, pickerel or doré, indeed all our native fish are more local in their wanderings and as a rule have definite courses of migration, and confine themselves within recognized limits. The German carp has no such defined movements or habitat, thus Lake Erie, the St. Clair waters of Western Ontario, Lake Huron and other Canadian areas are being overrun by these fish, which have wandered from the more or less remote localities in United States territory where they were originally planted. Like undesirable weeds they spread everywhere and it is practically impossible to limit their progress or to effect their extirpation. Dr. Eugene Smith referring to this difficulty in rooting out these fish says: "The carp family have a pronounced tendency to burrow in the mud at the bottom of streams, and can live there for some time, so that it is hard to eradicate the carp from any particular body of water without thoroughly draining it off."

(3.) They are voracious and omnivorous. Their voracity may be judged by the great size they rapidly reach. They have been known to grow a foot in length in nine or ten months, and it is authentically recorded that a German carp in the state of New Jersey grew in three years to a weight of thirty pounds. The carp may be compared to the hog amongst quadrupeds, both in respect to its fattening capabilities and its coarse and repulsive tastes. This opinion, indeed, I find to be expressed in terms almost identical with the foregoing, by the New York Fish Commissioners, in their report, in 1881. In this report they say: "The carp tribe stand in the fish family much as the hog does among quadrupeds. Confine the latter in a pen and steadily respond to his cravings of appetite and he will increase in flesh and multiply in fat to an extent which will reward the care of his owner. Similar treatment applied to the carp, changed only to suit the different element in which he lives, will make him a productive and profitable fish."

Their natural food appears to be insects, frogs, the spawn of other fishes; but they devour offal, or, indeed, anything edible, either animal or vegetable. A vegetable diet is as acceptable as any other, and wild rice, water plants and the like are voraciously eaten by German carp. "The destructive nature of the carp to the spawn of nobler fishes," says a distinguished authority, "and to the vegetation upon which wild fowl feed should act as a caution signal in the introduction of foreign species of fish in American waters." In connection with this charge, a western, U. S., paper tells of a rancher's visit to Portland, Oreg., to sue for damages he had sustained from the introduction of carp, he wished to find out whether he had recourse against the United States fish commission for the introduction of carp into the rivers of this section. He says these fish are destroying his meadows by eating his grass and grubbing up the roots. As the water overflows his meadow the carp follow it up in thousands, the small ones weighing about three pounds pushing their way up where the water is only three inches or so in depth and clearing off all vegetation, so that when the water recedes he will have mud flats in the place of meadows.

Buckland in view of this herbivorous habit recommended that at times the water should be run off carp ponds and grass seed sown on the mud and the edges, "then let the water cover the grass," he said, "and it will afford excellent pasture for the carp."

(4.) Their market value can never be great in Canada. For many seasons our Lake Erie fishermen have been taking large quantities of German carp, which have wandered across from their haunts on the United States shores. Thus off the south Essex shore, (Ont.), individual pound nets occasionally take two or three tons of carp at a single catch. In many cases personal questioning has elicited the information that the fish were found to be so worthless and such a drug in the market, that they had to be buried on shore in order to get rid of them. Certain public bodies in order to shield themselves from severe criticism have exaggerated the value of these fish, and the demand and sale for them. No doubt the markets of Chicago or New York, which are not regarded as the best or most remunerative by fish buyers, shipments of carp find sale amongst Russians, Jews, and other foreigners to whom trout and the best kinds of fish are practically unknown. The demand for carp must, however, be limited, while the demand for salmon, whitefish, trout, &c., is in reality unlimited. The economic value of carp as a permanent element in the fish markets of this continent is problematical. They no doubt have met a demand in markets, which the great fish buyers have termed the "dumping ground" for the fisheries; but in the best markets of Canada and the United States, German carp will never be esteemed or demanded. A division of opinion amongst fishery authorities on this side of the Atlantic, has existed every since German carp have been imported. The late Professor Spencer Baird was somewhat hopeful and enthusiastic, but the plants of carp fry allocated under his personal supervision were not always received with confidence. Everywhere can be found views like those expressed by the fish commissioners of the state of Nevada (1887):—

Professor Baird also very kindly presented me with 295 young carp from the United States fish car, all of which have been distributed to the best advantage possible. While fully appreciating the generous courtesy which prompted the gift, and gladly acknowledging our obligation to the donor, I feel it my duty to say that my observations have not impressed me favourably with the qualities of these fish. They multiply rapidly and attain a considerably size, but in my judgment they are not what can be fairly called a good table fish. I regard the Lake Michigan whitefish as being in every way superior.

5. They live upon the food of better fish, and propagate so fast that they prove injurious and even destructive to the higher kinds. It can be proven that whitefish and the yellow pickerel have been starved out and crowded out by hordes of hungry carp. Not only so, but it has been shown that other kinds forsake their usual haunts, and are in fact driven out by these foreign intruders. Recently the carp has been planted in Lake Michigan near Chicago, and competent authorities, including practical fishermen, hold that other fish will be driven out of these waters.

6. They ruin the waters which they frequent by destroying vegetation, rooting up the marginal banks and by disturbing the bottom. Ponds and waters which were clear and exhibited a hard bottom have become discoloured and "roily," and the bottom soft and tenacious by the grubbing actions of the carp. Such ponds have been changed into disgusting mud puddles. A Kansas authority who carries on private fish-culture operations recently wrote of the carp:—"The carp is a fussy fellow, and when not trying to pick a fight with some of the other denizens of the pond, is ploughing up the mud along the bottom of the waters and constantly keeps the pond in a roily and unpleasant state." The ill effects of carp upon other especially high grades of fish cannot be exaggerated.

7. They are destructive spawn eaters like all the tribe of sucking fishes. No spawning ground is safe from their attacks. There are predacious fish like the pickerel or doré, the pike, the salmon trout, &c., but these fish have their special haunts and the spawning grounds of whitefish and other kinds do not usually suffer seriously from their depredations. Not so with the carp. It has no favourite or special haunts, and every spot where fish eggs or other edibles are to be found will hardly fail of a visit from these marauding poachers. "I am quite certain," said the late Mr. Buckland, "that carp will eat their own eggs and very probably their young." No doubt this charge may

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be made against many fishes, but the peculiar roving tendencies of the carp make it especially injurious, as few deposits of spawn can escape its inquisitive search.

(8.) German carp are especially subject to parasites and contagious diseases. From their omnivorous and lethargic habits no fish are so readily attacked by diseases and parasites as carp. The "fish leprosy," described by Blake as a fungoid growth which spreads over the whole skin, turning the fish white and rendering it most unhealthy and a source of disease to all other fish, is essentially a disease of the German carp. Frank Buckland studied some of the diseases of these fish, and amongst others enumerated one malady which he called small-pox in the carp.

Tapeworms and other disgusting endo-parasites occur most plentifully in carp. One described by Harrington Keene taken from a carp of 16 pounds weight measured no less than 45 feet in length. Of all fresh water fishes the German carp are the most subject to external and internal diseases. This is, in fact, unavoidable in a family like the carps, with sluggish habits, a fondness for coarse and loathsome food, and a preference for muddy and almost tepid waters.

Whatever may be urged in favour of the carp, and, as already indicated, some considerations of weight have been put forward by various authorities, it cannot be questioned that the points unfavourable to carp-culture, so far as Canadian waters are concerned, deserve serious attention. Certainly no fish culturist should determine to introduce these fish or set about artificially rearing them without fully considering the grave possibilities associated with the raising of German carp.

60-61 Victoria.

Sessional Papers (No. 11c.)

A. 1897

Supplement No. 2 to the 29th Annual Report of the Department of Marine and Fisheries, Fisheries Branch

DISCOLORATION IN CANNED LOBSTERS

REPORT

OF AN INQUIRY INTO THE CAUSES LEADING TO A
DETERIORATION IN THE QUALITY OF
CANNED LOBSTERS

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

PRINTED BY S. E. DAWSON, PRINTER TO THE QUEEN'S MOST
EXCELLENT MAJESTY

1897

No. 11c—1897.]

Discoloration in Canned Lobsters.

NOTE.

Under an Order in Council dated 8th May, 1896, I was instructed to undertake an inquiry into the causes leading to a deterioration in the quality of canned lobsters. This inquiry has lasted for a year and a half and is now concluded. The results are set down herein. It was commenced in conjunction with Dr. A. A. Bruère, at my request to him, and it was conducted jointly with him for a very considerable period. Then Dr. Bruère notified to me his intention to retire from the investigation. I am, therefore, left solely responsible for the report in its present form, and am only too sensible of the loss to it of Dr. Bruère's able co-operation in the light of the very material value of his observations whilst he was associated with me. The present occasion is also taken to tender to him the fullest acknowledgment of his aid.

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Discoloration in Canned Lobsters.

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Discoloration in Canned Lobsters

INTRODUCTION.

Before undertaking this inquiry, it was necessary to measure the importance of the work in hand, to ascertain the amount of labour it would be thought advisable to bestow upon it. This problem was approached from various sides.

- 1st. The value of the industry.
- 2nd. The extent of the deterioration.
- 3rd. The loss entailed thereby.
- 4th. The distribution of the loss.

The following facts are therefore submitted, because it was the consideration of them which pointed to the necessity of an extensive and elaborate research. If any results were to be obtained, it was only by proceeding in an orderly manner and to great lengths, if necessary. Even if no results were to be arrived at, the preliminary work would have been done for some more fortunate observers. Therefore, the inquiry was projected upon a wide and sound basis, and the various operations are set forth along with the conclusions to which they led.

I.—VALUE OF THE INDUSTRY.

Statistics are available in a supplement to the twenty-fifth annual report of the Department of Marine and Fisheries. In it the Deputy Minister states that the number of cans packed in Canada that year was 14,285,157, or nearly 300,000 cases, which at the nominal price of \$8 a case amounted to \$2,400,000.

The value of the export of lobsters in 1891 was	\$1,930,175
do do 1892 was	1,909,756
do do 1893 was	2,071,225
do do 1894 was	2,331,660
do do 1895 was	2,135,756
While last year the value amounted to	2,489,995

The average price per pound in 1883 was 9.12 cents; in 1893 it had risen to 14.10 cents; at present it is 18.72 cents.

- (2.) The extent of the deterioration.
- (3.) The loss entailed thereby.
- (4.) The distribution of the loss.

These three factors will be considered together.

It is a matter of exceeding difficulty to estimate accurately the annual loss sustained by the industry through deterioration in the quality of the goods, by blackening and other causes, because the loss falls in so many quarters.

First, there is the loss to the individual packer; then to the buyer, the wholesale merchant, to whom the goods are sent, to the retail dealer, and finally to the consumer, who probably bears the bulk of it, and whose loss can never be ascertained.

To obtain some expression of opinion, a communication was addressed to packers, buyers and dealers in the Maritime Provinces of Canada, the United States, and Great Britain.

It contained two questions:

1st. What do you consider to be the causes of the depreciation in the quality of canned lobsters?

2nd. What, in your opinion, is the annual loss to the lobster packing industry through this deterioration?

From some of the factories came replies that they sustained no loss whatever. This fortunate condition is explained by the fact that these packers market their goods twice a week before any considerable change is manifest, receive their money, and the transaction so far as they are concerned, is finished. The first buyers ship the goods on commission and receive what the consignee can afford to send. This then is a source of information. In this connection, the following extracts selected from many letters are of value as showing the feeling of the trade in England :

From W. & D. Harvest, Dowgate Dock, Upper Thames St., London, E. C. :

"We trust the experiments you allude to may produce satisfactory results. Certainly, the present canned lobsters form so capriciously perishable a stock that the trade is avoided as much as possible by importers, dealers and retailers."

From Messrs. Crosse & Blackwell, Soho Square, London :

"There is a great need of improvement in the preservation of lobsters, as there have been special difficulties in the past few years."

From Petty, Wood & Co., Nos. 41-57 Southwark Bridge, London, S.E. :

"We think it is quite time some steps should be taken by the Canadian Government to regulate and try to secure the packing of fish which are sound and fit for the food of man and also to stop the shipment of rubbish and unsound food."

From Powell Bros. & Company, No. 27 Mincing Lane, London, England :

"The whole industry for years past has been going from bad to worse owing to the unsatisfactory out-turn of the major portion packed : in fact, to such a pass has it come that many firms have repeatedly expressed to us that they will need to seriously consider abandoning the sale of canned lobsters, owing to the unpleasantness and difficulties in which they are so constantly involved."

From the Cunningham & DeFourier Company, Limited, Great Alie St., London, England.

"It is our opinion that unless some prompt action be taken, the trade in these goods will practically cease as regards Great Britain.

For our part, we have made up our minds to discontinue offering lobster next season unless we can see an improvement in the pack, as the complaints which come to hand and which we have to satisfy by allowances, make the business very troublesome, and it is doubtful, taking all things into consideration, if we make any profit by handling these goods."

From Samuel Hanson, Son & Barter, No. 47 Botolph Lane, London, England :

"There is no doubt whatever that unless something is done to improve the packing, the trade in canned lobsters, which has already seriously declined, must go from bad to worse, to the injury of all concerned."

From A. W. Latham & Co., No. 17 Philpot Lane, London, England :

"If this blackening can be removed, it would be an enormous value to this industry for at present, the marvelous uncertainty as to whether, lobsters, from wherever they may come will show smut or turn black sooner or later, is one of the curses of this trade leading to endless difficulties and creating all sorts of dissatisfaction : in fact, if we were not obliged to handle lobsters, we should strike them off our list and thereby save ourselves much worry and loss."

The replies received from Mr. J. E. Grant and from Mr. W. F. Tidmarsh of the Portland Packing Company are to the point. In his reply Mr. Tidmarsh says : "I think I would be quite safe in saying that if the 'blackening' so called, could be prevented, and the lobster preserved so as to retain its colour, flavour and texture, when the confidence of the trade became established, the value would be increased by at least three dollars a case, representing a total in money value to the industry in Canada of about \$900,000 per annum."

Messrs. Macdonald & Bros. estimate the loss at two dollars a case, which according to the annual output is equal to \$600,000 a year.

Mr. Grant in his reply says :

"It is very difficult to answer your inquiry fully, as the loss does not frequently fall upon the packer, he realizing on them through the dealer, who ships them to the different markets of the world, and who in reality meets with the first loss and

Discoloration in Canned Lobsters.

ultimately the jobbers who buy them at a price and keep them in stock awaiting the demands of the trade. Some seasons I know the jobbers lose all their goods. As a dealer I can speak very feelingly and can say that I have lost thousands of dollars by shipping lobsters on consignment. The only certain method in handling lobsters is to get rid of them as quickly as possible. It might be interesting to you to know the actual commercial value of a choice can of bright lobsters. Few realize the fact that the choice parts of eight lobsters go to fill a one pound can.

"The consumer thinks nothing of paying 12½ cents for a fresh lobster. Multiply by eight and the can of lobsters show a value of one dollar. Now, if the canning of lobsters could be brought down to an exact scientific process and the consumer could be guaranteed that the goods were as good as when fresh, the question will answer itself."

As long ago as 1887, Inspector Duvar wrote:—

"Owing to the inferior grade of goods prepared by some packers, the lobster business is in great danger of being seriously imperilled. Canadian packed lobster is at a very low ebb in English markets, so much so that London green-grocers will have nothing to do with Prince Edward Island lobsters on account of their inferior quality."

From this it is clear that the loss is a very material one, not only in the deterioration of the present product, but from the fact that the best quality now produced is inferior to that which should be obtained and can be obtained by the adoption of scientific methods."

DESCRIPTION OF DAMAGED CANS.

This deterioration in the quality of the contents of cans is variously referred to as "blackening" or "smut," and other cans are known as being "sour," "acid," "fermented" and "blown." This points to the fact that the deterioration manifests itself in various forms and is due to widely different causes.

It will first be necessary to describe the appearances presented by a series of damaged cans. Upon opening a large number it was at once seen that there was the largest possible variety of condition. Indeed the discoloration was absent in many cases and the degree to which it had proceeded was different in all. In some the contents were uniformly dark, the colouring matter penetrating the whole tissue. In others it was confined to that portion which was in contact with the seam of the can, and at the junction of the cover and bottom with the two ends of the cylinder. Again it occurred in spots corresponding with the puncture made in the cover to allow the air to escape or to assist in the process of sealing. In these places the continuity of the tin coating was broken, allowing the middle plate of iron to come in contact with the contents. Again, the discoloration commenced over small areas where the tin was eroded, but whether this erosion was due to a primary defect in the material or whether it was due to some solvent action of the contents had to be reserved for further examination and will be referred to later. In some cases the paper lining was alone discoloured and in others a space along the seam of the can.

In most instances the contents remained solid though discoloured. Some were liquid and uniformly black and others liquid but of a normal colour. Many cans were bulging almost to the point of bursting with gas, and when punctured the gas escaped with a rush and foul odour while in others the amount of gas was imperceptible.

METHOD OF INQUIRY.

We are now able to define the scope of the inquiry as follows:—

1. To classify and describe the different forms of deterioration.
2. To ascertain their causes and consider the various theories in vogue respecting them.
3. To determine whether they began to operate before or after the process of canning commences.
4. To consider the present methods.
5. To provide a remedy and prepare a scheme for the profitable preservation of lobsters.

DISCOLORATION AND ITS CAUSES.

First of "blackening." This should be described as "discoloration," for the colour varies from a faint brown, a brilliant purple, a luminous yellow to a condition of inky blackness.

Of this discoloration we have separated seven different kinds all due to different causes which are here described in detail.

1. Brownish discoloration of the paper alone.

This form was found to be due to merely to scorching with an overheated copper too long applied. To determine this a can empty except for the lining, was sealed with a very hot copper, on opening, the paper was found scorched as described. Again a similar discoloured area was removed from the lining of a can and treated with hydrochloric acid. The colour was not removed, proving it was due to organic destruction of the paper by heat, and of no serious moment excepting in respect of appearance.

2. A yellowish discoloration of metallic lustre along the seam of the can.

This is observed in many cans newly made and before the lobster is introduced and is due to excessive heat in the soldering of the can itself, as can be shown by applying an overheated copper for an unusually long time to a piece of tin plate when a similar result is produced.

3. A purplish discoloration observable immediately after the cans are removed from the second bath, which will be dealt with in considering the "Remedy."

4. SULPHIDE OF IRON.

In another series a blackness as intense as that of ink was observed commencing where the raw edge of iron was exposed along the seam, around the covers and at the probe holes. This gradually extends to the contents of the can. This substance is soluble in hydrochloric acid and yields a precipitate of sulphur. When filtered and diluted with distilled water and a stream of sulphuretted hydrogen passed through, no precipitate is obtained, indicating that no lead or tin is present. If tin were present we would have a brown precipitate and black in the case of lead. If, now, ammonium sulphide be added, a black precipitate is brought down which is soluble in hydrochloric acid, and with potassium ferrocyanide yields the reaction of a ferrous salt. This discoloration then is due to sulphide of iron, and is caused by the sulphuretted hydrogen acting upon the iron. The sulphuretted hydrogen arises from the putrefactive fermentation of proteid matter, under the influence of micro-organisms, as will afterwards appear.

5. SULPHIDE OF TIN.

This produces a uniform brown tinge upon the paper. This material when treated with hydrochloric acid and sulphuretted hydrogen, produced a brown precipitate of proto-sulphide of tin, which dissolved in sulphide of ammonium, giving sulphide of tin; when acid was added a yellow instead of a brown precipitate was separated. This is the reaction of a stannous salt, the sulphide of tin being formed in the same manner as the sulphide of iron.

6. OXIDE OF IRON.

A yellowish brown rust upon the raw edges of iron due to common oxide of iron. A can was filled with a solution of salt and water and boiled for three hours, when a similar condition was produced. The material from the can answered all the tests for oxide of iron, that is to say, caustic alkalies gave a brick red precipitate of ferric hydrate insoluble in hydrate of potassium; ferrocyanide of potash gave a blue precipitate, and sulphocyanate of potash gave a deep red colour.

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7. BACTERIAL ACTION.

Discoloration due to bacteria. In many cans which are in the early stage of putrefaction one observes colonies of bacteria upon the surface of the contents giving a uniform brownish tinge. This may be scraped off, leaving the tissue beneath of normal colour.

From the foregoing it will appear that the ultimate source of a large series of discolorations is the presence and operation of bacteria.

It was therefore clear that an exhaustive bacteriologic study would have to be undertaken. To this end, it was necessary to establish a laboratory where abundant material was accessible. Accordingly in May, 1896, this was done in Charlottetown, Prince Edward Island, with all the necessary appliances. The work was continued there till the latter part of June and recommenced early in July to investigate some matters which were overlooked during the first visit.

GASES.

The sign of deterioration most eagerly sought for is a bulging of the ends of the cans due to an accumulation of gas within. These gases are a product of bacterial activity, and upon analysis were found to be composed chiefly of:

Sulphuretted hydrogen. Carbon dioxide.

The material from which sulphuretted hydrogen may be readily formed, is often introduced into the can by the non-removal of the gut and its contents. The stomach and gut of a living lobster were placed in a test tube with acetate of lead paper, within six hours sulphuretted hydrogen was developed in appreciable quantity and rapidly discoloured the edges of the plate placed in contact with it.

THEORIES IN VOGUE.

Among the numberless theories as to the cause of "blackening" of lobsters the use of acid easily holds the first place. Now, as a matter of fact if a portion of lobster tissue be immersed in pure hydrochloric acid for a few days it becomes beautifully white. Therefore, the use of acid in the manufacture of cans has been almost abandoned, and much ingenuity has been displayed to procure a suitable substitute. The general consent is in favour of employing a mixture of rosin and linseed oil. Another preparation is made as follows: "add one pound melted rosin to a gallon of lard oil, and stir to the consistency of cream." The effect of strong acid upon the tin is of course to dissolve it, but when tin is etched by a dilute acid the effect is to dissolve the minute crystals more quickly than the larger ones, giving to the surface a frusted appearance (*moiré métallique*).

SEASONAL INFLUENCE.

To determine what influence, if any, the time of year in packing exercises. Small packs were made in the following months, May, June, July, August, October and December. Upon examination of cans packed at these various periods it was not possible to observe any difference in quality in respect of colour.

THE QUESTION OF MOLTING.

It is worth inquiry if there is any connection between the deterioration and the molting of the lobster, but before doing so, it will be necessary to discuss the details of the process by which the shell is cast.

All shell-fish grow in stages. They are surrounded by a hard inelastic covering, and when in the process of growth this covering becomes too small, it is cast off. This is known as molting. The process was well studied by Vitzow in the marine laboratory of Roscoff, and by Francis Hobart Herrick in the laboratory of the United States Fishery Commission, at Wood's Hole, Massachusetts, from whose excellent report many of

these physiologic statements are taken. The shell of a lobster varies in hardness and colour, depending upon the period since the last molt. An animal which has recently cast its shell is known to fishermen as a "soft shell," "new shell," "paper shell," or "buckle shell" lobster, and just previously to molting as an "old shell," "hard shell," or "black shell."

In Prince Edward Island it is unusual to obtain soft shell lobsters before the middle of July, at which time a few may be found in the traps with the cast off shell by their side, or the shell alone may be found, the animal having escaped by reason of its smaller size. The newly molted lobster lies limp and helpless, but is covered by a limiting membrane resembling in shape at least, in every respect the shell itself. Not only is the shell cast off but the lining of the stomach, œsophagus and intestine is exfoliated as well, these structures being derived from infoldings of the skin. Water is now quickly absorbed and the flesh converted into a pulpy mass. There is now a marked increase in size and a rapid hardening of the new shell.

Many factors go to account for this rapid growth of the shell. On each side of the stomach of a molting lobster are found two bodies an inch long and half an inch thick composed of calcareous matter and known as gastroliths. These bodies may be, as Vitzow suggests, "dissolved in the acids of the stomach and entering the lymph form an inorganic reserve comparable to phosphatic plaques found in the membranes of the fœtus in ruminants." On the other hand Herrick may be right in holding that these gastroliths "represent the lime which has been removed by absorption from the old shell preparatory to the molt." But there is a more obvious source of supply of the calcareous matter necessary for the formation of the new shell. After molting the lobster is in the habit of swallowing fragments of shell, which are changed in the stomach to acid phosphates and thence carried by the blood to the locality where they are needed. It is difficult to say what period must elapse before the shell acquires any considerable degree of hardness. Reaumur, speaking of the crayfish, says that he has seen the new shell become as hard as the old in 24 hours, but that it usually requires from two to three days; and Chartran, referring to the same animal, says he has seen the shell resume its normal consistency in 48 hours. Vitzow admits that the carapace has become perceptibly harder in 24 hours, but that 72 hours must expire before it is completely so. It would seem that in the case of the lobster, there is a considerable variation in the time required, and that it is not marketable for at least a month.

Now, from experience, the condition of the flesh has no bearing upon its deterioration in the cans. The most that can occur is a slight alteration in the flavour or consistency of the flesh.

THE QUESTION OF SIZE.

It remains yet to consider what bearing the size, and, therefore, the age of the lobster has upon its value as a preserved food.

We have now to inquire what are the data from which the age of a lobster may be determined. The age can scarcely be determined by direct observation, since the conditions of confinement, food supply, temperature, &c., probably introduce variations which will render any conclusions fallacious. By observation, Herrick found that one yearling lobster which had been hatched from the egg measured $1\frac{1}{2}$ inch, while three others measured 2 inches in five months. He has constructed a table from which it appears that the increase in length after each molt is about twelve per cent of the previous length, or one-eighth, that is, an eight-inch lobster would measure nine inches after molting. If now the number of molts and the time interval could be ascertained, some conclusions could be drawn. In another table he estimates that a 2-inch yearling lobster has molted 14 times, a 5-inch lobster 20 times, an adult lobster 10 inches long 25 times. This leads him to the conclusion that a 10-inch lobster is from $4\frac{1}{2}$ to 5 years old. It will be seen then that the lobster is an animal of rather slow growth.

An examination of the tissues of lobsters five or six inches long discloses nothing which makes one think them unfit for canning. The expediency of so using them is another question.

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QUESTION OF SEX.

We have now to consider whether the sex of the lobster has any bearing upon the deterioration of the canned product. By way of preface to this consideration, a short statement of the sexual habits of the lobster will be necessary.

There is a complete separation of the sexes. The female is smaller in size, the claws are less highly developed. The abdomen is broader and more concave. The first pair of swimmerets is reduced in size to admit of the more complete flexing of the abdomen for the protection of the eggs.

The organs of reproduction are, (1), the ovaries, consisting of two masses of tissue connected by a bridge and situated in the dorsal region, extending from the middle of the carapace to the fourth or fifth abdominal segment. Just previous to laying, the ovaries are seen filled with eggs, which may be removed by cutting into the wall. (2.) Two short tubes leading from the ovaries and opening into (3.) two small slits upon the basal segments of the second pair of walking legs. (4.) The receptacle for the fertilizing element of the male situated between the third pair of legs. (5.) Glands which secrete a cement substance for securing the eggs, after they have been laid, to the abdominal appendages. The male lobster possesses a pair of testes, opening by ducts at the base of the last pair of walking legs, and the first pair of abdominal legs are modified as if to serve for conducting the fluid, which is inclosed in gelatinous capsules, into the seminal receptacle of the female.

The pairing of lobsters may take place at any time of the year and apparently has no connection with the condition of the ovaries of the female. The seminal fluid can be obtained from the receptacle of the female independently of the time of laying, hatching, or even molting. The male element is stored up until needed, and retains its vitality for a very long time.

There is a conflict of evidence as to how often the lobster lays eggs, when they are laid, and how long they are carried externally.

It is quite true that lobsters may be taken at all seasons of the year, with the eggs in all stages of development, but this does not affect the main statement that, for the majority of lobsters, there is a definite breeding season. The process of laying is as follows: The eggs are extruded from the body after being carried about a year, and are fertilized by coming in contact with the spermatozoa ready stored up in the seminal receptacles of the female. The tail is folded in, and the eggs are attached to the swimmerets by means of a cement substance secreted in special glands, and there carried for about ten months. The lobster is now said to be in "berry." Then the embryos escape as free swimming animals in the ocean. The number of eggs is very large, a twelve inch lobster producing about fifteen thousand. Seeing then, that the female lobster spends the most of its time in the business of reproduction, it is very important to decide its value as a food supply, especially since the number of males and females is probably equal.

First, lobsters can never at any period of life be compared with fish bearing their roe, because the eggs ripen over a period of two years, and there is no spawning time, comparable in point of intensity with that which obtains in the case of fish.

In the report of the English Fish Commission presented in 1877, it is stated that "the lobster when in berry is in the very best possible condition for food." The only evidence adduced is the fictions of fishermen and cooks. The fishermen wished to continue catching the female fish, and the cooks lusted after the eggs for the garnishing of salads. One witness remarked with the real fisherman's wisdom "lobsters in berry are worth twice as much as any other, the spawn is bruised and put into sauce and makes better sauce than the lobster itself. In salads it is boiled and sprinkled over the salads; it is a capital article of food. The cooks will not have the lobsters without spawn." Upon such information as this, and with logic like a fisherman's, the Commissioners are led to remark "it would be as illogical to prohibit the taking of lobsters in berry as to prohibit the taking of full herring."

On the other hand, Herrick shows that a lobster in berry is actually lighter than a female not carrying external eggs, by an average of 1.63 ounces.

In the case of smaller lobsters, the difference was found to be only a tenth of an ounce. The males are heavier than the females, but this is due to the larger size of the claws. The matter was put to the test, and as between a male lobster, a female in berry and a female carrying no external eggs, the most delicate palate can detect no difference in the flesh. Lastly, there is no difference in the tendency to deterioration after canning between these three classes.

EXAMINATION OF TISSUES.

To arrive at a conclusion as to whether lobster tissue was in a normal or pathologic condition, it was necessary first to make a preliminary study of a large number of animals to be used by way of comparison. These observations were confined principally to the muscular tissue and to the blood. A detailed account of this division of the work would be out of place here; and only so much introduced as is necessary for the main purpose.

THE BLOOD.

A number of good-sized animals were secured, and by means of a deep puncture through the membrane connecting the second and third joints of the crushing claw, the blood was allowed to escape, as it did in a considerable quantity. The amount depends upon the size of the animal and the thoroughness with which the operation is done. As the blood issued it was slightly viscous, but soon coagulated into an opalescent clot, in thin layers transparent, but when seen in sections of considerable thickness, opaque, from the presence of flaky masses. From the instant of shedding, a bluish coloration appeared on the surface, at first light blue, then of a rich indigo tint. This colour extended downward into the substance of the clot in a regular layer of about one-third its thickness, and after a time the whole mass changed to the same colour, with the exudation of a dark-coloured serum.

This colour disappears on heating to 100 C. in a water bath also by the addition of hydrochloric acid or hydrogen peroxide, leaving the clot opaque and of a pearly lustre. When further heated it assumes a brown hue, which, however, is limited to the surface. The blue colour does not return on cooling if the clot is protected by water, but on exposure to air, there is a slight reappearance. The colouring matter is not soluble in chloroform, ether or peroxide of hydrogen, nor upon spectroscopic analysis does it yield any absorptive bands, though there is a general dimming of the whole spectrum. This colouring matter is a respiratory pigment *hemacyanogen* and well deserves further study. The microscopic examination of the blood which was made with $\frac{1}{2}$ objective and a No. 4 ocular revealed white blood corpuscles much larger than those of the mammalia, with round sharply defined margins, or irregular with sinuous edges. The protoplasm granular and staining faintly with methylene blue, the nuclei salient either simple or compound with well defined nuclear membrane and staining deeply. In many cases, the cells were multinuclear. The blood also showed fibrin threads and granules, but no appearance of coloured corpuscles or micro-organism.

THE MUSCLE.

The muscle substance is composed of fibres in bundles, as in the case of the crab, the bundles separated by fibrous connective tissue, the fibres striated showing alternate dim and light stripes, in this respect also resembling the muscle of the crab, but much broader than in the mammalian muscle. In the physiologically extended fibre, the light stripe is almost as broad as the dim stripe. In the centre of the light stripe, there is a well marked line or membrane known as Dobie's line or Krause's membrane. This line seems to consist of a row of granules. On each side of Dobie's line and midway between it and the border of adjacent dim stripes is another faint line corresponding with the lateral disc of Engleman.

In fully contracted fibres the light stripe is much narrower than the dim one. The centre of the dark stripe appears comparatively clear and reveals the presence of a membrane like Henson's membrane in the dark stripe of the crab's muscle.

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Besides the transverse striation there is a longitudinal striation due to the presence of fibrilles. Histologically then, the muscle of the lobster is almost identical with that of the crab.

EPIDERMIS.

The epidermis covering the surface, and from which the shell is secreted, is composed of epithelial cells, containing a pigment soluble in ether, and chloroform. On evaporation of the ether, an oily residue remains pigmented red, which when combined with alkalis forms a soap.

DESCRIPTION OF PRESENT METHODS.

It will be necessary to give some small description of the methods at present employed in the lobster packing industry. It should be said in the outset that those engaged in the industry are using their best efforts to secure satisfactory results and that any failure is due to causes entirely beyond their knowledge, and all those with whom we came in contact showed a disposition to do everything in their power to forward the investigation. At the same time, in many cases the wonder is not that the canned product is so bad, but that it is as good as it really is. Many of the factories are mere hovels with inadequate appliances for ordinary cleanliness, and under the best conditions it is to be remembered that the quantity and kind of offal connected with the process is admirably suited for the growth of putrefactive micro organisms. The factories are seated upon the shore with stages leading into deep water for the accommodation of boats, or the buildings themselves are at the end of a stage connecting with the shore. Here the boats come laden with lobsters from the traps, and they are then counted out. They are shovelled into casks and at once thrown into a vat and boiled. The time during which they are boiled is said to be about fifteen minutes, but by actual test of many cases, we found it to be nearer half an hour when all the lobsters were out. They are then thrown upon large tables to cool, and when cool are "broken off" that is, the body is broken from the tail, and the claws removed by striking against the side of a barrel into which they fall.

The tails are taken to the "tail table" and the meat either "punched" or "pulled." That is, either pushed out from behind with a suitable instrument, or pulled out in front with a fork. The latter method is preferable, as otherwise the last segment of the tail is apt to be broken off. The claws are cracked and the meat shaken out: the "arms" are split longitudinally and the "arm-meat" pulled out with forks. Next the tails are split and the gut removed. This splitting may be done upon the "front" or back. Front splitting is preferred since it does not interfere with the contour of the body. The blood which has coagulated in the claws in boiling is removed by washing in sea-water, and the tails are cleansed in the same way, care being taken to remove as much of the "green-gland" as possible, which in boiling has tinged the upper part of the tail. The meat is placed in strainers, and soon is ready to be packed. The cans are of two sizes, half-pound and pound: of two shapes, tall or flat. So there are "pound-flats" and "pound-talls," "half-pound flats" and "half-pound talls."

As the lobsters which are taken are becoming smaller year by year, it takes an increasing number to fill a can. The average now is about six to a pound.

The cans are lined on the bottom and sides with vegetable parchment of suitable shape. The tails are curled up and placed in the bottom: then comes a little arm meat, and the claws are laid in rows on top. Salt has to be added, and one has heard much discussion as to whether it should be put in first or last, whether dry or in the form of pickle. The meat is "pressed" the can "wiped," the paper lining is put on and finally the can is covered. The cans are now given to the sealer, and an expert workman will seal a thousand in a day. When the day's catch is in cans, the "bathing" begins. A huge vat is filled with water and kept boiling by a fire of hardwood in a brick furnace. The cans are placed on trays and swung in by means of a crane. The practice of packers differs, but the average length of the first bath is one

hour and a half at the temperature of boiling water. The cans are hoisted out and the trays placed on a rack. Then the sealers puncture each can with a small mallet having a sharp point in its face, the steam and air rush out and then the opening is sealed. The ends of the can are now "concaved" by atmospheric pressure. This operation of puncturing the cans is variously designated, some referring to it as "probing," others as "brobing" or even "broging" but as philology was no part of the present inquiry, the matter is left in abeyance.

The trays are again introduced into the boiling water where they remain for another hour, and are then allowed to cool gradually. The pound cans are packed 48 in a case, and the half-pound cans 96 in a case.

For the employees, men and women, the business is not unpleasant. The work is not laborious, the pay is good, and on stormy days and wet they have good leisure to indulge their propensities, which sometimes unfortunately run in undesirable channels.

The food is abundant and good, if not very delicate, nor the cooking of it over dainty.

USE OF SALT.

To preserve the characteristic flavour of the lobsters, all are agreed that salt should be added, and as salt and water are cheaper than lobster, there is a further inducement for its employment. The usual amount is an ounce of pickle to the one pound can, which is included in the weight, and is, therefore, six per cent of the whole, a valuable margin of profit. In some markets the buyers specify that the meat shall be packed in dry salt. The best practice seems to be, instead of pressing the water out of the lobsters with a heavy weight, to allow them to drain by standing in perforated tins, and add the dry salt. Now, as one part of the salt is soluble in about three parts of water, it follows that an ounce of saturated solution is equal to about a third of an ounce of salt. Two teaspoonfuls, therefore, of dry salt seems to be the proper quantity to be added to a pound of lobster.

USE OF LININGS.

Linings of vegetable parchment were introduced four years ago as a remedy against blackening, the object being to protect the meat from contact with the tin. The practice has led to no improvement so far as can be learned. The device is pretty; the lining gives a pleasant appearance, and as it costs less than lobster tissue, it is likely to be retained. Yet, if scorched in soldering, or if the edges slip in between the cover and the can, it is a serious disadvantage.

"LEAKS" AND "DO-OVERS."

When the cans are removed from the first bath the ends are convex owing to the expansion of the heated air and steam within. If, however, there is a leak in the can there will be no expansion, and when punctured the can will not "blow." As soon as the can is punctured and sealed the ends are concave. Again, after the second bath, if there is a leak in any can this concaving has disappeared and is replaced by convexity. Such a can is known as a "leak." The test is applied by tapping the tops of the cans with a bit of metal, a nail or a piece of solder, and the "leaks" so discovered are set aside. This test is of very uncertain value, as the note varies with the fullness of the can, and the proximity of the contents to the cover. A number of cans which were declared by packers to be "leaks" were secured and set aside unmended. They were found to be sterile after three months. These "leaks" are then "mended" and re-bathed for half an hour. These cans are known as "Do-overs," and are considered of inferior value. Only a limited number are placed in each case. The percentage of "leaks" will depend on the care exercised in making the cans, and in the soldering of them, but the average seemed to be from three to five per cent. There seems to be no necessity for having any imperfectly sealed cans, since out of five hundred cans put up and sealed by us with only ordinary care not one turned out to be a "leak." Now, according to the principles to be afterwards laid down, if a leak should occur it is to be

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mended at once, and the process of "bathing" is to be commenced from the first, instead of merely boiling the can for half an hour, which, as we know, is insufficient to destroy such micro-organisms as may enter. Such a "do-over" would then be subjected to twice the ordinary amount of heat, and the contents might be injured thereby, though possibly to no great extent. Even this possibility might be avoided by care in sealing.

THE MATERIAL FOR SOLDERING.

Many makers have secret mixtures often purchased at great cost. As a matter of fact the use of rosin gives no additional advantage. It renders the manufacture of cans more difficult, and worst of all, the surplus rosin cannot be removed without some solvent, and it remains around the edges of the cans in a thick deposit. The result is, when the can is boiled the rosin volatilizes and permeates the tissue with its odour.

Again, shall the bottom be soldered upon the outside or the inside of the can? This is a pure matter of convenience, though in some countries there is a regulation that all cans shall have the bottoms upon the outside on account of a whimsical belief that the danger from lead poisoning is lessened by this manœuvre, solder being an alloy of lead and tin.

SOLDERING.

It is in the soldering of the cover that the lobster packers' fancy has an opportunity of exercising itself. Packers who were willing to yield up all their "secrets" would hesitate to reveal the nature of the "flux" they were using. Some affected to find virtue in a saturated sponge. The main thing is that whatever material be used—and there is nothing better than the ordinary "salts of lemon" it should be used in moderation, and not allowed to flow down upon the contents of the can. In many cases the copper employed was too large, and conveyed the heat to the interior of the can. The crescentic shaped soldering irons for this reason are objectionable.

OF THE BATH.

In three of the largest factories the heat is applied to the cans in iron retorts by the use of live steam. In the early part of the inquiry, as will be afterwards explained, the principles as laid down by Pasteur for the sterilization of media were applied and had to be abandoned. Upon this basis the use of steam retorts would have been invaluable. But since it is useless dealing with a temperature less than that of 100° C. the necessity for steam retorts no longer exists. The method of using the retorts at present is faulty, because too high a temperature is employed. It is the custom to introduce steam till the pressure gauge registers fifteen pounds to the square inch, and as the gauge does not begin to register till the atmospheric pressure of 14 pounds is overcome, an actual pressure above the vacuum of 29 pounds is being used. According to Regnault's tables this is to be translated into a temperature of 248° Fahrenheit which is too high for any tissue intended to be used as food. Besides as high a temperature is disastrous to the tin. In any tin crystal the co-efficient of thermic expansion has one value in the direction of the principal axis, and another in that of the subsidiary axis. Above 213° F. they assume different values, and as the crystals are oriented in a lawless fashion they tend to disintegrate. At the same time steam retorts may be used and fitted with a thermometer instead of a gauge, and the steam introduced without pressure.

The following is an abstract of Regnault's table reduced to Fahrenheit scale :

Gauge showing lbs. per sq. in.	Temperature F.
0	212
1·3	216
4·3	225
8·3	235
10·3	240
11·3	242
15·3	250

TIME OF BOILING IN SHELL.

To determine the length of time for which lobsters should be boiled the following experiment was made :

Six lobsters were placed in boiling water and one removed in five, ten, fifteen, twenty, twenty-five and thirty minutes respectively. The one first removed was only moderately red, it could be broken off easily, but the meat was rather difficult to shake out. The lobster which was boiled for ten minutes was in perfect condition for dealing with, and all the others were unnecessarily boiled. Now it is clear that the least possible amount of boiling should be given in the shell to allow of a maximum amount of heat being applied to the can for a definite purpose, and without damaging the tissue by too prolonged application of heat. The actual time required will depend upon the size of the lobster and the thickness of the shell, but a lot of seventy was selected above the medium size and boiled for ten minutes with perfectly satisfactory results.

How long after removing the lobsters from the traps may they be allowed to remain alive before boiling ?

To this question no answer can be given, because it depends upon the length of time during which they remain alive, and this depends wholly upon their surroundings, such as temperature and cleanliness.

Upon ice a lobster will live for many days and may be transported long distances, and upon a clean floor at ordinary room temperature it will live for twelve to twenty hours. But if the day be warm, if the lobsters be closely packed, especially in an unclean boat, death comes very quickly.

USE OF DEAD LOBSTERS.

Another very important question is :—

May lobsters which have died before being plunged into boiling water be used for canning ?

To determine this six lobsters were killed by forcibly breaking up the cervical ganglia. One was examined histologically at once and the others after four, eight, twelve, sixteen and twenty-four hours respectively, with the following results :

Lobster just dead, muscle teased out in eosin examined in Farrant's solution 350, shows fibres with white fibrous connective tissue, striped, with Kraus's membrane and Henson's line, healthy.

Tissue of lobster dead four hours teased in acetic acid, mounted in Farrant's solution by 360, muscle fibres healthy.

Lobster dead eight, twelve, sixteen, twenty and twenty-four hours respectively, muscles in good condition, no evidence of degeneration in sarcous substance, 350 no micro-organisms. (Methylene blue, mounted in Farrant's solution).

Lobster sixteen hours after death, raw and boiled, tissue perfect.

Lobster dead twenty four hours, though the tissue looks perfect, microscopically the transverse striæ are rather faint, indicating that the limit of post-mortem changes has been reached. The limit of use, then, appears to be twenty-four hours at 17°C. to 20°C.

Female lobster in berry sixteen hours after death, tissue perfect.

"BREAKING OFF ALIVE."

It is held by many that there is great efficiency in breaking off alive, that is, separating the tail and claws before the life of the animal is destroyed by boiling. By this device the blood is allowed to escape. Now, in the first place, there is by this method a considerable loss, since a fair-sized animal yields at least four ounces of blood, yet in any case a considerable amount of blood is lost in boiling, when it appears as a coagulum about the base of the claws and in the arms. To determine the value of this belief a number of lobsters were taken and the claws and tails separated whilst the animals were living. These were packed in cans and when opened no difference could be detected as compared with the usual method of boiling the lobsters and separating the parts afterwards.

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PARTS MOST LIABLE TO DETERIORATION.

To determine whether one portion of the animal is more liable to deteriorate than another, a number of cans were packed with claws alone, and others with tails alone. No difference could be observed in the results. There is always, however, even in boiled uncanned lobsters a slight brownish appearance in the "knuckle."

THE QUALITY OF THE TIN-PLATE.

There is another matter of some importance to be considered, that is, whether a saving cannot be effected in the quality of the tin plate used. For several years packers have held the opinion that much of the difficulty could be avoided by using a plate with a heavy coating of tin. Experiments were therefore made with the view of determining if the quality of the plate had any such influence. Now for the manufacture of 1,000 one-pound cans, including covers, it requires 532 sheets of tin plates 14 by 20 inches or $4\frac{1}{4}$ boxes, there being 112 sheets to the box. On August 5th Bessemer Cokes were quoted at 9s. 6d. f.o.b., Swansea and Charcoals at 13s. 6d., a difference between the two qualities of 4s. a box, or 19s. per 1,000 cans. Placing the annual output of lobsters at even 200,000 cases, equal to 9,000,000 cans, the difference in cost in tin-plate alone amounts to £9,120 or about \$45,000. An independent estimate based upon the price of tin-plate laid down in Charlottetown places the difference at \$3.25 per 1,000 cans, equal to \$31,200.

A large number of cans made of tin-plate representing these two grades were packed and careful observations made upon the results.

The conclusion to which we have come upon this important matter is that no necessity exists for a very high grade of tin plate.

In the early days of the industry the material used was iron-plate instead of steel-plate as at present. Three years ago several packers, thinking the deterioration was in some way bound up with the use of steel reverted to the former practice, at a very considerable expense, but they could observe no difference in the results. Then they imported a very heavy grade of plate at a material advance in cost, but with no corresponding profit, as has already been pointed out.

BACTERIOLOGY.

It is unnecessary to overload a report of a practical nature with technical details of bacteriologic work or dwell upon the difficulties encountered in it, because they are of a purely scientific interest and of little value to those whose first business is to pack good lobsters. Besides, it is questionable to what degree such studies should be prosecuted in a departmental inquiry. The main object was kept continually in view, to provide a remedy and there would certainly be no justification in delaying the report for the sake of attaining to a scientific completeness of detail. This is the more true since the working out of these scientific requirements can be done at one's leisure and has no heavy bearing upon the business in hand.

Only so much then is introduced as will serve to show the method of working; concerning the difficulties they are only such as are incident to all original bacteriologic inquiry. It may be noted, however, that much labour was spent upon obtaining suitable media. Many organisms refused entirely to grow upon the media usually employed and it was not until there was substituted for the ordinary peptone-gelatine and nutrient agar a preparation composed of lobster bouillon and agar, that success resulted.

An exhaustive series of plate cultures was made from a large number of cans with the object of isolating the bacteria infesting the tissue, to identify them and to study their growth and life history. Finally, four micro-organisms were obtained in pure culture. These were taken and in turn they were introduced into sterile cans, where they were allowed to grow. From these cans, again, pure cultures were obtained similar to those which were introduced. Lastly, these bacteria produced in the sterile cans, conditions similar to those observed in the cans from which they were originally obtained.

Of these four micro-organisms, the statement is made provisionally, that they have not been hitherto isolated or described. The further study of these forms and the proving of this provisional statement is the scientific work referred to, for which it was not thought justifiable to further delay the present report.

The following brief account is extracted from the notes of the work done in the research laboratories of the conjoint board of the Royal College of Physicians, London, and the Royal College of Surgeons, England (January, 1897.)

The organisms are named I., II., III., IV., provisionally.

Fresh inoculations were made in London with the following results:—

I.

Fourth day. Gelatine tubes all show a similar growth, well marked in the whole course of the stitch, wide at the top with serrated edges, the surface slightly depressed, but no liquefaction. The growth is folded in two places. One inclined agar tube shows a faint streak, the other yields no results; the tubes are now placed in the incubator at 20 C.

Fifth day. All growths are more apparent.

Sixth day. The surface of the gelatine tube is depressed and smeared, the growth has descended leaving a transparent ovoid filmy body 1 cm. long which connects with the main growth. The stitch is wide, the edges rough with distinct colonies and the whole growth rotated in spiral form.

Seventh day.—Heavy growth in both gelatine tubes, the globule at the top is now conical at the edges of the stitch, the colonies are discrete. No liquefaction of gelatine. Both agar tubes show distinct though fine growth.

Eighth day.—Heavy growth, surface extension, with distinct edge and glistening pearly appearance. Stitch much expanded, filmy and tubular at top, quite transparent. One-quarter way down, the growth is opaque and dense, becoming filmy again and finally dense in the lower quarter. The end is pointed and the edge serrated: agar tubes show discrete, white moist colonies.

Ninth day.—Surface growth extended and moist: two-thirds of the stitch is expanded, tubular and filmy: the bottom very dense.

Tenth day.—Three-fourths of the stitch are now tubular: the lower part very dense and opaque: no liquefaction.

Eleventh day.—All these characteristics more marked.

Twelfth day.—Gelatine liquefying, surface growth extending.

Thirteenth day.—Gelatine cupped and liquifying.

Fourteenth day.—Gelatine liquefied and growth diffusing throughout the tube.

Microscopic examination with No. 4 ocular and $\frac{1}{2}$ oil immersion lens: pure culture, rods of varying length and thickness, some slightly curved and others so short as to resemble cocci. No sporulation was observed. In hanging, drop No. 1 is slowly motile with an undulatory movement.

Grows in hydrogen. Coagulates milk. Forms gas.

II.

Fourth day.—The gelatine tubes show a growth in the whole course of the stitch, with a rather smooth edge, the growth transparent and not liquefying. One inclined agar tube shows a faint growth. The other none.

Fifth day.—Growth more marked. Tubes placed in incubator at 20° C.

Sixth day.—No surface growth: the stitch transparent, edges smooth and filmy. Agar growth very indefinite.

Seventh day.—Gelatine tubes show increased growth: the edges filmy and wavy. No liquefaction.

Discoloration in Canned Lobsters.

Eighth day.—The stitch is wide, the edges more undulating and filmy. No liquefaction.

Agar, very fine wide transparent growth, quite marked in both tubes.

Ninth day.—Gelatine not liquefying, no surface growth: stitch retains its characteristics. Agar growth more visible.

Tenth day.—Gelatine tubes: growth more marked.

Eleventh day.—Cupping of surface. Agar, growing.

Twelfth day.—Agar, very fine transparent colonies: confluent and glistening, Gelatine, cupping of surface, no surface growth, stitch wider, wavy border with lateral offshoots which are fine and filmy. During the next three days the cupping becomes more marked, the stitch wider, the border more wavy and the offshoots prominent, but no liquefaction. The agar tubes exhibited the same characteristics.

Microscopic examination: pure culture of cocci, in chains and clusters, the chains very fine, simulating spore-forming bacteria, the clusters composed of from three individuals to a mass impossible to count.

Coagulates milk: grows in hydrogen.

III.

No growth at room temperature. The tubes were placed at 20° C., where they remained for four days, when growth was visible in agar, there being ten colonies upon the surface of one tube and twelve on the other. The colonies, large and distinct, with a dark centre and transparent border. The agar tubes were placed at 37° C. when the growth became very rapid, the colonies confluent, and exhibiting one wide transparent growth with sinuous borders. From this a gelatine tube was inoculated and in two days showed a distinct growth, with a wavy border, translucent, but none upon surface. In two days more, one colony appeared upon the surface of the gelatine tube and the stitch was white and dense with here and there offsets radiating outward in long transparent points. After ten days, the gelatine began to liquefy.

Microscopic examination: pure culture, a fine long rod, straight or very gently curved, the individuals with no special relation to each other, but in many cases joined end to end, to form very long, straight, and wavy threads, at least ten times the length of the single rod. The rod shows refractive bodies not to be distinguished from spores.

This organism, when examined in the hanging drop, is slowly motile and shows a nail-shaped head, dark and round, the tail undulating slowly. In a young growth no threads are visible. During eighteen hours, the same hanging drop was kept under observation upon a warm stage, when end spores appeared in nearly every rod and motion still persisted. A cover glass preparation was made from this hanging drop, the rounded end had lessened in size under the process of staining, but free spores were observed, and some just breaking from the organism.

Coagulates milk. Grows in hydrogen.

IV.

Fourth day.—Gelatine tubes show a depressed surface with pale smeared growth. The stitch is wide above and curves to a point below, as a series of small discrete yellow colonies in a line.

Sixth day.—Surface smeared, depressed, stitch growth sunk downward, leaving a globule at the top, joining with the stitch which tapers to a point.

Seventh day.—Surface growth, glistening, radiating with distinct edges, transparent. Stitch descending, globule becoming larger, colonies at bottom, still distinct and tapering to a fine point.

Eighth day.—Extensive transparent growth on surface; upper part of stitch trumpet-shaped for one-fourth of its length, remainder conical, the bottom composed of distinct colonies.

These characteristics became more marked till the twentieth day, when the gelatine was completely liquefied.

This organism forms gas, coagulates milk and grows in hydrogen.

Microscopic examination : pure culture, fine short rods, straight, single or in pairs, lying at an angle with each other. No spores visible ; many cocci-like forms ; of the rods, the length is almost uniform.

In hanging drop this bacillus is actively motile. The four micro-organisms were stained, mounted permanently and photographed. The tubes were all drawn to scale in colour.

A chemical examination was undertaken to determine the products of their growth, and up to the present there have been isolated,

Indol,
Butyric acid,
Lactic acid.

Sulphuretted hydrogen, and
Carbon-dioxide.

Methylamine, and dimethylamine.

The following observations were made incidentally. Upon the paper linings, concretions were found ; these were composed of sodium, chloride, calcium chloride, tyrosin and epithelial cells. The jelly like covering of tissue in cans so much desired is due to fat tinged with pigment. Add ether, evaporate ; there are left fat drops tinged with pigment and "feathery phosphate of lime." No fat crystals were obtained by filtering through a wet filter

THE REMEDY.

Even if as yet we were apparently no nearer to the end, namely the providing of a remedy for all these evils we at least had a clear view of the problem.

1. The various forms which the deterioration assumed were observed.
2. The various causes of it were ascertained.
3. The degree of dependence of one cause upon another was determined.

The case might be stated thus. The deterioration was proved to be due in the main to putrefaction, and putrefaction to be due to the operations of micro-organisms. These micro-organisms could only be destroyed by heat, but it was experienced in the past that when a sufficient heat to destroy them was employed, the tin plate also was liable to be damaged and chemical changes at once ensued which became more marked as time went on. Therefore we now come to the main question.

What means are to be employed by which lobsters may be placed in cans with the assurance that they will retain their good qualities of flavour, texture and appearance for an indefinite period and under all climatic conditions ?

The use of germicidal fluids such as salicylates, borates and others with germicidal properties may be dismissed at once. In many cases they are poisonous and in most cases they injure the quality of the food-stuff to which they are applied. In the preservation of lobsters, such poisonous substances find no useful employment.

The only process that remains is the use of heat as a sterilizing medium, but that heat must be applied in such a way as not to injure the quality of the medium or the can in which it is contained. At the same time it must be sufficient to destroy all bacteria and their spores.

The general principles underlying the sterilization of media were first enunciated by Professor Tyndall in 1878. He says: "I had several cases of survival of bacteria after four and five hours boiling. Thus far has experiment actually reached, but there is no valid warrant for fixing upon even eight hours as the extreme limit of vital resistance. Probably more extended research would reveal germs more obstinate still. An infusion infected with the most powerful resistant germs but otherwise protected against the floating matters of the air is gradually raised to the boiling point. Such germs as have reached the soft and plastic state immediately preceding their development into bacteria are thus destroyed. The infusion is then put aside in a warm place for ten or twelve hours. We then raise the infusion a second time to the boiling temperature which as before destroys all germs then approaching their point of final development. The infusion is again put aside for ten or twelve hours and the process of heating is repeated. We thus kill the germs in the order of their resistance and finally kill the last of them. No infusion can withstand this pro-

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cess, if it be repeated a sufficient number of times. By this method of discontinuous heating, three minutes were sufficient to accomplish what three hundred minutes continuous boiling failed to accomplish."

Professor Tyndall also pointed out that a temperature much less than 100° C. or 212 degrees Fahrenheit may suffice to destroy bacteria and it was this principle which Pasteur worked upon and to which the name of Pasteurisation is applied.

A degree of heat which will destroy bacteria is entirely insufficient to destroy their spores. Many bacteria will not grow if the temperature is as high as that of the human body. Some will live at a freezing temperature while the spores of others may resist the action of boiling water for five or six hours. As a matter of fact, the packers have proved by years of costly experiments that an exposure of two hours and a half to a temperature of boiling water will not in many cases destroy all the spores which infest the lobster tissue.

Having in mind the prominent part which bacteria were proved to play, it remained to apply the principles of sterilization as laid down by Tyndall to the preservation of lobsters. That is to say, the degree of heat to be employed, the duration of the application and the number of successive exposures to destroy the bacteria. Ordinarily, this is done by heating a test-tube containing the bacteria in a water bath and noting the results. But the temperature conditions in an open test-tube are entirely different from those which one finds in a sealed can filled with a solid material. Therefore, as a preliminary measure it was necessary to determine the length of time required to raise the temperature of the contents of a sealed can to the temperature of the medium in which that can is immersed. To this end, an apparatus was constructed, consisting of a can through the cover of which a well closed at the bottom, was introduced into the interior. An air chamber was soldered on top, pierced so as to allow a thermometer to be carried down the well, which was filled with oil, into the can. The can was now filled with lobster and sealed. The apparatus was then placed in a vessel of water which was kept at 100° C.

The following table shows the result:—

" HALF-POUND FLATS."	
Time in Minutes.	Temperature C.
5.....	22
10.....	44·5
15.....	54·5
20.....	65·
25.....	76·5
30.....	86·
35.....	92·
40.....	94·5
45.....	96·
50.....	97
55.....	97·5
60.....	98·

" POUND FLATS."	
Time in Minutes.	Temperature C.
5.....	32
10.....	50
15.....	56
20.....	68
25.....	78
30.....	85
35.....	90
40.....	94·2
45.....	97
50.....	99
55.....	100
60.....	100

From this table it appears that it requires at least half an hour to raise the contents of a can to near the boiling point, allowing for radiation and imperfections in the apparatus. It would be easy to determine the time with scientific accuracy with a platinum electro-thermometer, but an instrument of this delicacy was not accessible and the above results are sufficiently accurate for practical purposes.

From the experiment of Pasteur, it was shown that many forms of bacteria are destroyed by a temperature of 57 degrees C. applied for half an hour, and that if this were repeated *three times*, the medium became sterile. From test-tube observation, it was observed that the bacteria of the lobster was not of so delicate a constitution and the heat with which we commenced was 80 degrees, applied *three times* at intervals of 24 hours. All the cans so treated were a failure. Next 85 degrees was used, this also failed. Then a temperature of 90 was employed; some of the cans so treated remain good up to the present time, while cans treated with 95 nearly all remained good. With special precautions, a temperature of 95° C. equal to 204° Fahrenheit will suffice. But as it is not possible in practice to convert a lobster factory into a bacteriologic laboratory, the problem ever present was to simplify the process. If 95 was accepted as the standard, it would involve the use of the thermometers and automatic temperature regulators. If a temperature of above 100° C. or 212° Fahrenheit was adopted, it would necessitate the use of autoclave retorts which very few factories possess, and which are beyond the reach of many worthy men. Therefore, all experiments were continued at a temperature of 212 degrees or that of boiling water, which yields excellent results. If it is theoretically less perfect than a temperature of 195 degrees, it is attended with no such risks as might be associated with the employment of lower temperatures. Following these lines, and acting upon the information thus gained, a fresh pack was made and the observations upon sterilization resumed. It is not necessary here to mention the series of failures which led up to satisfactory results. There were four factors to consider: the degree of heat, the time of exposure and the interval between them. From a full consideration of all these, we conclude as follows in the case of pound cans:—

1st. Apply the temperature of boiling water for one hour.

2nd. After 12 to 15 hours, apply the same heat for 50 minutes.

3rd. After another 12-15 hours, apply the same heat for 40 minutes.

This makes two hours and a half immersion in boiling water, but from the table it appears that it takes about half an hour each time to bring the contents of the cans to the same temperature as the medium in which they are immersed, that is, one hour and a half so that the lobster tissue has less than an hour's boiling divided into three separate periods of twenty minutes each.

4th. As a special precaution, in very warm weather, or in very badly infected localities, it is advisable to give a fourth boiling of 30 minutes at the expiration of another 12 hours.

In the case of half-pound cans, the time may be reduced to fifty minutes, forty minutes and thirty minutes. Cans treated in this way have all remained perfectly bright for 15 months, the fish is firm and white, the skin brilliantly red and the flavour as good as in fish fresh from the shell. Indeed, the only "defect" that can be pointed out is that the flesh is rather hard. This is due to the fact that it is under-boiled, and would permit of being heated again by the cook before serving. It has in fact been boiled for less than an hour.

In warm weather, the cans require to be cooled rapidly after each boiling. This can best be done by the application of ice, but a stream of cold water will do equally well. They should be kept cool by the frequent application of cold water in the intervals between boiling. Those who keep them coolest will get the best results.

CLEANSING THE CANS.

There is very little profit in keeping the lobster tissue free from contamination, if the cans themselves are not cleansed. No cans, as they come into the factories are clean enough for use. Those which have been soldered with rosin have a layer of that substance upon the bottom, when heat is applied the rosin volatilizes and permeates the

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meat with its odour. Workmen have a habit of carrying the cans by placing their fingers inside and grasping four at a time. If they have been using flux and solder the stains are transferred to the bright tin.

It has been already pointed out that the best flux for making cans is acid because it is clean. If rosin has been used, the excess must be removed by turpentine. The whole inside of the can is to be thoroughly rubbed with some cleansing material such as hot soap and water, a solution of soda or perhaps best of all a cloth moistened with methylated spirits. A gallon will suffice for a hundred cases. It would be easy to arrange some kind of revolving brush which might be kept moist with the solution. The cans are next to be passed through clean, fresh water and wiped dry. Then they are to be kept clean by turning mouth down upon a clean table. The covers are to be treated in the same way.

When the meat is removed from the shell, it is to be received in pans which have previously been washed in boiling water. The claws and arms are to be washed in fresh well water, upon no account in sea water. Those who are anxious to obtain the best results, will make the last washing in water which has been boiled and cooled. The tails should be split upon the front and every trace of the gut removed; if this precaution is neglected, no good results can be expected. The meat should be gently pressed and allowed to drain quite dry, being covered over with pieces of cotton just removed from boiling water. It is then to be placed in cans, directly by hand. If a cylindrical machine is used it should be boiled immediately before using.

It is quite useless adopting these precautions unless the hands of the employees are clean, and packers who value their results, will attend to this procedure, though it may appear to be an unnecessary refinement.

REMOVING THE AIR.

In the section upon sealing, it was pointed out that to facilitate the process, a small hole should be left in the cover, and that before this hole is closed the cover should be pressed down as closely as possible to the contents, that, in short, the can should be concave, for this is all the "concaving" the can is to receive. This can perhaps best be done by means of a lever worked by the foot.

We next come to a matter of equal importance, the removal of the air from the can after the first bath by puncturing the tin. In a word, it may be said, not only that this process is useless, but a long series of investigations proves that it is one of the main causes of deterioration. If a series of cans packed in the ordinary way be opened immediately after the second bath, the following condition may be found in nearly all cases. There is a purplish discoloration upon the inside of the cover, extending down the side in a limited area and over the inside of the bottom of the can. In marked cases, it is of an intense metallic hue and often arranged in a beautiful pattern. This discoloration appears instantly and has no connection with bacterial activity. The origin and remedy for this condition were discovered during a separate line of investigation, of which the following are details.

It is well known that some forms of bacteria thrive only in the absence of air: now, the process of probing the cans would create that very condition. If the bacteria found in the cans are of this nature, it follows that this practice merely creates the conditions favourable to their growth. To test this reasoning, a can was filled with lobster meat, it was boiled for an hour and a half, it was not probed but was boiled again for another hour. When this can was opened, to test its sterility, to our gratification and surprise it was found entirely free from discoloration. It may further be said that up to that time, its nature and origin had baffled every effort at analysis. This occasion however, was seized and to determine the conditions under which this blackening occurs, the following experiments were made:

Five cans were taken, and treated as follows:—One was sealed empty, one was filled with distilled water, one with a saturated solution of common salt and water, one with lobster meat, and another with the same material. These were numbered respectively, one, two, three, four, five. They were all boiled for one hour and a half at

a temperature of 100° C., and then allowed to cool. Number five was probed and all were returned to the bath for another hour and a half at the same temperature. Upon examination, number one was found unchanged, number two was very slightly rusted, where the raw edge of iron came in contact with the water, number three was more rusted, number four was unaltered, but number five, the one which had been probed, showed the discoloration above referred to.

Four hundred cans were then packed and heat applied of 100° C. for periods varying from 1½ to 3 hours and in no case did this discoloration appear when the cans were not probed. Again, all packers state this discoloration appears only after the second bath, that is after the cans have been probed. If then, this defect is caused by probing, as is clear, it remained to consider how cans might be packed without having resort to this practice which is universally employed.

Upon further examination of the question, no reason can be discovered for this practice. Flasks of media from which the air is not expelled are kept from putrefying in laboratories for years, if only that air is free from germs, and further, air is allowed to enter those jars with no ill effect if only the air is filtered through cotton wool to free it from germs. Therefore, in all subsequent work, the cans were not probed and this is an essential part of the process,

The sign of deterioration most readily observed is a bulging outwards of the ends of the can. There is reason in this since this bulging is due to the accumulation within of the gases incident to putrefaction, as a result of bacterial activity. If now the cans are not probed, they will be less concave than usual and will simulate blown cans. This appearance may be reduced by pressing the cover well down in the centre, before soldering the air hole. The force of this objection was anticipated, and, absurd, as it may seem, to explain this appearance was one of the reasons for an extensive visit to the English market, as will afterwards appear.

The old test of tapping the cans with a piece of metal has always been an imperfect one, in future, it will be equally imperfect, but it will be unnecessary since no can will blow if properly packed. In any case the objection is disarmed since it is explained that no extreme degree of concavity is required. On the contrary, a highly concaved can, in future, is to be regarded as a can which will probably develop "smut."

On the 25th of August last, the results were submitted to the Minister of Marine and Fisheries and to Professor Prince in Ottawa. It was then admitted that if lobsters could be placed upon the market of the same quality as those submitted, and if they would retain under all conditions of climate and season, the qualities therein observed, of colour, texture, flavour and general daintiness of appearance, the problem would be solved. The question asked was, "Will they so keep?" and the answer, "Time alone can settle." We have now the experience of fifteen months, and after that period no deterioration is observable.

From the time that some degree of success began to attend our efforts, samples were regularly submitted to experienced packers for criticism of the quality. This examination was continued for a period of five months. The samples were found satisfactory, "if they would only keep." To test the keeping qualities, the following procedure was adopted. A number of cans were placed in an incubator, which was kept at a temperature of 37 degrees C. equal to 100 degrees Fahrenheit constantly for two months. The cans were shaken from time to time to imitate the conditions they would have to encounter upon a sea-voyage. At the end of the test they were examined, and no deterioration was observed. At the present time, cans fifteen months old were opened and no signs of alteration can be detected.

Throughout the whole inquiry, we have been guided only by facts proven to be so, we have actual evidence that cans remain in perfect condition for over a year: every day increases our knowledge as to how long they will so remain. There is, however, nothing to show that they will not remain in perfect condition for an indefinite period.

Having knowledge of the fact that a large market and particularly the English market is very conservative as to the introduction of new processes, the Minister of Marine and Fisheries considered it advisable that personal interviews should be had with the principal importers in England. At the same time, some bacteriological

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problems were to be further dealt with in the Laboratories of the Conjoint Board of the Royal College of Physicians, London, and the Royal College of Surgeons, England, the Director of which, Dr. Sims Woodhead, afforded every opportunity for work. This portion of the work is considered in another section.

Accordingly, he directed me to proceed to London on the 15th December, where communication was had with the High Commissioner for Canada. It is worth pausing to refer to the admirable arrangements which were effected by Sir Donald Smith and the Secretary of the Commissioner, Mr. J. G. Colmer, C.M.G. These gentlemen wrote to as many importers as could be waited upon and without exception they expressed a willingness to aid us with advice and criticism. They redeemed their promise to the fullest extent. Lack of time alone prevented me from availing myself of the co-operation of the Liverpool dealers.

Interviews were had; test cans were opened and examined. The needs of the English market were considered. An opinion and criticism of the product were obtained. This opinion and criticism, judiciously intermingled, is contained in the following letters to the High Commissioner, whose Secretary, Mr. Colmer, so capably conducted the correspondence. This is also a fitting place to make mention of the willing aid given by Mr. L. Wurzburg and Mr. Weston, of Messrs Powell Bros. & Co., and Mr. Fowke, whose knowledge made the way easy.

In the following letters only some personal matters are omitted to bring them into harmony with a formal report, and it is thought best not to interfere with the text of the letters. They are submitted in the sense in which they were written, as an expression of opinion by competent judges upon what they had seen. Their judgment, however, need bind no one; any packer may satisfy himself by repeating the experiments in canning according to the method here set down.

POWELL BROS. & Co.,

No. 27 MINCING LANE, LONDON, January 14, 1897.

Sir DONALD A. SMITH, K.C.M.G.,
High Commissioner for Canada,
17 Victoria St., S.W.

SIR,—Dr. Macphail has submitted to my inspection several samples of 1 lb. Flat Lobsters, which he informs us were packed by him in June last.

The fish was perfectly clean and bright, while there was absolutely not a trace of "smut" or black, nor was the can in any way discoloured by the action of acid on the tin plate, and we might add that the flavour and texture of the meat left nothing to be desired. We are the more surprised at this, as Dr. Macphail informs us that these samples were packed in a district noted for the great percentage of cans which develop black and "smut."

Should Dr. Macphail have found a means of canning lobsters simple to every packer, which absolutely does away with smut in the can, or the lobsters turning black, it will be of inestimable benefit to the whole industry.

We have the honour to remain, Sir,
Your most obedient servants,

POWELL BROS. & CO.

CROSSE & BLACKWELL, LIMITED,

LONDON, January 12, 1897.

Sir DONALD SMITH,
Victoria Street, S.W.

DEAR SIR,—We had the pleasure of a visit from Dr. Macphail yesterday, when he showed us a tin of lobsters preserved by an improved process. The appearance and quality were excellent and showed a marked improvement upon the qualities shipped here for some years past.

We hope that the Canadian Government will follow out these experiments and so revive a large and important industry which has been gradually diminishing for some years, on account of the uncertain out-turn of the tins.

We are, yours faithfully,
THOMAS F. BLACKWELL.

No. 4 FENCHURCH BUILDINGS,

LONDON, E.C., January 7, 1897.

The High Commissioner for Canada,
No. 17 Victoria Street, S.W.

SIR,—We have seen to-day a can of lobsters preserved by Dr. Macphail during the first week of June last. We understand that these lobsters were taken on the shore of Prince Edward Island, a district notorious for producing hitherto a quality always more or less deteriorated by the presence of so-called black smut and inferior flavour.

The can opened before us was not only absolutely free from the defect just referred to, but the colour, tissue and flavour of the meat resembled the fresh article in a remarkable degree, quite unattainable by the present methods of canning the crustacea.

If this process can, as we are assured, be adapted in the factories without incurring great additional expense, the business in this article will not only, as a natural consequence become more satisfactory to everybody concerned, but very large sums of money will annually be saved, which hitherto have been lost either through depreciation or confiscation and complete destruction of many parcels shipped to Europe.

It seems to us that Dr. Macphail has solved the problem in a manner which must far surpass the most sanguine expectations which might have been entertained.

We have, etc.,

M. L. WURZBURG & CO.

E. LAZENBY & SON, LIMITED.

No. 18 TRINITY STREET,
LONDON, S.E., 14th January, 1897.

To the High Commissioner for Canada,
No. 17 Victoria Street, S.W.

SIR,—We were favoured with a visit from Dr. Macphail on Monday last, when he showed us samples of canned lobsters, packed by himself, some eight months or so ago. As far as we could see, there was not the slightest trace of discoloration, either on the fish or in the interior of the tins in which it was packed.

Dr. Macphail's system of preserving seems to have been perfectly successful, and if it is a practical one, great benefit should be derived from it by canners and others interested in the trade, for undoubtedly great harm has been done by the numbers of tins that come to this country every season, the contents of which are either wholly or partially discoloured.

We are, sir, your obedient servant,

E. LAZENBY & CO., LTD.

HENRY W. PEABODY & Co.

No. 5 EAST INDIA AVENUE,
LONDON, 15th January, 1897.

Sir DONALD A. SMITH,
High Commissioner for Canada,
Victoria St., S.W.

SIR,—We yesterday had an opportunity of inspecting a sample of canned lobsters packed by Dr. Andrew Macphail with a view of showing how the pack of these goods can be improved in Canada. That there is a very great necessity for improvement in

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the present methods is an undoubted fact, especially so far as fish put up in Prince Edward Island, New Brunswick and parts of Nova Scotia are concerned. In consequence of the uncertainty of the out-turn of the goods from these districts, we may say that it is now customary here for buyers to inspect and sample a large proportion of each parcel before buying, necessitating considerable expense and loss of cans to the packers. The sample which Dr. Macphail submitted to us opened as near perfect as possible with regard to flavour and appearance, and if fishermen can be educated to pack lobsters on the basis of Dr. Macphail's investigations, the demand in this country for canned lobsters will be increased.

Prices now obtainable for the high-class goods packed on the south shore of Nova Scotia and in Newfoundland would no doubt also be paid for lobsters put up under this system in Prince Edward Island and other parts of Canada, where it has always been claimed that in consequence of the shallow water and muddy bottom, it has been impossible to can lobsters to the same perfection as in the districts referred to above.

We are, sir,

Your obedient servants,

HENRY W. PEABODY & CO.

A. W. LATHAM & Co.

No. 17 PHILPOT LANE,

LONDON, E.C., 12th January, 1897.

To the High Commissioner for Canada,
Victoria Chambers, Victoria St., S.W.

DEAR SIR,—We have to-day had the pleasure of seeing Dr. Macphail, of whose visit you advised us by your letter of the 7th instant, and who has submitted to our judgment, a sample can of preserved lobsters, which he tells us were processed according to his own system, and we can but say that we are very pleased with the appearance of the fish, which has retained its brightness of colour, and freshness of flavour, and considering that he has used the poorest kind of lobster found in Prince Edward Island waters, we would say that provided the saltiness is got rid of, the result ought to be a very desirable article, when fish is used, caught on the Atlantic Coast of Nova Scotia or Newfoundland.

We think the Canadian Government has taken a step in the right direction, in commissioning these scientific gentlemen to investigate and improve on the present methods of canning, and thereby free the industry from many of its imperfect productions, and we, as interested parties, sincerely hope that they will see fit to continue these researches, and so help to make canned lobster, a sound, safe and wholesome article of food, which is at present by no means altogether the case.

We shall be glad to receive a copy of Dr. Macphail's printed report of the result of his experiments, and we remain.

Yours faithfully,

A. W. LATHAM & CO.

W. & D. HARVEST.

DOWGATE DOCK, UPPER THAMES STREET,

LONDON, E.C., 12th January, 1897.

The Honourable

Sir DONALD A. SMITH, G.C.M.G.

DEAR SIR,—With further reference to your letter of the 7th inst., we have to-day seen Dr. Macphail, and after an exhaustive examination of his process of preserving canned lobster, and also of the results of such process, we have come to the conclusion that his experiments will result in great benefit to the packers, dealers and consumers of this, up to now, unprofitable article of commerce, and beg to remain.

Yours most respectfully,

W. & D. HARVEST.

SAMUEL HANSON, SON & BARTER.

No. 47 BOTOLPH LANE,
LONDON, E.C., 12th January, 1897

Sir DONALD SMITH, G.C.M.G.

DEAR SIR,—We must express our satisfaction on finding the Canadian Government propose to take steps to improve the process of canning lobster, and we were pleased to see Dr. Macphail and hear his explanations as to the causes which give rise to the present unsatisfactory state of things.

We were favourably impressed with a sample shown to us by Dr. Macphail, which had been packed in a district from which we have, of late, received lobster of a poor quality.

If this is an indication of what can be done by careful and scientific process, then, all we need say is, that no time should be lost in bringing it under the notice of the packers.

Believe me, dear sir, yours faithfully,

SAMUEL HANSON, SON & BARTER.

JOHN PITCAIRN & SONS.

No. 7 UNION COURT, OLD BROAD STREET,
LONDON, 15th January, 1897.

Sir DONALD A. SMITH,
High Commissioner for Canada,
Victoria street.

DEAR SIR,—I had the pleasure of seeing to-day some of the cans of lobsters packed by Dr. Macphail. It is my opinion they are far superior to anything I have seen packed in my experience of ten to fifteen years.

The appearance, flavour, taste are excellent, and in my opinion is all that can be desired. If goods can be packed like these, the serious difficulties we have had in the past will be overcome and hundreds of thousands of dollars will be saved to the packers and exporters.

I remain, yours respectfully,

G. H. TOOMBS,
of Charlottetown, P.E.I.

JOSEPH TRAVERS & SONS.

No. 119 CANNON STREET,
LONDON, E.C., 15th January, 1897.

Sir DONALD SMITH,
High Commissioner for Canada,
No. 17 Victoria Street, S.W.

DEAR SIR,—We have pleasure in reporting on the improvements in lobster packing, as suggested by Dr. Macphail.

We are glad to learn from Dr. Macphail that the lobster which he showed us had been packed in a district where the fish which turns black in the tin is more frequently found, and we consider that his experiment with this description of lobster showed a decided improvement on the method of packing at present in vogue, particularly, as far as the color of the lobster was concerned.

We suggested to Dr. Macphail, that the flavour was in our opinion, not equal to the standard of some of the fine qualities of Newfoundland particularly, nor do we think that the fish in its present form, would immediately take the place of the fine quality that we referred to.

Discoloration in Canned Lobsters.

We are criticizing Dr. Macphail's process from a very high standard, which we understood from him was what he wanted. An important difficulty connected with his process, which Dr. Macphail pointed out, was the sounding of the tins, which was very similar to the sound emanating from the tin when it is what is known, to the trade, as "doubtful," which means that it is expected, sooner or later, to become "blown" or "swelled," the latter being the American phrase for this condition, and it would probably take some time to remove this prejudice, if this system were adopted; but we are of opinion that it would ultimately be overcome, provided the new system of packing was regarded by the trade as being successful in other particulars.

We are glad to hear from Dr. Macphail that his principle includes an improvement in the grading of lobsters, which has been a great difficulty with distributors and also must have been very detrimental to the general welfare of the trade, and we should be heartily glad to hear that he has been able to introduce a system which would enable us to depend on the regularity of the quality.

We are also glad to hear that the improved method would enable the trader to guarantee the lobsters to be sterilized and absolutely degerminated, which we think would provide distributors with a very strong argument for the purposes of pushing the trade and ought to result in an improvement in the consumption. We repeat that we pointed out to Dr. Macphail, that the consumers in this country wanted nothing better than what is packed at present by some of the best canners, and if he is successful in bringing the commoner qualities up to this standard, the result would undoubtedly be a perfect success.

The important points to be always borne in mind are, that the fish must be perfectly free from black smuts, that the liquid in the can should be as small a proportion as possible, that the meat should be as little broken as possible, and that the parcel should be graded uniformly.

We should be glad to know if we should be able to print on our labels that lobsters packed under this new system would be guaranteed by the Canadian Government to be absolutely free from all obnoxious germs or poisonous matter of any kind, and we think if the system were advertised as a new one backed up with this guarantee, it would remove a great deal of the prejudice which has been brought about through lobsters of indifferent qualities and also improperly processed having been sold.

We shall be glad to hear of Dr. Macphail's success, and we are quite willing to support any new idea, which is in the nature of a permanent improvement.

We are, dear sir,
Yours faithfully,

FOR J. TRAVERS & SONS, LTD.
E. BOWEN.

AUSTIN, NICHOLS & Co.,

NEW YORK, December 14, 1896.

The Honourable the Minister of Marine and Fisheries,
Dominion of Canada.

DEAR SIR,—At the request of Dr. Macphail we examined a sample of lobster canned by him experimentally to show the quality of fish which can be produced under a special process on which he has been experimenting.

We take pleasure in stating that we consider this finer in quality, the fish being firmer, of a better colour and more desirable than the average quality of canned lobster that we receive from the Dominion. Lobster, if canned equal to this sample, would command a higher price in our market, than such goods as we have been receiving from the Dominion for the past few years.

Respectfully yours,

AUSTIN, NICHOLS & CO.

The buyer for one American firm was not prepared to give an expert opinion upon the product till he would have an opportunity of examining many samples packed a long time. The communication of the Cunningham & De Fourier Company has already been alluded to.

CONCLUSION.

I have merely stated facts and given results, and have purposely refrained from giving "views" or "theories." The interests of a trade involving three and a half million dollars are not to be put in jeopardy for any theory no matter how closely reasoned. I have stated the causes of the deterioration, I formulate below the measures to be taken to prevent it, and have shown examples of what could be thus effected. I have added the opinions upon the product of men who have seen it and who are well qualified to judge. It now remains for each individual to judge for himself and decide whether he will put the matter to the test upon his own responsibility. In the course of a year's operations I have come in contact with so many men and received encouragement and assistance from them, that it is impossible even to mention them all by name. In Prince Edward Island the thanks of the whole industry in so far as any good may be accomplished are due to Messrs. Matheson, Grant, Hazard, Tidmarsh, Farquharson, MacNutt, and Longworth.

Last of all, it may not be out of place to say that while at times the perplexities of the inquiry were great, they would have been greater had it not been for the scientific enthusiasm of the Commissioner of Fisheries, Professor Prince, and for the liberality of spirit and generosity of hand experienced from the Honourable the Minister of Marine and Fisheries.

ABSTRACT OF METHOD RECOMMENDED FOR THE CANNING OF LOBSTERS, ON THE BASIS OF THE FOREGOING INQUIRY.

1. Boil the live lobsters twelve to fifteen minutes in sea water which is renewed daily. Page 18.
2. Cool on lime washed tables and break off as soon as possible. Page 15.
3. Pull the tails, remove the meat from arms and claws. Place separately in pans which have been cleansed in boiling fresh water. Page 15.
4. Front-split the tail, remove every trace of gut, wash off green gland in cold fresh water. Page 15.
5. Wash a second time in fresh water which has been boiled and cooled. (If the fresh water is taken from a fresh spring or deep pure well, this boiling is unnecessary.)
6. Place in earthenware dishes and cover with clean cotton which has just been boiled in fresh water. Allow to dry. Page 15.
7. Wash the claws in the same way removing all coagulated blood and drain dry.
8. Cleanse all cans, removing rosin with turpentine, and all other stain with methylated spirit or other suitable fluid, wash in cold fresh water and wipe dry with clean cloth. Do not touch inside of cans afterwards with fingers. Pages 24 and 25.
9. Insert linings which must be kept free from dust in the original packages.
10. Place the salt in the can one to two teaspoonfuls to the pound, salt to be of the best quality.
11. Place the lobster in the cans by hand, handling the meat as little as possible, with absolutely clean hands. Let the meat be quite dry.
12. Cover, wipe, and seal at once.
13. Concave the cover as much as possible before the blow-hole is sealed, by pressing down the middle. Page 25.
14. Bathe at once, the pound cans, fifty minutes to one hour, the half-pound cans, forty-five to fifty minutes. The water to be fresh, renewed daily and must be boiling vigorously. Pages 17 and 24.
15. Remove and cool. Do not probe. Keep cool. Page 26.
16. After twelve to fifteen hours, bathe again, the pound cans fifty minutes, the half-pound forty minutes.

Discoloration in Canned Lobsters.

17. Remove and keep cool. Do not probe. Keep cool.
18. After twelve to fifteen hours bathe again, the pound cans forty minutes, the half-pounds half an hour.
19. Remove and keep cool, do not probe.
20. In very hot weather repeat No. 18 after another twelve hours. Page 24.
21. Do over any leak and treat as a fresh can.
22. Before commencing "scald" in fresh hot water all vessels, tables, knives, forks, cloths, &c., which are likely to come in contact with the meat.
23. Let the shortest possible time elapse between breaking off and packing and between sealing and bathing. Bathe in small lots rather than wait till the day's catch, if large, is sealed.
24. Allow no bodies, refuse or other offal to accumulate about the factory or to be thrown into the water around it. Factories built in the water should have a free clean flow at every tide: those built on shore are to be kept clean as above mentioned, within and without.

REPORT

OF THE

JOINT COMMISSION

RELATIVE TO THE

PRESERVATION OF THE FISHERIES IN WATERS CONTIGUOUS

TO

CANADA AND THE UNITED STATES

(Submitted December 31, 1896)

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

PRINTED BY S. E. DAWSON, PRINTER TO THE QUEEN'S MOST
EXCELLENT MAJESTY

1897

Joint Fisheries Commission.

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Joint Fisheries Commission.

CORRESPONDENCE

RELATIVE TO

APPOINTMENT OF JOINT COMMISSION

Mr. Foster to Mr. Herbert.

DEPARTMENT OF STATE,
WASHINGTON, October 4, 1892.

SIR,—As the result of our several recent conferences on the subject of giving effect to so much of the understanding reached in concert by the Secretary of State and the delegates of the government of the Dominion of Canada on February 15 last, as relates to the prevention of destructive methods of fishing in the contiguous waters of the United States and Canada, and the preservation of the fisheries thereof, I have now the honour to submit the views of this government in the matter, to the end of reaching a formal agreement thereon.

The proposition of February 15, 1892, in this regard was that a commission of two experts should be appointed—one by the Government of the United States and one by the Government of Great Britain—to consider and report to their respective governments, either jointly or severally, as to the restrictions and regulations which should be adopted on the following subjects:

(1) The prevention of destructive methods of fishing in the territorial and contiguous waters of the United States and Canada, respectively, and also in waters outside the territorial limits of either country.

(2) The prevention of the polluting and obstructing of such contiguous waters to the detriment of fisheries and navigation.

(3) The close seasons which should be enforced and observed in such waters by the inhabitants of both countries; and

(4) On the subject of restocking and replenishing such contiguous waters with fish ova and the means by which fish life may be therein preserved and increased.

I deem it convenient thus to quote in full the text of the tentative understanding of the general scope and direction of the inquiries to be jointly set on foot, and as the groundwork upon which to essay a fuller and more precise international agreement.

The several lines of inquiry having relation to the different aspects, whether general or particular, of the questions so presented fall, as far as this government is concerned, within the purview of the operations conducted for a number of years past by the United States Commission of Fish and Fisheries, which, in its investigations, and in the practical application of its methods and making use of the extensive establishment and ample means appropriated by Congress, has massed a stock of information, much of which may be found available for the purpose of investigation and recommendation for which the joint commission is proposed to be organized. I am advised that the United States Fish Commission has within itself the resources in men and means to conduct such further inquiries in relation to the

statistics, methods and condition of the fisheries in question as the joint commission, or the American representative thereon may indicate as desirable for their information.

A similar fish commission is understood to exist in the Dominion of Canada, and to have pursued like valuable investigations and practical operations for a number of years past.

The necessary machinery and a large part of the data for the proposed joint investigation appear, therefore, to be already at the command of the Government of the United States and Her Britannic Majesty's Government without the necessity for creating other or independent methods for accomplishing the purpose in view by convention or coincident legislative appropriation. As the subject is to arrive at such concurrent recommendations as may commend themselves to the good judgment of the respective governments and open the way, in case of accord thereon, for a formal conventional agreement in promotion of the mutual interests of their respective citizens and subjects as regards their equal and common benefit in the conservation of food-fishes in the territorial and contiguous waters of the United States and Her Britannic Majesty's possessions in North America, it seems most desirable for the two parties to avail themselves in common, so far as may be practicable, of the means already at hand in order that the end in view may be the more speedily attained.

That this may be conveniently accomplished, I have the honour to propose for the consideration of Her Britannic Majesty's Government the following bases for an agreement to be reached by diplomatic exchange of notes :

I. The Governments of the United States of America and of Her Majesty the Queen of the United Kingdom of Great Britain and Ireland agree that a commission of two experts shall be appointed, one on behalf of each government—either jointly or severally, or jointly to both governments, with regard to matters in which they may be in accord, and severally to their respective governments with regard to matters of non-concurrence—concerning the regulations, practice, and restrictions proper to be adopted in concert, on the following subjects, viz. :

(a.) The limitation or prevention of exhaustive or destructive methods of taking fish or shellfish in the territorial and contiguous waters of the United States and Her Majesty's possessions in North America, respectively, and also in the waters of the open seas outside the territorial limits of either country to which the inhabitants of the respective countries may habitually resort for the purpose of such fishing.

(b.) The prevention of the polluting or obstructing of such contiguous waters to the detriment of the fisheries or of navigation.

(c.) The close seasons expedient to be enforced or observed in such contiguous waters by the inhabitants of both countries as respects the taking of the several kinds of fish and shellfish.

(d.) The adoption of practical methods of restocking and replenishing such contiguous and territorial waters with fish and shellfish, and the means by which such fish life may be therein preserved and increased.

II. The commissioners to be so appointed shall meet at the city of Washington within three months from the date of this present agreement, and shall complete their investigation and submit their final reports thereof to the two governments as herein provided, within two years from the date of their first meeting.

III. The contracting governments agree to place at the service of the said commissioners all information and material pertinent to the subjects of their investigation which may be of record, respectively, in offices of the United States Commission of Fish and Fisheries, and in the Department of Marine and Fisheries of the Dominion of Canada; and further, to place at the disposal of said commissioners, acting jointly, any vessel or vessels of either of said fish commissions of the United States and of Canada as may be convenient and proper, to aid in the prosecution of their investigation in the contiguous or adjacent waters aforesaid.

It is further agreed that, if required by either or both of the said commissioners, a competent employee of either or both of the said fish commissions of the

Joint Fisheries Commission.

United States and of Canada shall be detailed to assist the said commissioners in the preparation of their reports.

IV. Each government will defray the expenses of its commissioner, and of such employee as may be detailed to assist him, as provided in the preceding section.

V. The two governments agree that so soon as the reports of the commissioners shall be laid before them, as aforesaid, they will consider the same and exchange views thereon, to the end of reaching, if expedient and practicable, such conventional or other understanding as may suffice to carry out the recommendations of the commissioners, by treaty, or concurrent legislation on the part of the respective governments or the legislatures of the several states and provinces, or both, as may be found most advisable, but nothing herein contained shall be deemed to commit either government to the results of the investigation hereby instituted.

I beg that you will submit the foregoing draft of an agreement to Her Britannic Majesty's Government for consideration, with the limitation that, if it be accepted, this government will be prepared forthwith, for its part, to give full force and effect from the date when such acceptance may be notified to it.

I have, etc.,

JOHN W. FOSTER.

Mr. Herbert to Mr. Foster.

BRITISH LEGATION, October 6, 1892.

SIR,—I have the honour to acknowledge receipt of your note of the 4th instant, submitting a draft agreement in regard to the preservation of the fisheries in the waters contiguous to Canada and the United States, and to inform you that I have sent copies of this communication to the Earl of Rosebery and the Governor General of Canada.

I have the honour to be, with the highest consideration, sir,
Your most obedient, humble servant,

MICHAEL H. HERBERT.

Sir Julian Pauncefote to Mr. Foster.

BRITISH LEGATION, December 5, 1892.

SIR,—I have the honour to inform you that the draft agreement for the preservation of the fisheries in the waters contiguous to Canada and the United States, proposed in your note of the 4th October last, was duly submitted to the Canadian Government, and I have now received a dispatch from the Governor General, in which His Excellency states that the terms of the agreement are acceptable to his government, as appears from an approved minute of council, of which I have the honour to inclose a copy.

I have the honour to be, with the highest consideration, sir,
Your most obedient, humble servant,

JULIAN PAUNCEFOTE.

[1514 H.]

Certified copy of a report of a committee of the Honourable the Privy Council, approved by His Excellency the Governor General in Council, on the 31st October, 1892.

The Committee of the Privy Council have had under consideration a despatch, hereto attached, dated 6th October, 1892, from Her Majesty's representative at Washington, covering a communication from the United States Secretary of State, dated 4th October, 1892, to Mr. Herbert, resulting from several conferences on the subject of giving effect to so much of the understanding reached by the United States Secretary of State and the delegates from the Government of Canada, on 15th February last, as relates to the prevention of destructive methods of fishing in the contiguous waters of the United States and Canada and in other waters, and the preservation of the fisheries thereof, and with the object of reaching a formal agreement, the Secretary of State submits the views of his government.

The Minister of Marine and Fisheries, to whom the question was referred, observes that the proposition of 15th February, 1892, is referred to as the appointment of a commission of two experts, one by each government, to consider and report, either jointly or severally, as to the restrictions and regulations on the following subjects, namely :

1st. "The prevention of destructive methods of fishing in the territorial and contiguous waters of the United States and Canada, respectively, and also in waters outside the territorial limits of either country."

2nd. "The prevention of the polluting and obstruction of such contiguous waters to the detriment of fisheries and navigation."

3rd. "The close seasons which should be enforced and observed in such waters by the inhabitants of both countries;" and

4th. "On the subject of restocking and replenishing such contiguous waters with fish ova, and the means by which fish life may be therein preserved and increased."

He therefore proposed certain bases for an agreement to be reached by a diplomatic exchange of notes :

"I. The Governments of the United States of America and of Her Majesty the Queen of the United Kingdom of Great Britain and Ireland agree that a commission of two experts shall be appointed, one on behalf of each government, to consider and report to their respective governments, either jointly or severally, or jointly to both governments, with regard to matters in which they may be in accord, and severally to their respective governments with regard to matters of non-concurrence concerning the regulations, practice, and restrictions proper to be adopted in concert on the following subjects :

"(a) The limitation or prevention of exhaustive or destructive methods of taking fish and shellfish in the territorial and contiguous waters of the United States and Her Majesty's possessions in North America, respectively, and also in the waters of the open seas outside the territorial limits of either country to which the inhabitants of the respective countries may habitually resort for the purpose of such fishing ;

"(b) The prevention of the polluting or obstructing of such contiguous waters to the detriment of the fisheries or of navigation ;

"(c) The close seasons expedient to be enforced and observed in such contiguous waters by the inhabitants of both countries as respects the taking of the several kinds of fish and shellfish.

"(d) The adoption of practical methods of restocking and replenishing such contiguous and territorial waters with fish and shellfish, and the means by which such fish life may be therein preserved and increased.

"II. The commissioners to be appointed shall meet in the city of Washington within three months from the date of this present agreement and shall complete their investigations and submit their final reports thereof to the two governments, as herein provided, within two years from the date of their first meeting.

"III. The contracting governments agree to place at the service of the said commissioners all information and material pertinent to the subjects of their investigations which may be of record, respectively, in the offices of the United States Commission of Fish and Fisheries and in the Department of Marine and Fisheries of the Dominion of Canada, and further, to place at the disposal of said commissioners, acting jointly, any vessel or vessels of either of said fish commissions of the United States and Canada as may be convenient and proper to aid in the prosecution of their investigation in the contiguous or adjacent waters aforesaid.

"It is further agreed that, if required by either or both of the said commissioners, a competent employee of either or both of the said fish commissions of the United States and of Canada shall be detailed to assist the said commissioners in the preparation of their reports.

"IV. Each government shall defray the expenses of its commissioner and of such employee as may be detailed to assist him as provided in the preceding section.

"V. The two governments agree that so soon as the reports of the commissioners shall be laid before them as aforesaid, they will consider the same and exchange views thereon, to the end of reaching, if expedient and practicable, such conventional or other understanding as may suffice to carry out the recommendations of the commissioners by treaty or concurrent legislation on the part

Joint Fisheries Commission.

of the respective governments, or the legislatures of the several states and provinces, or both, as may be found most advisable; but nothing herein shall be deemed to commit either government to the results of the investigation hereby instituted."

The Minister of Marine and Fisheries reports that although the information at the command of the Canadian Government may not be so complete as that connected with the long-established Fish Commission of the United States, important material has been collected by the Department of Marine and Fisheries, and that conferences between the experts proposed to investigate and deal with the subjects, will, no doubt, lead to a full possession of the main facts connected with the fisheries in which the two countries are so much interested.

The minister therefore reports to Your Excellency that the terms of the draft agreement as submitted by the Secretary of State for the United States are acceptable.

The committee advise that Your Excellency be moved to transmit a copy of this minute to Her Majesty's representative at Washington for his information.

All of which is respectfully submitted for Your Excellency's approval.

JOHN J. MCGEE,

Clerk of the Privy Council.

Mr. Herbert to Lord Stanley of Preston.

[No. 89.]

WASHINGTON, October 6, 1892.

MY LORD,—With reference to my dispatch, No. 79, of the 13th ultimo, I have the honour to inclose a copy of a note which I have received from Mr. Foster submitting the draft of an agreement which he suggests should be effected by an exchange of notes in regard to the preservation of the fisheries in the waters contiguous to the United States and Canada.

Mr. Foster told me a few days ago that he thought, for the reasons which he has repeated in this note, that a convention was unnecessary at the present moment, and that his proposal as to the form of agreement to be reached would be simpler and more expeditious.

I have, etc.,

MICHAEL HERBERT.

Mr. Foster to Sir Julian Pauncefote.

DEPARTMENT OF STATE,

WASHINGTON, December 6, 1892.

SIR,—I have the honour to acknowledge the receipt to-day of your note of the 5th instant, by which you inform me that the Canadian Government has accepted the draft agreement for the preservation of the fisheries in the waters contiguous to Canada and the United States, proposed in my note to Mr. Herbert, October 4 last.

This reply consequently completes the agreement by exchange of notes as proposed by my communication on the 4th of October last, and fixes this day as the date of the agreement.

I have much pleasure in giving immediate effect to this agreement as far as depends upon the executive power, by informing you that the President has appointed as the representative expert of the United States for the purpose of the stipulated joint investigation, Mr. Richard Rathbun, of the United States Fish Commission.

I beg that you will advise me of the name of the expert to be appointed on behalf of Her Majesty's Government, in order that Mr. Rathbun may be instructed

to confer with his Canadian colleague as to the time of meeting and plan of operations.

I have the honour to be, with the highest consideration, sir,
Your obedient servant,

JOHN W. FOSTER.

Mr. Foster to the Commissioner of Fish and Fisheries.

DEPARTMENT OF STATE,
WASHINGTON, December 8, 1892.

SIR,—I have the honour to inclose for your information copies of correspondence between this department and the British chargé at this capital, relative to a draft agreement for the preservation of the fisheries in the waters contiguous to Canada and the United States, which was submitted by this department for the consideration of that government by my note of the 4th of October last to Mr. Herbert, chargé, etc.

You will observe that my note of the 6th instant to the British Minister completed the agreement by exchange of notes, and that thereby that day is fixed as the date of the agreement.

The department now awaits information as to the name of the Canadian representative expert. As soon as that information is received from the British Minister it will be communicated to you, in order that Mr. Rathbun may, without delay, confer with his Canadian colleague as to the time of meeting and plan of operations.

I have the honour to be, sir, your obedient servant,

JOHN W. FOSTER.

Mr. Rathbun to Mr. Gresham.

UNITED STATES COMMISSION OF FISH AND FISHERIES,
WASHINGTON, D.C., December 22, 1894.

SIR,—Referring to the agreement of December 5, 1892, for the preservation of the fisheries in the waters contiguous to Canada and the United States, I have the honour to report as follows upon the progress made in the inquiries relative thereto, and to ask your consideration of the question of extending the time for the completion of the work.

As provided by the agreement, the representatives designated on the part of the two governments, Great Britain and the United States, met in Washington on the 2nd day of March, 1893, at which time, after a conference at the State Department, the investigations necessary to secure the required information as a basis for the recommendations desired were determined upon, and plans were made for the conduct of the same.

The regions covered by the agreement in question were designated to be "the territorial and contiguous waters of the United States and Her Majesty's possessions in North America, respectively, and also the waters of the open seas outside of the territorial limits of either country to which the inhabitants of the respective countries may habitually resort for the purpose of such fishing."

Joint Fisheries Commission.

These waters were interpreted by the representatives to include the following, namely:

- The Atlantic sea coast between Cape Hatteras and the mouth of the River St. Lawrence, in respect to the mackerel fishery;
- The Bay of Fundy;
- The St. John and St. Croix Rivers between New Brunswick and the state of Maine;
- Lake Memphremagog and Lake Champlain;
- The great lake system;
- Lake of the Woods, and all other fresh-water lakes and streams along the northern border between Lake Superior and the Pacific Coast; and
- The salt waters lying between the state of Washington and British Columbia.

The field investigations were started early in the spring of 1893 and have been actively prosecuted up to the present time at all seasons when the weather has been suitable. The United States Commissioner of Fish and Fisheries has placed at our service the several vessels of the fish commission, and such other means at his disposal as could be utilized in this connection, and no pains have been spared to make the inquiries as thorough and exhaustive as the time would permit.

During 1893 the work related to the mackerel fishery along the Atlantic sea-coast, and the fisheries of the Bay of Fundy, the Rivers St. John, St. Croix and St. Lawrence, and the northern shores of Lakes Ontario and Erie. At the close of that season it became evident that the investigations could not be completed satisfactorily within the limit of time fixed by the agreement, namely, March 2, 1895, and I suggested to my colleague, the British representative, Dr. William Wakeham, that an extension of time should be requested. The attention of the Minister of Marine and Fisheries of Canada having been called to this matter, the latter expressed a desire that a report upon the fisheries of the great lakes be submitted in accordance with the terms of the agreement, but interposed no objection to further delay in respect to the other waters.

Feeling confident that such an arrangement would not be unfavourably regarded by this government, the past season has been occupied chiefly in making an investigation of the fisheries of the great lakes, which has been completed only within a few weeks. These inquiries have been conducted on a scale far exceeding any of a similar nature heretofore undertaken, and the amount of material secured in the way of field notes and stenographic testimony is much greater than had been anticipated. I am firmly convinced that it will be impossible to properly condense this information and to prepare a conclusive or satisfactory report upon the subject by the 2nd of next March.

In respect to this matter, Dr. Wakeham also agrees with me, and I beg to state that, in a letter recently received from him, he informs me that a proposition to extend the time for submitting the report relative to the great lakes would be considered favourably by the Canadian Government.

The two representatives feel confident of their ability to complete the work with respect to the great lakes by June 1, 1895, three months subsequent to the date based upon the agreement, but for the remainder of the region covered by the agreement at least another year (or until June, 1896) will be required, owing to the fact that sufficient field work remains to be done to occupy an entire season.

In view of the facts set forth, and also by reason of the extent and value of the industries that may be affected thereby, I feel constrained most respectfully to urge that the dates for submitting the reports of the commission be changed to those before indicated.

I have the honour to be, very respectfully, your obedient servant,

RICHARD RATHBUN,

Representative on the Part of the United States.

Forwarded.

HERBERT A. GILL,

Acting Commissioner.

Mr. Gresham to Sir Julian Pauncefote.

DEPARTMENT OF STATE,
Washington, December 31, 1894.

EXCELLENCY,—Referring to previous correspondence relative to measures for the preservation of the fisheries in the waters contiguous to the United States and Canada, I have the honour to inclose, for the consideration of Her Britannic Majesty's Government, a copy of a communication dated the 22nd instant, from the representative of the United States on the joint commission on the subject in question, under the agreement of December 6, 1892, suggesting an extension of the time for the preliminary investigations of the Commission until June 1, 1896, in order that the unfinished work which extends from the great lakes to the Pacific Coast may be completed.

I beg to say that this department fully approves of the suggestion for an extension of time made by Mr. Rathbun, and, if agreeable to your Government, would be pleased to carry the proposed arrangement into effect by an exchange of notes on the basis of the present agreement.

I have the honour to be, with the highest consideration, Mr. Ambassador,
Your most obedient servant,

W. Q. GRESHAM.

Mr. Gresham to Mr. Rathbun.

DEPARTMENT OF STATE,
Washington, December 31, 1894.

SIR,—I have to acknowledge the receipt of your letter of the 22nd instant, suggesting the advisability of extending the time for the completion of the work of the commission for the preservation of fisheries until June 1, 1896, and to inform you that the department has called the matter to the attention of the British embassy with a view to carrying the proposed arrangement into effect by an exchange of notes.

I am, etc.,

W. Q. GRESHAM.

RICHARD RATHBUN, Esq.,

*Representative on the Part of the United States on the
Joint Commission for the Preservation of Fisheries, etc.*

Sir Julian Pauncefote to Mr. Gresham.

WASHINGTON, February 22, 1895. (Received Mar. 4.)

SIR,—I have the honour to inform you that I lost no time in referring to the Earl of Kimberley your note of December 31 last, respecting the joint commission for the investigation of the fisheries in the waters contiguous to the United States and Canada.

I am now instructed to state that Her Majesty's Government has no objection to offer to the suggestion to extend the time for the preliminary investigation until

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June 1, 1896, and I am accordingly authorized to carry the arrangement into effect by an exchange of notes as proposed in your note under reply.

I have, etc.,

JULIAN PAUNCEFOTE.

Mr. Gresham to Sir Julian Pauncefote.

No 44.]

DEPARTMENT OF STATE,
Washington, March 2, 1895.

EXCELLENCY,—I have the honour to acknowledge receipt of your note of the 22nd ultimo, which only reached this department to-day, informing me that Her Majesty's Government accepts the proposition contained in my note of December 31, 1894, for an extension of time for the preliminary investigation of the fisheries in the waters contiguous to the United States and Canada until June 1, 1896.

In accordance with the concluding paragraph of that note, this action of Her Majesty's Government is accepted as carrying the recent agreement into effect by an exchange of notes.

I have, etc.,

W. Q. GRESHAM.

Mr. Adee to Mr. Rathbun.

DEPARTMENT OF STATE,
Washington, April 12, 1895.

SIR,—In connection with your letter of December 22, 1894, and the department's reply of the 31st of that month, I herewith transmit for your information a copy of a note from the British ambassador of February 22, 1895, assenting to the proposition of this department that the time for the completion of the work of the joint commission for the preservation of the fisheries in the waters contiguous to the United States and Canada be extended until June 1, 1896, by an exchange of notes.

I am sir, your obedient servant,

ALVEY A. ADEE,

Acting Secretary.

Mr. Rathbun to Mr. Olney.

UNITED STATES COMMISSION OF FISH AND FISHERIES.

Washington, D.C., April 6, 1896.

SIR,—I have the honour to bring to your attention the inquiries which are being conducted in accordance with the provisions of the agreement of December 6, 1892, between the United States and Great Britain for the preservation of the fisheries in the waters contiguous to Canada and the United States, and to request consideration of the question of extending the time in which that work shall be completed.

The representatives on the part of the two governments had their first meeting in Washington on the 2nd day of March, 1893, and by the terms of the agreement

they were to submit their report within two years from that date. As it was found impossible, however, even to complete the field investigations within that period, the time was extended by an exchange of notes, to the 1st of June, 1896. The field work was practically finished last fall, and during the past winter each of the representatives was engaged, in so far as his other official duties permitted, in arranging and reviewing the notes taken preliminary to the final meeting and preparation of the report.

The British representative, Dr. William Wakeham, arrived in Washington for the latter purpose on the 1st of March last, when the joint consideration of the testimony which had been collected was immediately taken up. After a month's time spent in examining and condensing this material, however, we find that the subject is much more extensive and complex than had been supposed, and we have become convinced that full justice can not be done it in the period now remaining. Not only have we to consider and reconcile the conflicting statements contained in the large amount of testimony and notes secured by ourselves, covering over 15,000 typewritten pages, but it is also necessary to consult the published records of both governments bearing upon the same questions, which date back many years, and to study, in respect to their application to the requirements of the boundary fisheries, the different systems of fishery legislation now or hitherto in force in this and other countries.

In view of the extent and importance of the interest which may be affected by our conclusions, and also of the fact that our report could not be taken into consideration either by the Congress of the United States or by the Canadian Parliament before that time, I would, therefore, respectfully urge that the date for submitting the report of the commission be changed to December 30, 1896.

The British representative, Dr. William Wakeham, is in accord with me in regard to this matter, and will so advise his government.

I have the honour to be, very respectfully, your obedient servant,

RICHARD RATHBUN,

Representative on the part of the United States.

Mr. Olney to Sir Julian Pauncefote

DEPARTMENT OF STATE,

Washington, April 7, 1896.

EXCELLENCY,—Referring to previous correspondence relative to measures for the preservation of the fisheries in the waters contiguous to the United States and Canada, and particularly to Mr. Gresham's notes of the 31st December, 1894, and March 2, 1895, and the replies of your embassy thereto, dated February 22, 1895, and March 2, 1895, I have the honour to inclose for the consideration of Her Britannic Majesty's Government a copy of a letter, dated the 6th instant, from the representative of the United States on the joint commission on the subject in question, under the agreement of December 6, 1892, suggesting an extension of the time for the investigations of the commission from June 1 until December 30, 1896, to enable the Commission to complete its work, which has been found to be more extensive than was anticipated.

I beg to say that this department fully approves of the suggestion for an extension of time made by Mr. Rathbun, and, if agreeable to your government, would be pleased to carry the proposed arrangement into effect by an exchange of notes on the basis of the present agreement.

I have the honour to be, with the highest consideration, Mr. Ambassador,

Your most obedient servant,

RICHARD OLNEY.

Joint Fisheries Commission.

Sir Julian Pauncefote to Mr. Olney.

WASHINGTON, April 11, 1896.

SIR,—I have the honour to acknowledge the receipt of your note, No. 362, of the 7th instant, suggesting an extension of time for the investigations of the commission appointed to inquire into the measures to be taken for the preservation of the fisheries in the waters contiguous to the United States and Canada.

I have not failed to bring your proposal to the notice of Her Majesty's principal Secretary of State.

I have the honour to be, with the highest consideration, sir,

Your most obedient, humble servant,

JULIAN PAUNCEFOTE.

Mr. Olney to Sir Julian Pauncefote.

DEPARTMENT OF STATE,

WASHINGTON, May 30, 1896.

EXCELLENCY,—With reference to previous correspondence concerning the proposal for the extension from the 1st of June to the 31st of December, 1896, of the time limited for the completion of the report of the joint commission under the agreement between the United States of America and Great Britain, of December 6, 1892, for the preservation of the fisheries in the waters contiguous to the United States and Canada, I have the honour to acknowledge the receipt of your note of to-day in which you notify me of the assent of Her Majesty's Government to the extension of time proposed in my note to you of the 7th of April last.

This consequently completes the agreement in question by an exchange of notes.

I have the honour to be, with the highest consideration, Mr. Ambassador,

Your most obedient servant,

RICHARD OLNEY.

Sir Julian Pauncefote to Mr. Olney.

WASHINGTON, May 30, 1896.

SIR,—In reply to your note of the 27th instant, I have the honour to inform you that I am duly authorized by Her Majesty's Government to assent, and do hereby assent on their behalf, to the proposal, contained in your note of the 7th ultimo, for the extension from the 1st of June to the 31st of December, 1896, of the time limited for the completion of the report of the joint commission under the agreement between Great Britain and the United States, of December 6th, 1892, for the preservation of the fisheries in the waters contiguous to Canada and the United States.

I have the honour to be, with the highest consideration, sir,

Your most obedient, humble servant,

JULIAN PAUNCEFOTE.

Mr. Olney to Mr. Rathbun.

DEPARTMENT OF STATE,

WASHINGTON, June 1, 1896.

SIR,—Referring to your letter of the 6th of April last, relative to the necessity for extending the time for the completion of the work of the American and British commission to devise measures for the preservation of the fisheries of the waters contiguous to the United States and the Dominion of Canada, I inclose for your information a copy of the correspondence by which an agreement has been concluded by an exchange of notes for an extension of the time for the completion of the work of the commission from June 1 to December 31, 1896.

I am, sir, your obedient servant,

RICHARD OLNEY.

Mr. Wakeham to Minister of Marine and Fisheries.

OTTAWA, CANADA, December 31, 1896.

SIR,—I have the honour to submit herewith the report of the joint commission relative to the preservation of the fisheries in waters contiguous to Canada and the United States, as provided by the joint agreement between Great Britain and the United States under date of December 6, 1892.

I have the honour to be, very respectfully, your obedient servant,

WM. WAKEHAM,

Representative on behalf of Great Britain.

Joint Fisheries Commission.

REPORT

OF THE

JOINT COMMISSION

RELATIVE TO THE PRESERVATION OF THE FISHERIES IN WATERS CONTIGUOUS TO CANADA AND THE UNITED STATES.

An agreement having been entered into between the government of Great Britain and that of the United States of America, under date of December 6, 1892, providing for the appointment of a commission of two experts, one on behalf of each government, "to consider and report to their respective governments, either jointly or severally, or jointly to both governments with regard to matters in which they may be in accord, and severally to their respective governments with regard to matters of non-concurrence, concerning the regulations, practice and restrictions proper to be adopted in concert, on the following subjects, viz.:—

"1. The limitation or prevention of exhaustive or destructive methods of taking fish and shell-fish in the territorial and contiguous waters of the United States and Her Majesty's possessions in North America respectively, and also in the waters of the open seas outside of the territorial limits of either country to which the inhabitants of the respective countries may habitually resort for the purpose of such fishing.

"2. The prevention of the polluting or obstructing of such contiguous waters to the detriment of the fisheries or of navigation.

"3. The close seasons expedient to be enforced and observed in such contiguous waters by the inhabitants of both countries as respects the taking of the several kinds of fish and shell-fish.

"4. The adoption of practical methods of restocking and replenishing such contiguous and territorial waters with fish and shell-fish, and the means by which such fish life may be therein preserved and increased.

"The commissioners to be appointed shall meet at the city of Washington within three months from the date of this present agreement, and shall complete their investigation and submit their final reports thereof, to the two governments as herein provided, within two years from the date of their first meeting."

And the undersigned having been duly commissioned by their respective governments, in accordance with the above agreement, and having communicated to each other their respective powers, found to be in due and proper form, have agreed to the following report:—

The first meeting of the commission was held at Washington, beginning on the 2nd of March, 1893, at which an understanding was reached respecting the scope and conduct of the inquiries necessary to be made. Owing, however, to the extent of the waters requiring examination, it was found impracticable to complete the work within the limit of time specified, and the same was accordingly extended, by an exchange of notes between the two governments, to the 31st of December, 1896.

The following fisheries were considered to be covered by the terms of the agreement, namely: The mackerel fisheries of the Atlantic sea coast and the Gulf of St. Lawrence, and the fisheries in general in the boundary and contiguous waters as follows: Passamaquoddy Bay and adjacent waters, and the St. John and St. Croix

Rivers, situated between the province of New Brunswick and the state of Maine; Lake Memphremagog, between the province of Quebec and the state of Vermont; Lake Champlain, between the province of Quebec and the states of Vermont and New York; the upper part of the St. Lawrence River and the chain of the Great Lakes, between the province of Ontario and the border states from New York to Minnesota, inclusive; Rainy Lake and River and Lake of the Woods, between the provinces of Ontario and Manitoba and the state of Minnesota; the Columbia River, which crosses the international boundary line from British Columbia into the state of Washington; the Fraser River, Gulf of Georgia, Puget Sound and Strait of Juan de Fuca, contiguous to British Columbia and the state of Washington.

All of the waters above named, except Rainy Lake and the Columbia River, have been visited by the two representatives conjointly, who have carried on such detailed investigations respecting the fisheries and fishery resources of each of them as the time and means at their disposal have permitted. Additional information has been obtained through the observations of several naturalists and fishery experts, who have been detailed from time to time to the study of the same waters, and use has been made of such records belonging to the Department of Marine and Fisheries of Canada and the United States Fish Commission as relate to the several subjects in question.

The conditions which the commission has found to exist and the conclusions which it has reached are presented under the several headings which follow.

On account of the diversified characteristics of the waters investigated, the variety of their products and the magnitude of the industries to which the latter give rise, we have found it impossible to consider fully all the questions which the subject presents, and have, therefore, been unable in many cases to reach more than general conclusions, leaving the matter of details to be settled by further and more complete inquiries. Our observations, moreover, have clearly demonstrated the inexpediency of attempting to regulate any of the fisheries herein discussed by a rigid code of enactments, owing to their constantly changing character and conditions, and we would therefore urge, in the event of joint action by the two governments, that a permanent joint commission, to be composed of competent experts, be provided for, which shall be charged with the direct supervision of these fisheries, and shall be empowered to conduct the necessary investigations, and to institute such modifications in the regulations as the circumstances may call for from time to time.

That a uniform system of regulations common to the entire extent of each body of water along the boundary line is required to insure the protection of its resources, is fully shown by the conditions which we have found to exist in nearly all of them, whether bordered on the side of the United States by a single state or by several states. The failure to secure adequate results in that direction has, naturally, been due to the diversity of legislation, but it has resulted in large part from the general lack of accurate information regarding the habits of the several fishes to serve as a basis for intelligent action. While we have been able to establish some important facts respecting the natural history of the commoner market species, much more remains to be accomplished in that regard, and the subject should be given due prominence in the future.

All questions, outside of navigation, with which we have had to deal have been considered solely from the standpoint of the preservation of the several fisheries, and we have endeavoured in each instance to provide for the most liberal amount of fishing, which, in our judgment, is warranted by the circumstances. In so doing we have been led to suggest greater license in some regions than is granted by existing laws, but wherever a state on the one side or the Dominion government on the other would impose greater strictures than are here recommended, we see no objection thereto.

We are convinced that no system of regulations can be properly administered except by the registration or licensing of the fishermen, as a basis for restricting the character and amount of apparatus employed in each locality, while, on the

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other hand, we feel confident that the fishermen themselves would be greatly benefited by such a measure, through the protection of individual rights thereby assured to them.

Much of the irritation occasioned from time to time, especially in the region of the Great Lakes, through the fishermen of one country extending their operations into the territory of the other, has undoubtedly resulted from the imperfect knowledge which prevails respecting the relations of the intervening water areas. In fact, the belief is wide-spread that wherever the lakes exceed six miles in width each country has jurisdiction only to a distance of three miles from its shores, leaving a neutral area or high sea between, to which the fishermen from both sides are privileged to resort in common. On the official maps of the Great Lakes the boundary line is not shown, nor can its position be accurately marked in most places until new surveys shall be made conjointly by the two governments. It would be greatly to the advantage of the fishing interests in that region, and much annoyance would be prevented in the future, by having the boundary line re-defined and appropriately located on a series of charts made available for distribution among the fishermen.

Very extensive investigations have been made respecting the mackerel and mackerel fisheries throughout the entire extent of the range of that species, the same having been continued during each of the four seasons which have elapsed since the date of the agreement. As it has been impossible, however, to give proper consideration to the large amount of testimony collected in that connection, we have been unable to incorporate the subject in this report.

ST. JOHN RIVER SYSTEM.

THE RIVER SYSTEM DEFINED.

Of the two streams which unite to form the St. John River in the north-western part of Maine, the so-called south-west or boundary branch lies mostly between the State of Maine and the Province of Quebec, while on the north, eastward of the meridian of about 69 degrees 15 minutes west, the same state is separated from the provinces of Quebec and New Brunswick by the main river and its northern tributary, the St. Francis. After leaving this part of the boundary line the St. John River belongs wholly in New Brunswick, but three of its larger lower tributaries, the Aroostook, Big Presque Isle and Meduxnickag rivers, have their origin in Maine. At Grand Falls, only a few miles below the north-eastern corner of the state, the main river makes an abrupt descent of about sixty feet, which serves as a barrier to the ascent of all fishes, and practically divides the river into two parts, having quite different characteristics in respect to fishery matters; they may be designated as the upper and lower courses of the river.

International Interests.—In the lower St. John River international interests relate chiefly to such anadromous fishes as, under natural conditions, would ascend the tributary streams into the state of Maine; there as well as in the upper river the trout and possibly other species also merit joint protection.

(*Important Fishes.*)

Anadromous species.—The main river below Grand Falls contains no natural or artificial barriers to the ascent of anadromous fishes, of which the salmon (*Salmo salar*), shad (*Alosa sapidissima*), alewife (*Pomolobus pseudoharengus*), sturgeon (*Acipenser sturio*), smelt (*Osmerus mordax*), and striped bass (*Roccus lineatus*) belong in this region. The only species, however, which are known to have made their way up the western tributaries into Maine are the salmon and the alewife.

Salmon.—The salmon ascend the St. John River as far as Grand Falls and formerly had their spawning grounds in many of its tributary streams on both sides, but the most of these have been closed against them to a greater or less extent. The Tobique, a clear, cold and rapid river which enters from the east about twenty miles below Grand Falls, is the principal salmon stream at present as it has probably always been. The fishing privileges are now leased by the provincial government, and great pains are taken to insure the preservation of its natural features. Other exclusively provincial affluents to which the salmon are said to have resorted more or less abundantly at one time, but in which they now appear only sparingly or not at all, owing to obstructions, pollutions or insufficient protection, are the Nashwaak, Oromocto, Canaan, Kennebecasis and the two salmon rivers.

The Meduxnickieag River, the lowest of the international tributaries, joins the St. John River at Woodstock, N.B., and consists mainly of two principal branches of nearly equal size, which unite about twelve miles above its mouth and only a few miles east of the boundary line. Its drainage area, comprising about 420 square miles, is situated mostly within the State of Maine, in close proximity to the eastern border. Authentic records show that during the early part of this century salmon entered this river in abundance, having been observed more especially in the vicinity of Houlton, Me., where they continued plentiful until shut out by dams about 1826. During some years, however, it is reported that a few salmon still find their way into the lower part of the river.

The Big Presque Isle River is naturally a clear and rapid stream, about forty miles long, which traverses five or six townships in the extreme eastern part of Maine, between the Meduxnickieag and Aroostook valleys, and reaches the St. John River a few miles below Florenceville, N. B. It was formerly resorted to by salmon, but to what extent it has been impossible to ascertain.

The Aroostook River, which empties into the St. John River about six miles above the town of Andover and sixteen miles below Grand Falls, is the largest tributary of this system, having a length of 138 miles and a drainage area of 2,160 square miles. Only the last four miles of its course are in New Brunswick. It has numerous tributaries and some lakes. Its waters are mainly tranquil to near the boundary line, where a series of rapids begins, the river finally entering a gorge in which there are five principal cascades with an aggregate descent of 75 feet, the largest being a fall about 16 feet high. Within the gorge the waters are very turbulent, and in the three miles below it, to the mouth, there are several rough rapids.

Although the fall above mentioned constitutes a serious impediment to the passage of salmon, it is not insurmountable, and a considerable run seems to take place every year. While making the ascent they are said to accumulate in a broad basin at the foot of the fall, and to find a resting place in a small pool farther up. They have been observed a hundred miles up the river, and are captured at many places along its course. The building of a dam across the main river at Caribou, in 1888, interposing an obstruction to their movements, has made their presence conspicuous in that locality, and shown them to be much more plentiful than had been supposed. Reliable information respecting the amount of salmon taken annually from the Aroostook River is not obtainable, as the fishing is carried on only by sportsmen and poachers, but many relatively large catches are reported from time to time. The species was undoubtedly much more abundant in early times than it is at present, as many, if not most, of the tributary streams containing the original spawning grounds are now closed by dams or encumbered with refuse. That some spawning places are still accessible, however, is indicated by the continued presence of the salmon in the river.

Alewives.—Alewives formerly entered the Meduxnickieag River and were shut out from it by the same agencies that interrupted the ascent of salmon, but we have not been able to learn of their occurrence in either the Aroostook or Big Presque Isle rivers.

Trout.—The brook trout (*Salvelinus fontinalis*) is generally distributed throughout the St. John River system wherever suitable conditions exist, and is the species

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chiefly sought by sportsmen. It has been greatly depleted by overfishing and the presence of dams and pollutions. Local interests on both sides of the boundary line, especially on the upper river, appear to justify its joint protection as a source of profit in attracting visitors to the region. The great grey trout, togue or touladi (*Cristivomer namaycush*), which inhabits the upper part of this system, is also regarded as a sport fish, but the only boundary waters in which we learned of its occurrence are the lakes of the St. Francis River.

OBSTRUCTIONS AND POLLUTIONS.

Main river.—The only absolute barrier to the ascent of salmon in the St. John River is found at Grand Falls, where the conditions are entirely unsuited to the building of a fishway. The distribution of this species, therefore, must always be restricted to the lower river and its tributaries, but below the falls there are no serious obstacles to impede its movements in the main stream. Log driving and the drifting of saw-mill refuse with the current are both conspicuous and objectionable features of the region, which are supposed to exert a more or less harmful influence on the fish, but precisely to what extent it is impossible to say. The former practice could not be restrained but the latter might readily be stopped. The saw-dust is said to aid in the formation of shoals at certain places, whereby navigation is impeded, while the cedar drifts keeps the water charged with suspended rubbish, which settles quickly upon the banks and over the broad intervals at the close of every spring freshet.

Tributaries.—None of the tributary streams which the salmon used to frequent for spawning purposes have escaped at least some injury through the building of closed dams or the polluting influence of saw-mills; generally through both of those agencies combined. Even the Tobique River, the cleanest of the salmon waters in this valley, is disfigured in its lower part, while the Nashwaak River, terminating at Fredericton, N.B., is completely choked with saw-mill waste for several miles above its mouth and is barred by several dams, none of which provide a passageway for fish. Similar conditions prevail on practically all of the remaining provincial tributaries to which the salmon might resort, the lumber interests dominating every stream regardless of the rights or welfare of the public. The three tributaries which cross the boundary lines have also suffered very greatly in this respect, as explained below.

Meduxnikeag River.—This river has been continuously obstructed by a dam at its mouth, in the town of Woodstock, since about 1826. A fishway is said to have been added for the first time in 1868, but nothing could be learned of its history, and in 1893 no trace of it remained. The dam is relatively low and during high water a few salmon manage to pass over it. Two saw-mills are located just below the dam, and one a short distance above it, nearly all the waste from the former being allowed to enter the water, but at the latter it is now mostly disposed of on shore. The appearance of the Meduxnikeag at this place is extremely unsightly, due mainly to the accumulation of milling refuse, drift material, bark.

There are no other dams or saw-mills than the above on the main Meduxnikeag River. The north branch has a fall near its mouth, in New Brunswick, sufficiently high, it is stated, to bar the ascent of salmon. The south branch is free from natural obstructions, but contains at least six dams on the main stream the lower one being at Houlton, Me., and a few on its branches. None of these dams are provided with fishways, although supplied with gates for log driving, but there is no assurance that the latter would be kept open during the salmon run. The main stream has also five or six saw-mills and several factories for the making of starch from potatoes. As none of the former are above moderate size, they produce only a relatively small amount of waste, but as the volume of water becomes very small in summer the channel may readily be filled by this means. This we found to be the case in one or two places. Practically all of the refuse was formerly thrown into

the water, but scarcely more than the saw-dust is now disposed of in this way. The pumice from the starch works seems to be rapidly dissipated, and no evidence was obtained to show that it had a pernicious effect on fish life; in fact, it is locally believed to serve as food for some fishes. We heard of only one tannery on the Meduxnieag River, and only a few small saw mills are reported on its tributary streams. It is not considered that the drainage of Houlton and Woodstock, the two largest towns on the river, is sufficiently extensive to be taken into account.

Big Presque Isle River.—This river was not visited, but from information derived from several sources we are led to conclude that its condition as a salmon stream has been greatly impaired by dams and milling refuse. Saw-mills are located at Tracey's Mills, N.B., and in the townships of Bridgewater, Blaine, Mars Hill and Easton, Me.

Aroostook River.—The lumber interests on this river are very great, and it contains some of the largest saw-mills in the St. John valley, the extent of its pollution from that source being in due proportion thereto. Examinations were made at Fort Fairfield, Caribou and Presque Isle, Me., and at several intermediate points, at all of which the conditions were found to be deplorable, the river being encumbered in many places with extensive banks of saw-dust, edgings, bark and shingle rubbish, sometimes reaching several feet above the surface. While only the sides of the channel may be thus filled in in the lower part of the river, higher up and in some of the former salmon tributaries, as in Caribou stream, for example, the channel is almost completely blocked from bank to bank. Much of this material is carried away by the spring freshets and distributed through the main St. John River, making room for new deposits the following seasons. Except for the small amount consumed by the steam mills, the river is made the common dumping ground for all the waste of this character, as the most convenient way of disposing of it, no regard being had for the public interests which are thus impaired.

The lower mill is in New Brunswick, near the mouth of the river; the remainder are all in Maine, three shingle factories at Fort Fairfield being especially conspicuous. The only dam across the Aroostook River was built in 1888, about three-eighths of a mile above the bridge at Caribou. It supplies that village with water and furnishes power for an electric lighting plant. The height of the dam above the water level below is about 14 feet in the summer, becoming much less in the spring. Salmon have been seen to jump it, but it is doubtful if many succeed in such attempts. Between 1889 and 1893, a temporary ladder, wholly unsuited to the purpose, was maintained at irregular intervals on the surface of the apron. In the latter year an appropriate fishway was constructed, and it is hoped that it may operate to remove the chief objection to the presence of the dam.

With respect to the principal lower tributaries of the Aroostook River, the Little Madawaska River, midway between Fort Fairfield and Caribou has several mills and closed dams, no pains being taken at the former to secure the retention of the waste products. Caribou stream has at present two lumber and shingle mills and three closed dams within a mile of its mouth, all located in the town of the same name. This stream has been effectually dammed, it is claimed, for 50 years, and its channel is completely choked with rubbish. On the Presque Isle River in the town of that name, about one and three-quarter miles above its mouth, there is a closed dam dating back over 30 years, and an accumulation of saw-mill waste, filling in a large proportion of the channel. Other mills and dams are reported in the upper waters, but they were not visited and positive information respecting them was not obtained.

Cedar Drift.—One of the most objectionable features of saw-mill waste, especially prominent on the St. John River, is the refuse derived from shingle factories, all of which, except the saw-dust and bark, retains its buoyancy for a long period. If there is sufficient water in the channel when rejected, it floats off at once; otherwise it accumulates about the mills until freshet time, being then carried down stream in enormous quantities to the annoyance and detriment of the different interests along

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the lower. There is a much greater proportion of waste in shingle making than in the sawing of ordinary lumber, and the amount of rubbish derived from that source can scarcely be appreciated by any one not personally acquainted with the circumstances. That it has a baneful effect upon the habits of the fishes in the river, both when stranded and when floating in large quantities, there can be no doubt. The shingle mills are situated chiefly above Fredericton, on the main river and many of its tributaries, both in Maine and in New Brunswick.

SALMON FISHING.

Commercial fishing for salmon is carried on quite extensively in the lower part of the St. John River and in the Bay of Fundy outside, weirs and gill nets, both set and drifting, being used for that purpose. The season begins about June 1 and closes August 15. The number of weirs has been limited to 24, the privileges pertaining thereto being controlled by the city of St. John. Drift nets are employed in the harbour of St. John, and thence along the outer coast to Point Lepreau and the Wolves. Prior to 1895 they were not licensed and their number was not restricted. Set nets are used to a limited extent, and some poaching with drift nets is also carried on, in the tidal part of the river which extends to a distance of about six miles above Fredericton. Testimony was presented to the effect that both the net and weir fishing is being prosecuted on a more extensive scale than is justified by the present supply of salmon, but, while this is probably the case, we have not been able to entirely substantiate the fact. A limited amount of sport fishing is conducted on some of the tributary streams, but the opportunities are nowhere recognized as even fair except on the Tobique River.

SUMMARY OF CONDITIONS.

Fisheries.—The fact is thoroughly well established that the stock of salmon entering the St. John River system has been greatly depleted, the quantity resorting to it annually being very much smaller now than it was originally. This species formerly ascended many of the tributary streams below Grand Falls for spawning purposes, conspicuous amongst these having been the Aroostook, Meduxnickag and Big Presque Isle rivers, each of which belongs mostly in the state of Maine. It is also undoubtedly a fact that this depletion has been brought about mainly through the agency of the lumber interests, the closing by dams of the majority of the spawning waters and their pollution and encumbrance by milling refuse, although other minor causes must have operated to the same end. The resulting conditions have affected the welfare alike of both sport and commercial fishing, and the latter has probably been overdone.

There is every reason to suppose, however, that if the natural conditions were again restored and a judicious system of protective measures instituted the supply of salmon would be much increased and might thereafter be maintained upon a satisfactory basis. Artificial propagation would aid materially in accomplishing that result. While it could not be expected to establish a commercial fishery by this means in the upper salmon waters, we anticipate that the advantages for sport fishing would be so greatly improved as to constitute a source of much profit, both locally and to the state and province. We strongly advise that the necessary steps be taken to accomplish this result.

In case the three international rivers alone, the Aroostook, Meduxnickag and Big Presque Isle, were opened up and cleaned of their rubbish, the salmon would probably enter them in greatly increased numbers, but we are firmly convinced that the greater the area of available spawning grounds, the greater will be the advantages to be gained by each stream, and we, therefore, urge that the entire river system be considered as a unit in respect to this matter.

A large part of the milling refuse which passes down the river is derived from its upper waters above Grand Falls, where the interests of the brook trout demand the same measures of relief that may be accorded to the salmon.

Any means taken to increase the stock of salmon in the St. John would also benefit the alewives as well as the other anadromous species, all of which are of commercial value.

Navigation.—Ocean commerce stops at the harbour of St. John, but river steamers ply as far as Fredericton and flat bottomed boats ascend to Woodstock during periods of high water. Steamers are also used on some of the larger of the lower tributaries, and small ones may be employed to a limited extent above Grand Falls. The Aroostook, Meduxnickieag and Big Presque Isle Rivers, however, offer few, if any, facilities in this respect. The presence, therefore, of dams and saw-mill waste has comparatively little bearing on the subject of navigation in this river system, although the cedar drift gives some annoyance and saw-dust is said to aid in the formation of bars and shoals. The principal source of trouble is the extensive rafting of logs, for which, however, no feasible remedy can be suggested.

RECOMMENDATIONS.

In order to restore and protect the fishery resources of international interest in the the St. John River system, the following measures seem to be demanded:—

1. That all dams throughout the system be provided with suitable fishways, except those used exclusively for log driving and containing gates, and that the latter shall be kept open at all times when the driving of logs is not actually in progress, and just previous thereto for the collecting of water.
2. That the construction of all new dams be subject to governmental authority and conform to such requirements in each case as the circumstances may warrant.
3. That the practice of throwing saw-mill waste of any kind into the water be everywhere prohibited; and that all existing accumulations of such waste in streams where it may be detrimental to the movements or spawning requirements of useful fishes be removed. As the saw-mills situated in the city of St. John have been able, for many years, to dispose of their rubbish without recourse to the adjacent river, it is not considered that this provision would work undue hardship in other places.
4. That it be prohibited to throw or to allow to pass into the water any garbage, lime, waste from gas works, or other deleterious substances from manufacturing or other establishments.
5. That commercial fishing be limited to tidal waters, and be so restricted therein as to insure an ample run of salmon and other anadromous fishes to their respective spawning grounds.
6. That uniform regulations be adopted for the protection of the salmon, trout and other useful fishes throughout the fresh waters of the system.
7. In case the measures above suggested are carried out, it is recommended that joint action be taken to increase the supply of salmon by artificial propagation.
8. It is recommended that all natural obstructions which impede the passage of salmon to important waters adapted to their spawning, such as the fall near the mouth of the Aroostook River, be examined with reference to improving the conditions for the distribution of that species.

ST. CROIX RIVER SYSTEM.

DESCRIPTION OF THE RIVER SYSTEM.

The southern half, approximately, of the boundary line between the state of Maine and the province of New Brunswick, above Passamaquoddy Bay is formed by the main St. Croix River and its eastern branch system, the latter including Monument Brook, at its source, and the Eastern Grand Lakes. The short west branch, draining the Western Grand Lakes, both of which lie wholly within the territory of Maine, joins the main stream about 20 miles above Calais. From Calais and St. Stephen down the St. Croix is a tidal river, with an average rise and

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fall in the upper part of about 20 feet. Its shores are bold and picturesque. As far as Oak Bay, a distance of about 7 miles, the thread of the channel is narrow and tortuous, navigation being especially difficult above "The Ledge" (about $4\frac{1}{2}$ miles from Calais), where is located the customary anchorage for vessels of large tonnage. There is relatively deep water at and below The Ledge, while beginning at Oak Bay the river assumes more the characteristics of a fiord, deep water generally approaching close to both shores.

The upper limit of the tide is determined by a comparatively rapid rise in the river bed, commencing near the lower or main bridge connecting Calais with St. Stephen and continuing up stream through a constricted part of the river, a distance of about $1\frac{3}{4}$ miles, with an elevation of about 72 feet. These conditions have produced excellent water power, which has long been utilized for saw-mill purposes. Salmon Falls, about 14 feet high, is situated near the upper end of this ascent. Thence to Vanceboro, at the foot of the Eastern Grand Lakes, there is a succession of still waters, rips and rapids, with several low falls, the most important of which, called Sprague's Falls, $10\frac{3}{4}$ miles above the Calais-St. Stephen bridge, has a total height of 25 feet, distributed over a distance of 114 rods. The length of the river from Vanceboro to the Calais-St. Stephen bridge is $54\frac{1}{2}$ miles, its total descent in that distance being about 380 feet. This part of the river is not navigable. It receives a number of small tributary streams from both sides.

At Vanceboro' begin the Eastern Grand Lakes, consisting in succession of First Lake, Second or Spednic Lake, Mud Lake, Grand Lake and North Lake, with their connecting thoroughfares, the total length of the chain by channel route being about 42 miles. They are navigable in part, especially Grand Lake, by boats of moderate size. Small steamers or steam launches are now used upon them to a slight extent. Monument Stream empties into North Lake.

The west branch of the St. Croix River is similar in character to the east branch, and is about 9 miles long from its mouth to Princeton. The Western Grand Lakes, of which it is the outlet, cover a considerable area, the individual lakes composing it being, as a rule, more completely separated from one another than those of the eastern chain. The following waters, named in the order of their succession from the town of Princeton, are all that need be considered in this connection, namely, Lewey's Lake, Long Lake, Big Lake, Grand Lake Stream, and Grand Lake.

International Interests.—The international interests relate to (1) the protection of three species of anadromous fishes, the salmon (*Salmo salar*), shad (*Alosa sapidissima*), and alewife (*Pomolobus pseudoharengus*), (2) the protection of several game fishes in the upper waters of the system, (3) the regulation of certain minor fisheries on the Grand Lakes, and (4) navigation in the tidal part of the river.

Salt water fisheries.—The purely salt water fisheries in the lower part of the St. Croix River are considered separately, under the heading of Passamaquoddy Bay and vicinity.

IMPORTANT FISHES.

Salmon.—In the early times the St. Croix River was considered to be one of the most prolific salmon streams on the Atlantic Coast, and during a number of years it yielded a large annual catch, the fish being taken chiefly at and below Salmon Falls, in the upper part of Calais and St. Stephen, as they were making their way up the rapids. It was then the custom for re-idents of the neighbouring country to resort to this favoured spot at the proper season, for the purpose of obtaining supplies for their own use, and some market fishing was also engaged in. The fishery was carried on principally by means of dip nets, and while no records have been preserved to show the quantity actually caught in any year, statements recently secured from persons then living in the vicinity, furnish ample proof that the salmon ascended this river in extraordinary numbers. Daily catches of at least 100 barrels have been reported, and it is also stated that a single individual would occasionally obtain as many as 50 to 100, and even more, salmon in the same length

of time by the use of dip nets only. Large quantities were speared by the Indians, and gill nets and traps were early introduced for their capture in the tidal part of the river.

Until 1825 the salmon are said to have had a free passage-way to their spawning grounds, but in that year the first closed dam was built, at the head of tide, which remained unprovided with a fishway for many years. Although a few salmon were able to work over it at high water, it acted virtually as a check upon their movements, and in connection with pollutions and the extensive fishing then being carried on was the means of diminishing their numbers at a rapid rate. In 1850 it was estimated that the catch for the entire river did not exceed 200, and during the next 15 years the quantity taken annually remained very small, amounting in some seasons to only about 100. In 1866 and 1867 an increase was reported. Since then the catch has fluctuated from year to year, but no complete statistics of the same have been obtainable. The run is still so small, however, as to bear no comparison with its condition in the early part of the century. None of the lower dams has been without a fishway since 1869, however, and the failure of the stock to replenish more rapidly must be charged against the excessively polluted and encumbered condition of the river due mainly to the saw-mills.

The legitimate market fishery for salmon during recent years has been limited to a few trap nets located on the Maine side between The Ledge and Red Beach, and a few gill nets used chiefly in the upper part of tidal water at Calais and St. Stephen. Poaching is also carried on more or less extensively above the Calais-St. Stephen bridge by means of nets, and in the pools about the dams, by different methods. Very little fishing was ever done above Salmon Falls, nor do the fish seem to be sought for at present in any of the upper waters.

The St. Croix River receives a number of tributary streams which are said to be suited to the spawning habits of the salmon, and to some of these the fish are known to have resorted formerly. These streams all enter the main river above the Calais-St. Stephen set of dams, the lower two being the Magurrewock, on the Maine side, in the upper part of Calais, and the Moannes, on the New Brunswick side, opposite Baring, Me. The entire distribution of the spawning grounds of this species, however, has never been accurately determined. Salmon have been seen in the past as far up as Vanceboro' on the east branch, and in the upper part of Grand Lake Stream, on the west branch, but only a very few examples have been authoritatively identified from those places. To what extent they may have entered the lakes at the head of both branches is unknown, but it is probable that the bulk of the spawning was accomplished in lower tributaries.

Shad.—Shad were very plentiful in the St. Croix River before the construction of the lower or Union dam in 1825, and made their way over Salmon Falls in large numbers, being captured there in the same manner as the salmon. We have not been able to obtain any reliable information respecting their subsequent history, except that they rapidly disappeared, and for some years have been practically absent from the river, although a very few are observed occasionally. Their virtual extermination may readily be accounted for on the very plausible supposition that their original spawning grounds were located in that part of the main river above Salmon Falls, which is now more or less covered by the beds of saw-mill refuse and bark. The very foul condition of the water may also tend to hold them back, and their natural timidity, much greater than that of the salmon or alewives, may deter them from making use of the fishways through the dams.

Alewives.—The alewife is the third species of fish of anadromous habit which used to pass the tidal limit at Calais and St. Stephen, and find at least a part of its spawning grounds above Salmon Falls, at which place it was captured in immense quantities every season. Like the salmon and the shad, its ascent of the main river was impeded for a long period by the dam at Union Mills, but since the introduction of the fishway there it has renewed its upward movement, although in greatly diminished numbers. Its abundance is said to have fluctuated from time to time, but during the past few years a more marked increase has been reported from

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several sources. Nothing definite could be learned respecting the present limit of its migrations up stream. Large quantities are seen every season both below and above Union Dam, and some have been noticed in places higher up the river, but if large schools now ascend beyond the upper dams at Milltown, that fact has escaped general observation. It is probable, however, that many do reach the still water above. The alewives have been less affected by the obstructions and pollutions than either the salmon or the shad, as they have had more or less uninterrupted access, for spawning purposes, to a number of tributary streams which enter the St. Croix River below Calais and St. Stephen. Their extermination in the St. Croix River system has thereby been prevented, and they have continued present in greater or less abundance. This species is not regarded with the same favour now as formerly in this region, and gives rise to only a limited fishery. Small quantities are taken in the few weirs above Red Beach, Maine, on Porter's Mill Stream, New Brunswick, and probably also in some other places.

Land-locked Salmon and Brook Trout.—Besides the sea salmon, the important game fishes found in the St. Croix River system are the land-locked salmon (*Salmo salar sebago*) and the brook trout (*Salvelinus fontinalis*). The "togue" or lake trout (*Cristivomer namaycush*) should probably also be included in this category. The land-locked salmon belong to both series of lakes forming the headwaters of the St. Croix River, but we did not learn of their presence in either the east or west branch except as they may possibly enter them for spawning purposes. Some of the lakes are much better suited to them than others, in which they may be scarce or practically lacking; and there are also certain streams which are better adapted to their spawning, the most noteworthy being Grand Lake stream of the western system. The land-locked salmon have everywhere decreased greatly in abundance, and at the present time they are said to be far less common in the eastern than in the western lakes. We were unable to obtain much information respecting them in the Eastern Grand Lakes beyond the commonly accepted fact that they were at one time very abundant there and quite generally distributed. Two of their principal spawning streams have been the one connecting Grand Lake with Mud Lake, and that draining the latter lake, both of which are now obstructed by dams at or near their entrances, the former being also seriously affected by tannery refuse below Forest City. These agencies alone would have been sufficient to cause the present depletion in both the lakes mentioned, and it is said that the dams and tannery at Vanceboro' have had a similar influence upon the fish in the lower lake.

Brook trout are reported to have been very plentiful at one time throughout the St. Croix River system in all of the many situations favourable to their existence. A marked decrease was reported by all of our informants, and, as this can be traced only in part to the pollution of the water, it has probably been caused chiefly by over-fishing and the extensive log-driving.

The "togue" occur in parts of both the Eastern and Western Grand Lakes, where they are fished for to some extent by trolling, but mainly by the use of lines through the ice in winter.

Market fishing in the Grand Lakes.—A very small amount of market fishing is carried on in the Eastern Grand Lakes by means of nets, the principal species said to be so taken being pike (*Lucius*), white perch, suckers and whitefish, which are shipped through Vanceboro' to different places in Maine and to Boston. While this method of fishing has been permitted in New Brunswick waters, it is prohibited on the Maine side, but the state law is said to be constantly evaded. The nets are employed mainly, if not entirely, in the lower shallow lakes, where excessive fishing by that method could not fail to have a serious result. The pike and white perch can readily be caught by means of hooks, a method followed to some extent in the Western Grand Lakes, especially through the ice in winter.

NAVIGATION.

On the St. Croix River system above Calais and St. Stephen the means of water communication are very limited, and have been utilized only to a slight extent. In

the upper part of tidal water, however, certain conditions prevail which affect navigation as well as the fisheries so seriously as to call for radical measures of relief in the interests of both. The conditions in question have been brought about by the practice, which still continues, of allowing the rubbish from the saw-mills near at hand to pass into the stream. The natural result has been to cause a general filling of the river bed from near the head of tide to the neighbourhood of The Ledge, a distance of about four and a half miles, thereby occasioning much inconvenience to the extensive shipping trade which centres at Calais and St. Stephen. As the exports from those two places consist chiefly of lumber, the product of the mills from which the refuse is derived, and the shipping and manufacturing interests are, therefore, practically identical, there is less local complaint with respect to this source of annoyance than would otherwise be the case. Many vessels, especially the larger ones and those not acquainted with the region, receive their cargoes at The Ledge, where there is good anchorage, while others proceed to the wharfs above, which they must approach at high water, as they become stranded on the soft bottom when the tide recedes. The Eastport-Calais steamer, drawing $5\frac{1}{2}$ feet at the time of our visit, makes use of two wharfs, an upper one near the bridge, which is the only convenient landing place for freight, and a second one nearly $1\frac{1}{2}$ miles further down. Between thirty and forty years ago, it is stated on good authority, a steamer of the same draught had no difficulty in making the upper wharf at all times except during extreme low spring tides. At present there is only about 3 feet of water abreast of that wharf at ordinary low tide, and for many years the lower wharf has been utilized for landing passengers when the tide serves badly. Some fifteen years ago it is reported that the depth of water in front of this wharf was about 12 feet; now the regular passenger steamer often grounds there even an hour or more before low tide, and it is not an unusual event for through passengers bound for Boston or St. John to lose their railroad connections in consequence.

The testimony of the older residents of Calais and St. Stephen, respecting the changes which have taken place during their experience, in the depth of water off and about the wharfs was found to be so conflicting that no satisfactory conclusions could be deduced from their several statements in that regard. Our inquiries, therefore, were extended to include a detailed hydrographic survey of this part of the river, in order to obtain data for comparison with the results of earlier government investigations in the same region, as described below.

OBSTRUCTIONS AND POLLUTIONS.

Natural obstructions.—None of the falls and rapids on the St. Croix River were sufficiently high and abrupt, in their natural condition, to prevent the ascent of the anadromous fishes. Salmon Falls did impede their passage to a certain extent, thereby causing them to congregate in considerable abundance in the pools below and on its slope and affording fishermen convenient opportunities to decimate their numbers, but they were able to surmount this swift water and to reach their spawning grounds above. Sprague's Falls and Grand Falls, higher up the river, are also said not to act as barriers, at least as regards the salmon, the only species that requires access to the upper streams.

Dams.—Beginning at the head of tide water is a series of four dams, designed to control the water power lying between the upper part of Calais, Maine, and Milltown and the upper part of St. Stephen, New Brunswick. These dams, named in the order of their succession from below, are designated as Union Dam, Cotton Mill Dam, Third Dam, and Fourth Dam. The first and the last two were constructed early in this century, Union Dam in 1825. Cotton Mill Dam was erected in 1881, and was built to conform to the irregular outline of Salmon Falls, which it almost completely covers. Until 1869 Union Dam remained without a fishway, and during that period it was, therefore, a serious obstruction to the ascent of all anadromous fishes, although salmon are said to have made their way over it to a limited extent at times of very high tide.

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The Cotton Mill Dam has had a suitable fishway since the fall of 1881, but the latter is located alongside of the mill with its lower entrance just below the outlet of the drain through which the waste from the mill empties into the river. For convenience in driving logs past this dam, a chute has recently been excavated through the solid rock on the Maine side of the river. Although the water rushes through it at a rapid rate, its incline is not so great but that it may be used by the salmon, which are reported to have been seen ascending it, and the opinion generally prevails that it is better adapted to their wants than the ladder on the other side. Unfortunately, however, during times of drought it becomes necessary to place a temporary dam at the head of the chute, thereby entirely cutting off its flow of water.

The third and fourth dams consist essentially each of two wing dams, one extending offshore and up stream from each side of the river, and having an open channel between which entirely obviates the necessity for fishways. These passageways, however, are liable to be choked with logs and we found the upper one entirely impassable for fish from this cause at the time of our visit. Log booms could readily be arranged to prevent this occurrence.

A fifth dam is located at Baring, Maine, $5\frac{1}{2}$ miles above the Calais-St. Stephen Bridge, and although it extends practically across the river, much water is said to escape around the Baring end at some seasons. There is also fishway of suitable pattern near the centre of the dam, but it is reported to be generally out of repair.

No other dams are encountered until near the head of each branch. At Vanceboro', on the east branch, there are two dams, one with a fishway at the tannery, and another about 500 yards farther up stream. The latter, used in connection with log driving, has no fishway, but is provided with 5 gates, one or more of which are supposed to be open at all times except during a few weeks in the spring. Following up through the Eastern Grand Lakes there is a driving dam with 2 gates at the heads of Grand Lake stream where it leaves Mud Lake, and a similar dam with one gate, used also by a saw-mill and tannery, at Forest City. The gates in both of these dams were shut down at the time of our visit, and, judging from appearances, they had been closed for a long time. Above Forest City the only obstructions of this character are small driving dams in many of the streams flowing into the several lakes.

At Princeton, just below the head of west branch, there is a combination driving and power dam, with an elaborate fishway now in poor condition. The next dam is at the head of the Western Grand Lake stream, and is provided with log gates only. Many of the streams tributary to the Western Grand Lakes also have log driving dams the same as on the eastern system.

We find, therefore, that, with one exception, all of the dams reaching entirely across stream on the main St. Croix River and its west branch are provided with fishways, for the most part of suitable design, although some improvements in that respect are advisable and insufficient steps have heretofore been taken to insure their proper maintenance.

The dams at Vanceboro' and Forest City, those at the head of both Grand Lake streams, and some of the driving dams in the tributaries of the lakes, having no fishways, may be closed entirely for any length of time at the option of their owners, and might, therefore, readily be made to interfere with the spawning movements of the land-locked salmon and trout, but to what extent this may have taken place it has been impossible to ascertain.

Saw-mill refuse.—Ever since the beginning of the milling industry on this river, at the commencement of the present century, it has been the custom for the different saw-mills to allow the waste produced in cutting lumber to fall into the water, as the most convenient means of disposing of it. The result of this practice, long continued, has been to bring about conditions in certain parts of the river which are detrimental to other interests. This has been especially the case in the vicinity of Calais and St. Stephen, where both the fisheries and navigation have been seriously affected. The principal saw-mills in this neighbourhood are located at

Union, Third, and Fourth dams, from about two-thirds of a mile to one and two-third miles above the Calais-St. Stephen Bridge. Other mills are situated at Baring, about three and one-half miles farther up the river.

The part of the river containing Union, Third, and Fourth dams is much constricted and descends rapidly, producing continuously swift water throughout nearly the entire distance. Consequently a large proportion of the saw-mill refuse entering the water in this district finds its way directly into the tidal part of the river where much of it falls to the bottom, the remainder being carried seaward and soon dissipated.

The saw-mill waste consists of saw-dust, edgings, slabs, and other pieces of wood, planer shavings, shingle saw-dust, bark, &c. Formerly all of such waste that could not be utilized was dumped into the river. In 1871 a law was passed by the state of Maine which prohibited this practice, but no attention seems to have been paid to it until about 1883. At that time the mill owners on both sides of the river united, in their own interest, to partly remedy the matter by withholding all kinds of waste except saw-dust, as the floating wood set adrift at one dam caused more or less annoyance to the mills on the next dam below. The reason assigned for not also retaining the saw-dust was that the mills were not suitably constructed to permit of so doing, the saws being placed so near the level of the water that no device could be interposed to catch and hold it. At present, therefore, it is intended that only the saw-dust shall enter the river from the mills, the coarser kinds of refuse being burned or otherwise disposed of on the land, although a relatively small quantity continues to escape.

Bark is one of the most obnoxious features in all rivers, where lumbering is carried on extensively, and in the past large quantities were undoubtedly thrown out from the mills in question. The principal source of this nuisance, however, is furnished by the floating logs before they reach the mills, and for this no remedy can be suggested. The bottom of the river in many places is said to be much encumbered by this class of rubbish.

The effect produced at Calais and St. Stephen by the throwing of saw-mill refuse into the river is manifested in two ways: first, by the formation of extensive beds of extraneous matter on the bottom; and, second, by what may be regarded as an actual pollution of the water. The beds of edgings, saw-dust, &c., occupy a considerable area between the several mill-dams wherever the conditions are such as to cause their retention, the rubbish being piled many feet deep in places, as between the Cotton Mill Dam and Fourth Dam. Through this mass the swift current cuts deep and narrow channels, on either side of which the soft material reaches nearly or quite to the surface of the water.

At the Calais-St. Stephen Bridge, in tidal water, the deposits begin again and continue to near The Ledge, their extent and depth varying in different places in accordance with the contour of the bottom and the windings of the channel. The original river bed has been very greatly altered by this means, to the serious detriment especially of navigation. The edgings, slabs and bark constitute the most objectionable features of the saw-mill waste in this respect, as they tend to mat together, and after becoming water-logged and massed upon the bottom they are exceedingly difficult to move. They also serve to collect and hold the saw-dust and silt, which fill the interspaces and help to solidify the banks. As the saw-dust retains its buoyancy for a longer time than the coarser materials, it is carried farthest down stream, where it largely predominates.

The deposition and consequently the accumulation of saw-mill refuse takes place mainly during the seasons of low water in the river. The freshets and moving ice tend to remove it, and naturally have the greatest effect upon the sawdust and other lighter materials. The fact that the beds of rubbish persist throughout the year, however, clearly indicates that in the long run the influence of the freshets has not been adequate to overcome the effects produced by the outpourings of so many mills. In consequence of the reform instituted about 1883, through the agency of the mill owners, whereby only the saw-dust is allowed to enter the water, it is claimed locally that the chief objection raised to the practice of so disposing of the

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waste has been removed, and that the scouring action of the freshets each season is sufficient for the removal of all accumulations which took place during the year preceding. The results of a recent examination tend, in a measure, to substantiate this belief as regards the tidal part of the river.

That part of the river lying between The Ledge and the Calais-St. Stephen bridge was made the subject of a hydrographic survey in 1873, under the direction of General George Thom, of the Engineer Corps, United States Army, and again in 1887 by the United States Coast and Geodetic Survey. In order to determine the condition of the channel at the time of our inquiry, two investigations were conducted by the United States Fish Commission, in 1893 and 1894 respectively. The former was designed to disclose the thickness of the beds of saw-mill waste by probing, while the latter was carried on in accordance with the same plan as the surveys of the Engineer Corps and Coast Survey.

A comparison of the data furnished by these surveys affords the following results, the figures being for the width of the channel between low water mark on either side: In accordance with the survey of 1873 the volume of water within these limits was 4,914,192 cubic yards; by the observations of 1887 this volume was reduced to 3,824,907 cubic yards, showing a filling in during that period to the extent of 1,089,285 cubic yards. The Fish Commission survey of 1894, however, indicates a volume of 5,083,166 cubic yards of water, an increase since 1873 of 168,974 cubic yards, and since 1887 of 1,258,259 cubic yards. Owing to the more or less yielding character and constant shifting of the refuse beds it cannot be assumed that the increase or decrease in their extent has continued uniformly, but the figures given above are at least significant of changes which have taken place, and point to a marked improvement in the condition of the river channel since the coarser refuse has been withheld. Notwithstanding the general improvement thus demonstrated, however, the continued grounding of the passenger steamer on the saw-dust beds off the lower Calais wharf at very low water, and its inability to reach the upper landing at lower stages of the tide than formerly, show that the same benefits have not been felt in all locations.

The general tendency of the ebb tide current is to deposit the saw-dust along or near the shores, while, in dry weather at least, the flood tide lifts the upper layers of these beds and carries them up and out into the stream until, becoming again saturated, the material falls to the bottom throughout the deeper portions of the channel. The wide distribution of the saw-dust is, therefore, aided by the alternating effects of the ebb and flood tide.

After a thorough consideration of the facts briefly set forth above and in spite of the favourable showing by the survey of 1894, we have been forced to the conclusion that the continued disposition through the agency of the river of even the saw-dust alone is detrimental to the interests of both navigation and the fisheries. While the former suffers through the changes produced in the configuration of the bottom, we are not prepared to say whether the deposits of saw-dust in tidal waters actually interfere with the movements of the anadromous fishes or not. Their spawning grounds naturally lie above the influence of salt water, and their impulse is simply to pass through this portion of the river. By its polluting influence, however the saw-dust certainly affects their welfare adversely. On both tides the water is more or less heavily charged with the fine particles of suspended woody fibre, which, in accordance with the degree of their saturation, are scattered through the different levels from top to bottom. The appearance of the stream is sufficient to indicate its uninviting condition, even had the pernicious effect of this character of pollution not previously been studied and demonstrated by others.

The anadromous fishes which ascend the river as far as Calais and St. Stephen must, at least, pass the lower or Union Dam to reach their spawning grounds. Those of the salmon occur in tributary streams, the lowest of which enters above Fourth Dam. The places which have been resorted to by the alewives and shad for spawning purposes are not definitely known, but it is possible that formerly one or other of those species found the conditions suitable between the cotton mill and fourth dam, although this is merely conjecture. Taking the most favourable view of

the case, however, all of the species in question would have to work their way past the four dams, encountering the same character of impediments as in the upper tidal waters, but in a greatly aggravated form—much narrower channels and a larger amount of suspended material. A few salmon and alewives still make the passage, but the shad, a more timid species, has ceased to frequent these waters.

Nothing positive has been learned respecting the present condition of the salmon tributaries, but they will probably demand some attention in case steps are taken to increase the supply. The spawning grounds of the shad and, to some extent, those of the alewives must have been located in the main river, where they have been more or less covered and damaged by the saw-mill refuse and the bark from floating logs.

There is only one saw-mill on the river above Baring, located at the head of west branch, in the town of Princeton, where all the waste is thrown into the stream. There are no sources of pollution of this character on east branch below the lakes.

Cotton Mill.—The only other important source of pollution on this river system below Vanceboro' and Princeton seems to be the large cotton mill (St. Croix Cotton Mill) situated in Milltown, N.B., by the side of the second dam at Salmon Falls. The testimony relative to the effects produced by the drainage from this mill is conflicting, and we were unable to remain a sufficient length of time on the spot to make our examination either thorough or conclusive.

The liquid waste passes out through a single drain having its outlet at the base of the dam near the mill, about 100 feet above the pool from which the fishway makes its ascent, although it is nearly 100 feet farther, around the edge of a rocky ledge, to the actual entrance to the fishway.

The bulk of the coarser sediment is supposed to be stopped by a catch basin extending below the level of the drain, but the sewage which escapes undoubtedly contains the usual quantity of chemical matter, both in solution and in suspension, composing the waste in all manufactories of this character. Although a list of the different chemicals employed in connection with the dyeing and bleaching processes, together with a statement of the quantity of each expended during stated periods, was furnished us, we had no means of determining the amount, character or strength of the mixtures when discharged from the vats.

A supply of pure water is said to enter the drain continuously from the river above the dam, filling it to a depth of about 6 inches, and serving both to flush it and to dilute its impurities. Sewage from one source or another also passes into the drain at practically all times when the mill is in operation, but the amount is much greater sometimes than at others. Moreover, a large part of this sewage consists of the water used in washing the yarns after bleaching and dyeing, and contains only a relatively small amount of foreign matter.

The harm caused by the sewage from the mill under present arrangements relates not so much to the general pollution of the water, even in the vicinity of the mill, as to the effect produced in driving the fish away from the pool through which they gain access to the fishway. The discoloured water from this source can often be distinguished for a considerable distance below the outlet of the drain. When the river is high, especially in the spring, the volume of water discharged over the dam becomes so great that the influence of the sewage must be imperceptible, but during the months when the salmon are working up stream the water is comparatively low and may become very low in the latter part of the season. It was in this condition at the time of our visit, in the early part of August, 1893.

The sewage does not, directly at least, effect the entrance to the log chute on the opposite side of the river, but the passage of water through that channel may be cut off for a considerable period during each year, as explained above. The pool below the cotton mill, however, has been and still remains the natural collecting place for the salmon before attempting to ascend the fall now capped by the high dam, and it seems to us that no better position could be selected for the fishway than the one it now occupies.

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In Great Britain, where the subject has been carefully studied, the practice of allowing the waste products from cotton mills to pass into streams containing important fisheries has been condemned as prejudicial to the latter.

Tanneries.—The first tanneries encountered, in ascending the St. Croix River, are located at the head of east branch and of west branch, in the towns of Vanceboro' and Princeton respectively. There is one such establishment at each of those places and also one at Forest City, above Vanceboro', and another on Grand Lake Stream, above Princeton.

The waste products derived from these tanneries are as follows: The salt liquid resulting from the first soaking of the skins in water; the lime liquor in which the skins are immersed in order to swell them and loosen the hair, the fleshings and hair resulting from the scraping of the skins; the waste tan liquor; the tan bark after leaching; and the water used in washing the skins after scraping and after their removal from the tan vats.

According to the report of the British Royal Commission of 1865, appointed to investigate the question of river pollution, "Outside the tanning community itself there can be but one opinion, which is, that the refuse matters from a tan-yard are disgusting in a high degree, and should on no account be allowed to pass into rivers."

It was formerly the custom at the several tanneries on the St. Croix River system to dispose practically of all refuse through the medium of the adjacent stream, as the most convenient means of effecting its removal. The result of this practice, as in the case of the saw-mills, was manifested in two ways, by the deposition of much sediment upon the bottom and by the actual pollution of the water. The former effect was produced by the dumping of the exhausted tan bark, enormous quantities of which were disposed of in this way, and it has been permanent. Carried down by the current it has found lodging places in the eddies and still waters, where, in some places, extensive banks have thus been formed. The fleshings have also stranded under the same conditions, and, retaining their foulness for long periods, have contributed materially, it is said, toward injuring many of the spawning beds of the land-locked salmon and brook trout. The other kinds of refuse, being in liquid-form, have only a transitory influence, the extent of which is to be measured by the frequency as well as the amount of their discharge.

Within a few years the more serious features of this practice have been remedied. The bark, fleshings, and hair are no longer allowed to pass into the water, although occasional infractions of the rule are reported. The bark is now utilized as fuel and the fleshings, to some extent, as fertilizer. It is also claimed that the discharge of tan liquor has mainly been stopped, being returned again to the leaches after each using. The sewage at present consists, therefore, principally of the liquor from the soaking vats, and the waters used in successive washings. The relatively small percentage of chemicals and of animal impurities contained in these liquids, taken in connection with the small number and isolated position of the tanneries, makes it improbable that this source of pollution is very important at the present time, but it is deemed advisable that all liquids discharged from these tanneries should be rendered entirely innocuous, if possible, by some system of filtration or precipitation.

The harm caused by the tanneries has been done mainly in the past, and is irremedial as regards the tan bark at least. The injury produced by this substance, as well as by the other kinds of tannery refuse has been especially severe in the Western Grand Lake stream and in the stream and lake below Forest City, where the abundance of the land-locked salmon more particularly has been affected by this means, although the brook trout has undoubtedly suffered much, if not equally, from the same cause.

Less is known respecting the former distribution and movements of these species in the vicinity of Vanceboro' and Princeton, but the testimony tends to show that one or both of them once frequented those localities within the area affected by tannery refuse, and while a few trout may still be taken there, the land-locked salmon has disappeared.

In case the sea salmon had spawning grounds in either of the lake systems, as seems probable to some extent, that species must also have felt the influence of this polluting agency.

SUMMARY OF CONDITIONS.

The results of our inquiries on the St. Croix River system may be summarized as follows:—

The salmon, shad, and alewives formerly ascended the St. Croix River in very large numbers and had important spawning grounds above the limits of tide water at Calais and St. Stephen. The abundance of each of those species, however, has decreased so greatly, beginning in the early part of the century, that of the salmon and alewives, only small annual runs have taken place for many years, while the shad has become virtually exterminated. The agencies chiefly concerned in causing this decrease have been the dams, the waste from saw-mills and other sources, and over fishing, the most of which have been remedied in part, but not nearly to the extent required for the replenishment or even for the rapid increase of the supply.

It seems probable that the original spawning grounds of the shad and alewives have been more or less permanently injured by deposits of bark and saw-mill refuse, and that the condition of the salmon streams has been impaired in many ways. The salmon is much the most important of these anadromous fishes and the one most deserving of attention, but whatever measures are taken in its interest will also benefit the others. While the alewives have comparatively little market value in this region, their importance as an article of food for several of the salt water species makes their preservation on a large scale exceedingly desirable.

The land-locked salmon and brook trout, important and at one time common game fishes, the former restricted to some of the lakes and connecting streams at the head of both branch rivers, the latter having a wide-spread distribution, have both greatly decreased. This is supposed to have been due to the combined influence of tannery and saw-mill waste, the smaller dams in the upper part of the system, and overfishing.

Net fishing for pike, white perch, suckers, and whitefish is carried on in some of the Eastern Grand Lakes, in which, owing to their small size and slight depth, the stock is said to have been much reduced and to be in danger of becoming practically exhausted. Hook and line fishing for the same species, exclusive of the whitefish, is followed on the lower of the Western Grand Lakes, and this method should also be adapted to the eastern chain.

The St. Croix River system presents exceptional advantages for the development of an important sport fishery, which, under judicious management, could not fail to secure much greater local benefits than any market fishery which these waters might be expected to support. We are, therefore, of the opinion that the entire river system, as regards its fishes, should be considered primarily from that standpoint. This would involve the limitation of salmon fishing and of fishing for all species in the fresh waters to hook and line methods, the enactment of other proper regulations, the improvement of the condition of the waters, and the increase of the more important species by artificial means.

We find that navigation in the upper part of tidal waters has been impeded during a long term of years through the deposition of refuse materials coming from the saw-mills, and while the conditions have been somewhat improved as a whole by the withholding of the coarser kinds of refuse since about 1883, adequate relief cannot be secured until the practice of allowing any waste of this character to pass into the water has been entirely stopped.

RECOMMENDATIONS.

In conformity with the statements and suggestions made above, the following remedial measures are recommended:—

1. That the disposal, through the medium of water, of all kinds of saw-mill refuse be prohibited throughout the entire river system. Saw-dust is the only kind

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of such refuse now understood to be disposed of in this manner, and its retention on land can undoubtedly be provided for at comparatively slight expense, as has been done in other places.

2. That all extraneous material encumbering the channel of the river in tidal water between the Calais-St. Stephen Bridge and The Ledge, and resulting from the deposition of saw-mill refuse, be removed. This measure is requested in the interest especially of navigation, but there is no doubt that the fisheries would also be benefited thereby. We do not consider, however, that such a step would be justifiable while the practice of allowing said refuse to escape into the river still continues. It would also be of great advantage to the fisheries if the beds of saw-mill refuse occurring between Union Dam and Fourth Dam, above tidal waters, could be removed to the extent of providing, at least, a wider and more direct channel for the passage of salmon.

3. That the sewage from the St. Croix cotton mill be disposed of in such manner as to prevent any harmful influence upon the salmon in that vicinity during their ascent of the river.

4. That the tanneries be prohibited from using the streams adjacent to them for the disposal of tan bark, tan liquor, fleshings, hair or other refuse which may be deleterious to fishes. All liquids from the washings of the hides, containing any harmful ingredients, should be purified before being allowed to enter the stream.

5. That all fishways and passageways through the several dams be placed in good repair and be modified, where necessary, to insure their greater efficiency; and that, subsequently, they be maintained in proper condition, and their approaches kept clear of drift materials. The construction of all new dams should be subject to government authority, and should conform to such requirements in each case as the circumstance may warrant.

6. That in the case of all log-driving dams, provision be made to keep one or more of the gates open at all times when their use is not actually required in connection with the driving of logs.

7. That in those streams to which the salmon resort for spawning purposes all sources of pollution be restrained, and all obstructions and existing impurities be removed so far as possible.

8. That net fishing be prohibited throughout the fresh water of the system.

9. That the capture of salmon in the neighbourhood of their spawning grounds and in the approaches to fishways, or by any means except hook and line, be prohibited.

10. That appropriate and uniform regulations be established with respect to all classes of fishing in the fresh waters of the system, the same having reference to methods and extent of fishing, close seasons, &c.

11. That, in the event of the removal of all obstructions and polluting agencies, and the establishment and enforcement of suitable regulations, the increase of the supply of both salmon and land-locked salmon by artificial means, be attempted through the co-operation of the two governments.

PASSAMAQUODDY BAY AND VICINITY.

DESCRIPTION OF THE WATERS.

The boundary waters which it is necessary to consider in connection with Passamaquoddy Bay and vicinity are confined within an area extending from West Quoddy Head, in Maine, to Point Lepreau, in New Brunswick, and from Grand Manan to the vicinity of Robbinston, Maine. The shores are irregular and broken with numerous headlands and bays, while the waters are studded with islands, both large and small, offering many facilities for the prosecution of the characteristic fisheries of the region. The rise and fall of the tide varies from 15 to 26 feet, causing strong

currents of very complex distribution. These conditions are especially favourable for the method of fishing with brush weirs which has been found most efficient in catching the small herring with which the region teems. The district is distinguished as being the centre of the sardine canning industry. Upon the Maine shore there were in 1895, 36 canneries, employing 4,564 hands, which turned out a product of 682,040 cases, valued at \$1,644,379. On the Canadian side there is in this region but one sardine cannery.

FISHES AND FISHERIES.

The principal fishes of the Passamaquoddy region are as follows:—

Herring (*Clupea harengus*), hake (*Phycis tenuis* and *Phycis chuss*), pollock (*Pollachius virens*), haddock (*Melanogrammis aeglefinus*), cod (*Gadus callarias*), smelt (*Osmerus mordax*), and lobsters (*Homarus americanus*).

Herring.—The herring is by far the most important species, and the prosperity of the fishing communities depends almost entirely on its abundance. The line fisherman finds it the most readily procured and serviceable bait, and moreover, the abundance of the species which he seeks is largely regulated by its presence or absence. When, for any reason, the great schools of herring fail to appear, the cod, the haddock and especially the pollock are less plentiful, being largely dependent upon these schools for food. The lobsterman also has difficulty in prosecuting his calling when the herring are scarce.

The immense quantity of young herring now used in the production of sardines, in addition to the large ones smoked and pickled, has made the species of vastly greater commercial importance than all the others of the region. For two reasons then, its own importance for food, and its value as a bait in the prosecution of the line fishery for pollock, haddock and cod, the prosperity of the fishing communities of the region, and of others depending largely on them, is governed by the condition of the herring supply.

The herring here occurring is the same species which has long constituted an important item in the wealth of certain countries of Northern Europe. On the Atlantic coast of North America its southern limit appears to be in the vicinity of Block Island, although small bodies are occasionally seen further south, while to the north it is known to extend well up the Labrador coast.

Although other places may be more important for the catch of adults, Passamaquoddy Bay stands pre-eminent in respect to the abundance of young herring, such as are used in the production of sardines. Formerly these herring, from 6 to 10 inches long, were in demand for the manufacture of oil, but it was not until the perfection of the canning process in 1878 that their great value for canning was recognized. They remain in the vicinity of Passamaquoddy Bay throughout the year, but during the cooler and rougher months they do not approach the shore so closely as to be taken in the weirs in any considerable quantity.

Much apprehension has at various times existed among fishermen and dealers concerning the effect of the sardine industry upon the supply of herring, it being predicted that the continued capture of such enormous quantities of immature fish must exhaust the supply. Our observations lead us to believe that these apprehensions are not so far warranted. Taking into consideration the entire Passamaquoddy region before described, more herring were taken in 1894 and 1895 than ever before; this was especially the case with sardine herring, many more being caught than could be utilized by the canneries, notwithstanding the fact that the pack was unprecedented. In consequence of this, many of the weirs were rarely fished, although containing an abundance of herring. The young of other fishes, such as alewives, pollock, hake and mackerel are occasionally taken with the herring in the weirs but never in great quantities.

Those who were apprehensive of a failure held that the catch was kept up by an increase in the number of weirs, and not by the maintenance of an average catch per weir. An examination of the records shows this assumption to be totally

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unwarranted. Since 1879, when the sardine industry began to assume considerable proportions, the total catch has increased in a greater proportion than the number of weirs. In 1879 and 1880 the average yield per weir was 80 hhd., irrespective of the use to which the herring was put; in 1893 the average was 148 hhd.; while in 1895 the average was no less than 171 hhd. per weir. Recent advices from Eastport and Lubec state that the young herring have this year appeared at those points in unprecedented abundance, and some of the canneries have obtained part of their supply by simply dipping their fish from the wharfs by means of dip nets. A careful consideration of this whole subject, carried on since 1893, indicates that with the present conditions there is no need for alarm concerning the supply of young herring.

The smoked herring trade is now of less importance than it was formerly, but it still gives employment to a number of persons. The centres of the smoking industry are at Lubec and Grand Manan, but smoke-houses are scattered at intervals along the entire shore of the Passamaquoddy district.

Herring are not now salted or pickled to any great extent in this region, the industry being much less extensive than formerly when large quantities were imported from the Magdalen Islands to Eastport to be cured, their transportation and handling giving employment to a number of vessels and men. No pickling herring are now brought from a distance, the supply being derived mainly from Grand Manan and the spawning grounds near Machias. When regular runs of the fine "Quoddy River" herring occurred they were used mainly for pickling, but for a number of years this run of fish has been practically absent.

Winter herring.—The fishery for winter herring began to attract attention about 1864 and soon assumed important proportions, reaching its maximum between 1880 and 1885, and ceasing entirely in 1889, owing to the non-appearance of the schools upon the coast. The winter herring were adult fish, which were shipped to market in a frozen condition, and were used either for food or for bait in the line fisheries.

It would seem that these schools of winter herring appeared first off Grand Manan, soon afterwards at Campobello, thence moving into St. Andrew's Bay; sometime the schools would divide, a portion only entering St. Andrew's Bay, and another portion passing on up the Bay of Fundy. Between 1877 and 1883, a change in the regular habits of these schools began to manifest itself. The date of their first appearance became gradually later until in 1889, the last year of their occurrence, they did not arrive at Campobello until about January 10. Coincident with this retrogression in the date of their arrival they manifested a tendency to remain further off shore, and the fishery, which was entirely by means of gill-nets, moved out into deep water also. Though the fish were latterly more difficult to take on account of their being further off shore, there was no great diminution in their numbers, and the theory that they were caught up is untenable. The only explanation of their absence since 1889 is that they now spend the winter months elsewhere. Their actions during the last decade of the fishery closely resembled those which are said to presage the unexplained periodical disappearance of herring from some portions of the coast of Europe. It is believed that in the case of the winter herring in this region we may have a periodicity not before recognized on account of the short time during which the fishery has been pursued.

The absence of the winter school of herring has apparently had no effect upon the numbers of young herring in the Passamaquoddy district.

Line fisheries.—In the Passamaquoddy region, exclusive of Grand Manan, it is estimated that there are about 1,200 men employed in the hook and line fisheries for hake, haddock, pollock and cod.

The hake fishery is conducted on the outer shore of Campobello and eastward. It is a trawl fishery solely, being at its height in July and August. The haddock fishery is next in importance. This species is caught both in the Bay of Fundy and in the inside waters of Passamaquoddy Bay. The fishery is by means of trawls; it begins about 15th May and continues sometimes until January. The pollock fishery appears to be characteristic of the vicinity of Eastport; it is a handline fishery and

is confined to the inshore grounds. The fish usually arrive about the middle of June and remain until 25th July, a second school coming about 15th August and lasting until the end of September. There is no distinct fishery for cod, this species being taken with the haddock. It appears to be most abundant in the spring.

Smelt.—The smelt fishery in the vicinity of Passamaquoddy Bay is very limited. At Pembroke and other places in Cobscook Bay, west of Eastport, some bag net fishing is done under the ice. The fishery is also followed at some places in New Brunswick, but the output of the entire region is inconsiderable.

Lobster.—Since the failure of the winter herring fishery in 1889 there has been a marked increase in the importance of the lobster fishery. For many years, prior to that time, lobsters had been shipped from this region, but the fishery was carried on only in the spring, and was confined to the shallow waters near the shores. With the failure of the winter herring fishery, many men, finding themselves without employment, turned their attention to the capture of lobsters. They soon found that traps could be fished profitably in deep water, and the fishery was pushed with a greatly increased vigour. Although the number of lobster pots, as given in the statistics for Charlotte County, N.B., shows practically no increase since 1890, there is no doubt that the traps are fished during a greater portion of the year. Formerly lobstermen did not go far from home to engage in this work, but now traps are set all along the coast, fishermen leaving their home waters as soon as a falling off is manifested there. As a result of this extending of the fishery, the catch was doubled between 1890 and 1894, while its value was almost trebled. The following table gives the catch and value for the New Brunswick coast between Grand Manan and Point Lepreau, for the five years ending with 1894:

Year.	Fresh. Tons.	Canned. Lbs.	Value.
1890.....	657	.....	\$39,420 00
1891.....	553	31,056	26,467 84
1892.....	748	1,440	30,131 60
1893.....	944	7,000	76,540 00
1894.....	1,324	3,000	99,720 00

The fishery has assumed an importance which merits attention, and an effort should be made to regulate its needlessly destructive features, as, wherever the lobster fishery has been extensively prosecuted, the invariable experience has been that in the course of time depletion, and often utter failure have followed. The continued capture of small individuals, which have not yet reached the age of sexual maturity, cannot do less than precipitate the end. Such lobsters are used only for canning or for shipment to markets where no size limits are enforced, and the price which the fishermen receive for them is insignificant and pitiful, when we consider the effect of their capture upon the fishery and the prices received for the mature lobster. If permitted a year's further growth many of these "shorts" would be given a value five or ten times that which the fisherman receives by their premature capture. Owing to the sedentary habits of the lobster, individuals returned to the water for further growth would not be likely to stray far from their place of liberation, and the fisherman of any locality where this practice was followed would themselves reap the benefit of their own forethought and prudence. Most of the fishermen are in favour of fixing the minimum size at 10½ inches, and a recent enactment in Maine compels the fishermen to return to the water all lobsters of less length. This has caused the closing of certain lobster canneries in that state, but has relieved one of the greatest drains upon the fishery. In Canada lobsters of a smaller size may be taken. As a consequence the only cannery at Eastport has been removed to the opposite Canadian shore where they can still continue to capture undersized and immature lobsters.

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Methods of the fishery.—Herring are taken in weirs and with gill-nets. The weirs are built of brush and are generally situated in some small cove or on the side of some point where shelter is to be had and where the tide does not entirely dry out in the pot; they are roughly constructed by driving in upright stakes, about which the walls are built by introducing fine fir boughs. They are of no particular shape, being built to conform to the bottom where they are fished, the mouth of the weir faces the direction from which the herring are expected to run; the wings are, as a rule, short, and no attempt is made to lead and hold the fish by any system of hearts or tunnels such as is done in the ordinary pound net. The fish enter the weirs during high water, and having passed the wings go directly into the bowl or pot where they remain. A small seine is then used by the fishermen to capture the fish which are swimming about in the pot; when thus secured in the seine they are baled or dipped into the fishermen's boat. The line fishery is conducted with the same style of handline and trawl as is used all along the Atlantic Coast. Smelt are taken under the ice in the ordinary bag nets used for that purpose and with the hook and the line; they are not often caught in the weirs, as they do not strike in until that fishery is over. Seines are not used to any extent save for the purpose of gathering in the herring taken in the weirs.

RECOMMENDATIONS.

International fishery interests in Passamaquoddy Bay and its neighbourhood are concerned chiefly with the preservation of the herring, and as no decrease of that species has been proved, beyond the disappearance of the winter school, which cannot be attributed to over-fishing, it is not considered necessary to suggest any changes in the methods employed, and the only recommendations made are as follows:—

1. As the present regulation providing for a close season on the principal spawning grounds off Grand Manan has undoubtedly been a wise one, and may have, to some extent, aided in maintaining the supply of herring, it is recommended that it be continued, and that a similar close season be adopted for a part of the herring spawning grounds off Machias.

2. It is recommended that a regulation be adopted prohibiting the use of herring for the manufacture of oil or fertilizer.

3. It is recommended that the minimum size of lobster which may be taken be fixed at 10½ inches, and that all lobsters caught, by whatsoever means, under that size be returned alive to the water.

4. It should be made unlawful to take berried lobsters at any time.

5. With a view of protecting the smelt, a close season, extending from March 15 to July 1, is recommended, during which close season it should be unlawful to take smelt in any manner except with hook and line.

LAKE MEMPHREMAGOG.

Description of the lake.—Lake Memphremagog extends north and south across the international boundary line, being located partly in the province of Quebec and partly in the state of Vermont. It is elongate in shape, quite narrow in most places, and about 30 miles in length, two-thirds of which is in Canadian territory. Its outlet is the St. Francis River, a tributary of the St. Lawrence River. The depth is said not to exceed 60 feet in the southern part of the lake, but in the central and northern parts much deeper water occurs, the maximum recorded being over 600 feet, in the neighbourhood of Rondeau. The eastern shore is generally abrupt, but the western is boarded by shallow water.

Fishes.—The principal fishes of the lake are small-mouthed black bass, lake trout, whitefish, yellow perch, pike, bullheads, suckers, smelt, ling and eels.

Sport fishing.—Many anglers are attached to the region by the abundance of black bass (*Micropterus dolomieu*) and lake trout (*Cristivomer namaycush*); and the yellow perch (*Perca flavescens*) is also classed among the sport fishes. There are several resorts for sportsmen about the lake, the majority being on the Canadian side of the line.

Market fishing.—The lake trout and whitefish (*Coregonus labradoricus*) have given rise to a limited amount of net fishing, which in recent years, however, has been mainly abandoned. They are taken by means of seines in the shallow waters to which they resort for spawning in the latter part of October and in November, and also by gill nets in the same places, but to a greater extent in deeper water. Both species are said to be captured more or less in company on these grounds, which would seem to preclude the use of nets for the whitefish alone, unless it be for a very short period.

Trawl lines are set occasionally for the lake trout, and trolling for the same species is carried on during the spring, summer and fall—chiefly at the bottom in the summer, and at the surface in the spring and fall. The latter method of fishing is followed extensively by about fifteen persons who supply the local demand. The lake trout are also fished for through the ice in winter in depths of 25 to 100 feet by means of handlines, and are speared to a slight extent in the fall. This fishing is mainly limited to the area lying between the Mountain House and Lord's Island, in Canadian waters. The entire catch is said to be disposed of locally. Seining is now permitted only in the waters of Vermont.

Conclusions and Recommendations.—The interests of this lake can undoubtedly best be served by fostering the game fishes, and, in our opinion, this should be done to the extent of prohibiting all net fishing. The lake has become an angling resort of much importance, and as long as its attractions in that respect are properly maintained the local welfare will be benefited more materially through the influx of visitors than by the continuance of a commercial fishery dependent on so small a basis of supply as that furnished by these waters.

The use of spears, which are employed on the spawning grounds, is also to be regarded as detrimental and should be stopped.

It is further recommended that the black bass and lake trout be protected by close seasons, extending from 1st November to 15th June in the case of the former species, and from 1st September to 1st January in the case of the latter.

LAKE CHAMPLAIN.

Description of the Lake.—Lake Champlain is divided mainly between the states of Vermont and New York, but it extends a short distance into the province of Quebec. Its outlet, the Richelieu River, beginning just south of the international boundary line and flowing northward into the St. Lawrence River, lies almost entirely in Canada.

International Interests.—International interests are chiefly concerned with certain conditions and practices prevailing in the north-eastern arm of the lake, terminating in Missisquoi Bay, to which our inquiries were mainly restricted. We do not find that the Richelieu River, under existing circumstances, presents any questions for serious consideration in this respect.

Character and Extent of Fisheries.—From a fishery standpoint the principal interests of the lake are in the direction of sport fishing or angling, which now constitutes one of its chief attractions as well as an important source of local revenue. The opportunities for commercial fishing have always been very limited, and at the present time it has few, if any, fishermen who can be regarded as professional, those who engage in this business for profit being mostly farmers residing along the shores. Their operations have, at the most, been restricted to short seasons, and their yearly catch has been inconsiderable.

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In New York and Vermont the prevailing sentiment is strongly in favour of reserving the lake for sport fishing purposes, or at least of prohibiting all apparatus, such as nets and set lines, ordinarily employed to obtain supplies for market. It is contended that under such complete restrictions the pleasure travel to the region would be increased by the superior inducements held out for angling, and that more material benefits could be secured thereby than by the continuance of market fishing on the small basis here afforded. On the Canadian shores of Missisquoi Bay, however, net fishing is still looked upon with favour, and hence results the only serious contention respecting fishery matters which the lake presents.

The use of nets and practically all market fishing have been abolished by New York. The same status existed with respect to the Vermont waters of Lake Champlain in 1892. The regulations of Canada permit the use of seines along the shores of its territory during the spring and fall, when two species of fish enter Missisquoi Bay for the purpose of spawning. These are the wall-eyed pike, in the spring, and the whitefish, or shad-waiter, in the fall. The authorities of Vermont sought to secure the repeal by Canada of these fishing privileges, which resulted in the matter being referred to this joint commission. In the meantime the legislature of Vermont passed a law empowering the state fish commissioners to issue seining licenses to its fishermen in the event of operations being continued in Canadian waters. Advantage was taken of this provision in 1893, but by mutual agreement all fishing was stopped during 1894 and the spring of 1895. Vermont then legalized fall seining, to begin with the fall of 1895, a step considered by the Canadian government as terminating the temporary arrangement, and leading to the renewal of both spring and fall seining on both sides of the line. The main features of the seine fishery are as follows:—

Spring fishery.—In the spring the wall-eyed pike (*Stizostedion vitreum*) enter Missisquoi Bay in large numbers from the south along the eastern or Hog Island (Vermont) side of the long entrance. After remaining therein for a short period they return to the lake along the western or Alburgh shore. This movement is connected with their spawning habit, and is regularly repeated from year to year. While the species is widely distributed throughout the lake and must have many breeding places, the north-eastern arm apparently contains its most extensive and important spawning grounds. These grounds are located both in the open waters of Missisquoi Bay and in the lower parts of its tributary streams, the principal one being the Missisquoi River, which the fish ascend as far as Swanton.

There is more or less variation in the times of beginning and ending of the spawning movement, dependent upon seasonal conditions. The wall-eyed pike are said to begin to work north in February, the main run past Hog Island taking place in March and the early part of April, and the inward movement terminating between the middle and last of April. The return run along the Alburgh shore begins about the first of May and is generally completed by about the middle of that month; the heaviest part continues during only about two weeks. The movement up the Missisquoi River occurs in April and is of short duration, but in some years relatively large catches are made there by hook and line.

There is conflict of testimony respecting the actual time of spawning, but it seems to begin mainly about or slightly before the middle of April and to continue a week or two into May. By the laws of both Canada and Vermont, the close season for the species now begins on April 15. The wall-eyed pike taken on the seining grounds are said to be almost exclusively of mature size, ranging in weight from about $1\frac{1}{4}$ pounds up.

The only net fishing in this part of the lake which has been legally followed in recent years is the use of drag seines. The employment of such nets in the spring has been permitted by Canada between March 1 and April 15. All spring netting in Vermont waters was prohibited from about 1876 to 1892, when the contingent regulation before referred to was enacted, making an open season for seines, under certain conditions, between March 20 and April 15, but limiting their use to the waters north of a line connecting Stevenson's Point with Long Point. They were

so employed during the spring of 1893, were prohibited during 1894 and 1895 by arrangement with Canada, and were again permitted during the spring of 1896, when Canada once more licensed her fisherman, on the assumption that the passage of the Vermont law, granting unrestricted seining in the fall, virtually cancelled the agreement previously reached between the state and the Dominion. The number of seine licenses granted by Vermont in the spring of 1893, was 22, and in the spring of 1896, 32, every applicant who could show ownership or had a written lease to a regular seining ground within the limits prescribed, being recognized. In the Canadian waters of Missisquoi Bay, the number of seines employed has been from 10 to 15. The main part of the spring seining is done before the ice breaks up. It begins on the Hog Island shore, is taken up, subsequently, in Missisquoi Bay, and ends finally on the Alburgh shore. In former times when net fishing was unrestricted the use of seines was continued more or less during June, but as the fish did not collect together so abundantly as earlier in the season, smaller catches were made at that period, and the summer heat was detrimental to their preservation.

The wall-eyed pike are the principal object of the spring seining and the main feature of the catch at that season. The other species taken with it are perch, suckers, mullet, pike and sheepshead, the perch coming next in abundance after the wall-eyed pike. Very few black bass are captured in this connection. The total amount of the spring catch is relatively very small.

No satisfactory evidence has been obtained respecting the abundance of the wall-eyed pike at the present time as compared with the past. The statistics of the Canadian catch are not indicative of a decrease. The market fishermen on the Vermont shores are positive that no falling off has taken place, and the majority of the sport fishermen interviewed claim nothing more than a periodical fluctuation in abundance. Some of the latter, however, are confident that a general decrease has been manifested, although its extent has not been great.

Fall fishery.—The main object of the fall fishery has been the white fish or shad-waiter (*Coregonus labradoricus*), which, in its spawning movements, follows essentially the same course as the wall-eyed pike, entering Missisquoi Bay along the eastern shore and returning from it along the western shore. It has given rise, therefore, to essentially the same character of fishery, participated in by the same class of individuals. The run of the shad-waiter may begin as early as the latter part of September and continue through October and more or less of November. Its exact spawning time is not known, but it probably occurs mainly in November, although possibly commencing to some extent in October. Very few wall-eyed pike or black bass are captured in connection with it, the other part of the catch consisting essentially of the same species taken in the spring.

The common whitefish of the Great Lakes (*Coregonus clupeiformis*) is also supposed to be an inhabitant of Lake Champlain, the National Museum at Washington containing specimens received from that source some years ago, but *Coregonis labradoricus* is the only species which has been noticed in the seine catches recently examined. During most of the year the whitefish seems to resort to the deeper parts of the lake where no fishing is carried on and where it escapes observation. Practically nothing is known, therefore, regarding its distribution and habits except during the short breeding season when it comes into shallow water for the purpose of spawning. So far as we could learn, its spawning grounds are located mainly, if not exclusively, in the north-eastern arm of the lake. The fish are said to appear first in the shallow water between Butler's Island and Maquam, and to proceed thence through the passage by Hog Island into Missisquoi Bay, which they reach a week or two subsequently to their first arrival on the shore. So far as we could learn they never enter the Richelieu River.

No decrease has been observed in the abundance of this species. It is stated to range in size from about three-quarters of a pound to seven or eight pounds, but the majority taken in the seines are between one and a half and two and a half pounds in weight. The bulk of the catch is shipped fresh to New York, but some are salted for local use.

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The fall seining was intermitted in the waters of both Canada and Vermont during 1893 and 1894, as before explained, but in the latter year the Vermont legislature passed a law legalizing this fishery, which was, therefore, engaged in during the fall of 1895. The number of licenses issued by Vermont was 85.

Statistics of the seine fishery.—The amount of the Canadian catch is reported officially at the close of each year, but a discrimination is not made between the quantities taken in the spring and fall. The figures for the past ten years are given in the following table. The wall-eyed pike belong almost entirely to the spring catch, and the whitefish exclusively to the fall catch, but it is impossible to say what proportion of the miscellaneous kinds was obtained in each season. The number of seines employed varied from ten to fifteen.

STATISTICS of the Seine catch in the Canadian Waters of Missisquoi Bay from
1884 to 1893.

Year.	Wall-eyed Pike.	Whitefish	Miscellan- eous kinds.	Value.
	Lbs.	Lbs.	Lbs.	\$
1884.....	30,960	6,500	38,200	3,890
1885.....	17,000	5,400	36,000	2,620
1886.....	2,125	7,218	19,000	983
1887.....	22,800	11,400	34,200	3,078
1888.....	33,200	16,000	27,000	3,978
1889.....	22,000	11,375	33,400	3,004
1890.....	39,600	21,815	41,800	4,938
1891.....	32,440	12,340	44,400	3,694
1892.....	23,090	9,750	33,400	2,741
1893.....	29,440	6,250	35,200	2,903

No statistics of the seine catch by the fishermen of Vermont are obtainable except incomplete ones for the fall of 1895 and spring of 1896. In the former season the total value of the catch of both whitefish and miscellaneous species was \$6,478; in the latter the quantity of wall-eyed pike taken was 100 barrels, and of cull fish about 488 barrels, valued at \$5,175.

Sport fishing.—The black bass is the most important of the game fishes, but not being sufficiently abundant to meet the demands of the anglers, the latter fish extensively for the wall-eyed pike, and also consider the yellow perch as coming within their legitimate province. They desire to have both the black bass and wall-eyed pike reserved exclusively for sport purposes, but do not claim protection necessary for the yellow perch. The conditions for sport fishing are much the best in the northern half of the lake. There are a number of well known resorts and fishing camps for sportsmen, and every effort is being made by New York and Vermont to increase this class of tourist travel.

The lake trout is said to have been plentiful at one time in Lake Champlain, but it has practically disappeared.

Market Fishing Methods.—Seine fishing is one of the oldest methods that has been employed on Lake Champlain, and it has been carried on legitimately down to a later date than any other kind of net fishing, as before explained. Seines have been used in all parts of the lake, generally for the wall-eyed pike, at the northern end for whitefish, and at the extreme south principally for bullheads. Fall seining for whitefish was permitted by Vermont without restriction during October and November until 1892, and was again legalized in 1894.

Pound nets, trap nets and fyke nets were formerly employed to a limited extent, but their use has been prohibited during a number of years past. Both traps and

fyke nets, however, are still sometimes set surreptitiously, although this practice is deprecated as much by the seiners as by the sport fishermen. The latter kind of apparatus could undoubtedly be employed in many places so as to take only coarse varieties of fish without detriment to the sporting interests. It is permitted by Canada in the Richelieu River, and at the time of our examination in 1894, about 125 such nets were in use between St. John's and the head of the river. The open season is limited to the period from October to April, and the catch consists chiefly of bullheads, sunfish and eels. A few wall-eyed pike may be taken occasionally, but black bass are captured very rarely if at all. We are of the opinion that this special fishery can have no effect upon the fishing interests of Lake Champlain. No other form of net is sanctioned on the Richelieu River above St. John's.

So far as we have been able to ascertain, gill nets have never been used on the lake except on a very small scale and in shallow water. They are not regarded as an effective means of securing supplies for market, and there seems to be no desire among the fishermen to have them legalized.

The use of trawl lines is prohibited by both New York and Vermont, and in the Canadian waters of Missisquoi Bay there is no inducement for their employment. Set lines may be fished in Vermont waters under certain restrictions, and the local markets are supplied to a limited extent by the ordinary method of hook and line fishing.

Summary of conditions.—Lake Champlain presents favourable conditions for a certain class of sport fishing, but only very limited inducements for the prosecution of a market fishery. In New York and Vermont, as previously explained, the popular sentiment is so strongly prejudiced in favour of promoting the interests of the former that all methods pertaining strictly to the latter have practically been abolished except fall seining in Vermont; but in Canadian waters it is still desired to continue the use of seines both spring and fall, as heretofore. Local interests will, undoubtedly, best be subserved by fostering the sport fishing, and making the market fishery entirely subordinate thereto.

The common game fishes here recognized are the black bass, wall-eyed pike and yellow perch. Protection is especially demanded for the first two, the last not being held in much esteem. Market fishing has been directed more particularly toward the capture of the wall-eyed pike and the whitefish. In connection with them, relatively, large quantities of perch are taken, and also several other species of no direct interest to sportsmen, except an occasional maskinonge. The wall-eyed pike are fished for during their spawning movement in the spring, and the whitefish during their corresponding movement in the fall.

The spring fishery, therefore, removes a certain quantity of one of the game fishes every year, and its harmfulness to the sporting interests would be measured by the extent of the catch or by its effect in reducing the supply. We did not learn, however, that any appreciable decrease had taken place in the abundance of this species. Only a very small number of black bass is obtained in the course of the spring seining, as they remain in the deeper waters until a later date. In the event of a continuance of the spring seining, those having jurisdiction in the matter should be given full authority to limit and define the grounds which may be fished, and to so restrict the number of nets employed as to insure ample protection to the wall-eyed pike.

The fall seining presents an entirely different phase from the spring seining. The whitefish is not a sport fish, nor can it be caught by means of hooks. Only small quantities of wall-eyed pike or black bass are taken in connection with it, and those species can be released alive if need be. The supply is not sufficient to maintain a fishery meriting special consideration, and the question of its preservation or depletion is not of much moment, unless the young may serve as food for the game species at some seasons, a subject on which we have no information. The sport fishermen and authorities of Vermont are not opposed to its capture by seines under regulations which will prevent abuse of the privilege so granted. The only grounds in shallow water which the whitefish are known to frequent are contained

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within a limited area in the north-east arm, and the period of their run along the shore is of short duration. It may be advisable, however, to afford them some protection during the actual time of spawning.

The seining benefits only a small number of men, who are not in any sense professional fishermen, but generally farmers who seek through this means to add something to their income. The catch by each person is very limited, and the entire abandonment of the fishery would work comparatively little hardship. So far, however, as the practice is not injurious to the larger interests of the lake there seems to be no valid reason why it should not be permitted, especially in view of the fact that the benefits derived therefrom are demanded by one of the countries which shares in its advantages.

In the case of both the wall-eyed pike and the whitefish, practically the only time when they are collected together in sufficient numbers to make seining profitable is while they are approaching and are on this spawning grounds. They become scattered soon thereafter and the whitefish appear to retire immediately to the deeper water.

The privilege of using other kinds of nets than seines in waters contiguous to the boundary line is not requested, nor is it deemed advisable to permit the employment of any such, unless it may be the small class of fyke nets, which, under proper restrictions, could undoubtedly be fished without detriment to the sporting interests, and possibly to their advantage through the removal of some of the coarse varieties having predaceous habits. The seines do not make as extensive catches as the pound nets and trap nets, and may, therefore, be regarded as the least destructive of these methods. They also present the advantage of being always in sight when employed, and it is consequently very difficult to fish them illegally. Sturgeon, eels, catfish and a few other species might also be taken in the deeper parts of the lake by means of set lines without prejudice to the game fishes.

Recommendations.—The following recommendations respecting Lake Champlain are in conformity with the suggestions made above, namely:—

1. That no net fishing other than by seines be permitted in waters adjacent to the boundary line or elsewhere in the lake where international interests would be affected thereby.

2. That the use of seines be permitted from February 1 to March 31, inclusive, for the capture of wall-eyed pike and other associated species, but under such limitations as to localities and number of nets employed as shall amply provide against the decrease of the species named. Should further inquiry establish the fact that this fishery is proving harmful to the wall-eyed pike by materially reducing the supply, its abolishment is recommended.

2. That the use of seines be permitted during the month of October for the capture of whitefish and other associated species, under suitable restrictions as to localities and number of nets employed.

4. That the length of any seine shall not exceed 40 rods; and that the mesh of the seine shall not measure less than $2\frac{1}{2}$ inches in the bunt and 3 inches in the wings.

5. That the capture of black bass be entirely prohibited from November 1 of each year to June 15 following; that angling methods only be allowed for this species and the catch by each angler be limited to 15 fish daily; and that all bass taken in nets, and all bass measuring less than 10 inches long taken by anglers be immediately returned alive to the water.

6. That the capture of wall-eyed pike by any means, be prohibited from April 1 to May 31, inclusive, of each year.

7. That joint regulations be also adopted with respect to any game or other fishes, not specifically mentioned, which may require protection.

RIVER ST. LAWRENCE BETWEEN THE STATE OF NEW YORK AND
THE PROVINCE OF ONTARIO.

Description of the waters.—For a distance of about 90 miles from the foot of Lake Ontario, to where the line of 45° north latitude crosses the river, a little above Cornwall, the St. Lawrence forms the boundary between the state of New York and the province of Ontario. In the upper part of its course, within the above limits, the mainland shores are from 5 to 8 miles apart, the intervening waters being thickly studded with islands of varying extent. This portion of the river is sometimes called the Lake of the Thousand Islands. At the foot of the Thousand Islands the river narrows rapidly, the current, which in the upper half among the islands has been moderate, runs more swiftly, and a short distance below Ogdensburg navigation is interrupted by a series of rapids, which prevents the upward passage of vessels. The water varies greatly in depth, being as a rule deepest in the long, still stretches, and shallow where the current is rapid; the bottom is either covered with soft mud or is hard and rocky, shoals and reefs abounding everywhere.

International Interests.—But little commercial fishing is carried on within the limits under discussion; in fact, on the United States side, in the waters of the state of New York, this branch of fishing is entirely prohibited, while in Canada its amount has been small, only a few fyke nets being permitted. A few set-lines for sturgeon have been tacitly allowed from both shores, but the number has always been small and they have not been regularly fished. International interests are, therefore, confined entirely to the protection and development of sport fishing, the facilities for which are unusually great. The region of the Thousand Islands furnishes one of the most important summer resorts for the people of both countries, and there can be no doubt that the sporting interests are here of vastly more consequence than the amount of commercial fishing which could possibly be carried on. It is estimated that between four and five million dollars are here invested in hotels, summer residences, cottages, camping grounds and parks, all of which are frequented by tourists and sportsmen largely interested in the sport fishing. More money is spent every year by people who come for sport than the river could ever be made to yield by commercial fishing. Not only are hotel keepers, transportation companies, guides, oarsmen and boat and canoe builders benefitted by the presence of the immense number of people who regularly visit the region between June and September, but the farmers on both sides are furnished with a local market for almost everything they produce.

Fishes.—The principal fishes found in this part of the St. Lawrence are black bass, wall-eyed pike, maskinonge, grass pike, sturgeon, bullheads, channel cat, eels, ling, perch, sunfish, suckers, &c.

Of these, the only ones of value to sportsmen are the black bass, wall-eyed pike, maskinonge and grass pike. On set-lines sturgeon, eels, channel cat and ling are caught, while the principal catch of the fyke nets is bullheads, perch, sunfish, suckers and grass pike, and to some extent black bass and wall-eyed pike, especially if these nets are fished in April, May and June.

Character and extent of fishing.—As before stated commercial fishing is prohibited under the regulations of the state of New York, and though a small amount of set-line fishing for sturgeon has been allowed at Cape Vincent and off Ogdensburg, this fishery was not considered to interfere with the purely sporting interests. The sturgeon set-lines vary in length, the average being below 600 feet; the hooks are baited with chubs, perch or alewives, or even pieces of liver or beef, only dead bait being used. On the Canadian side a few similar set-lines, baited and fished in the same way, have been employed, while prior to the summer of 1895 a small amount of commercial fishing with fyke nets had been licensed. These nets were generally fished from October to May; they were set in the mouths of creeks, or in shallow marshy coves, either on the mainland or on some of the larger islands. They

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usually took coarse fish, though, no doubt, when allowed to be kept in the water through April and May, bass and wall-eyed pike would also be caught. During the summer of 1895 an arrangement was entered into between Canada and the state of New York, under which commercial fishing has also been prohibited on the Canadian side of the river, between Kingston and Prescott. In sport fishing, the methods employed are those known as trolling with spoon or minnow, rod fishing with live bait, and surface fly fishing. The sportsman uses a boat which is either anchored over some favourite bottom, or kept gently under way.

Summary of conditions.—Although a certain amount of commercial fishing has heretofore been carried on in the waters of the Thousand Islands, and in the river below, yet the condition of the purely sporting fishery is such as is not elsewhere surpassed, and it is doubtful whether better fishing for bass, wall-eyed pike, or that always rare and highly prized fish, the maskinonge, can be found anywhere else, especially for an almost unlimited number of rods. Owing to the great extent of the fishing grounds, the numerous channels, reaches, leads and coves among the islands, the opportunities for quiet fishing cannot elsewhere be equalled.

Recommendations.—As an arrangement, approved of by the sporting community, has already been entered into for the greater part of the waters under discussion, between Canada and the state of New York, and the necessary legislation provided for, we consider it unnecessary to suggest any other regulations than those already agreed to. We are, however, of the opinion that a small amount of commercial fishing made with fyke nets fished during the winter months in creeks or marshy places for such species as bullheads, perch, suckers, sunfish, &c., could do no harm. If such nets were allowed they should not be set before 1st November, and they should be removed from the water by 31st March. Fished during such a season, in suitable localities, there could be no risk of their taking bass, wall-eyed pike or maskinonge. A set-line fishery might also be allowed for such fish as sturgeon, eels, ling and channel cat, as the removal of some of these fishes would certainly be of benefit to the sporting interests.

Under the arrangement made between Canada and the state of New York it was enacted:

1. That no commercial fishing be permitted in the waters of the St. Lawrence between a line drawn from Cape Vincent, in the state of New York, to the city of Kingston, in the province of Ontario, and a second line from the town of Prescott, in Ontario, to the city of Ogdensburg, in New York.
2. That within the waters above included the close season for bass, maskinonge, wall-eyed pike and grass pike be from the 1st day of January to the 9th day of June, inclusive, in each year.
3. That the limit of the number of bass to be taken by each rod, per diem, be fixed at twelve (12) and that the number of rods to each boat be limited to two (2).
4. That all undersized and immature fish be returned alive to the water, and that no bass under ten (10) inches in length be taken.

While we do not consider that the close season as enacted above by any means fully covers the spawning season of the bass, which in the region of the Thousand Islands extends from the 15th of May to the 1st of July, at least, yet when taken in conjunction with a size limit, a limit to the number taken by each rod per diem, and a further limit of the number of rods per boat, it may be allowed that the protection is ample for the present.

5. We would recommend a continuance of the above arrangement, and would further suggest that it be extended so as to include the rest of the St. Lawrence from the lower limit above mentioned, between the cities of Ogdensburg and Prescott, to the point where the river ceases to be the boundary between the two countries, at the crossing of the line of 45° north latitude.

LAKE ONTARIO.

DESCRIPTION OF THE LAKE.

Lake Ontario, the smallest and most easterly of the great lakes, is bounded on the south and east by the state of New York, and on the west and north by the province of Ontario. It has a length of 185 miles, an average width of 40 miles, and a total area of 7,339 square miles, including the Bay of Quinté, with an area of 145 miles. The lake is free from islands or shoals over its entire extent, except at the north-eastern end near where it discharges into the St. Lawrence River. The water deepens more rapidly from the south than from the north shore, the greatest depth, 123 fathoms, occurring about 12 miles off the former in the eastern part of the lake, along the south shore the 10-fathom line lies only a little more than one mile off the land, and the 50-fathom line about 5 miles on an average; on the north shore the same curves are reached at about double those distances. The bottom over most of the lake consists of mud, clay and hard sand, with rocks in many places near the shores; but north of a line drawn from Stony Point, in New York, to South Bay, in Ontario, the water shallows, and among the islands in this section the bottom is rough and hard, and there are numerous reefs and shoals.

The south coast has only two or three small harbours, but between Oswego and Cape Vincent, at the eastern end, the shore is broken by a number of bays, affording ample shelter for vessels and boats, and from these most of the fishing is carried on. The Ontario shore is more broken, and toward the north east the long, narrow and deep inlet, known as the Bay of Quinté, extends inland almost parallel to the lake front for about 35 miles, being separated from it by the peninsula of Prince Edward county. Most of the fishing on the Canadian shore is carried on from the Bay of Quinté, and between Toronto and Niagara at the western end.

MARKET FISHES.

Eleven species of food fishes are enumerated in the statistics for the United States waters of Lake Ontario, the relative importance of which in each of the years, 1885, 1890 and 1893, as indicated by the size of the catch, is shown by the following table:—

	1895.	1890.	1893.
1	Catfish.....	Herring and long-jaws.....	Wall-eyed pike and grass pike.
2	Herring and long-jaws.....	Sturgeon.....	Herring and long-jaws.*
3	Sturgeon.....	Catfish.....	Perch.
4	Wall-eyed pike and grass pike.....	Wall-eyed pike and grass pike.....	Sturgeon.
5	Black bass.....	Perch.....	Catfish.
6	Whitefish.....	Black bass.....	Eels.
7	Eels.....	Suckers.....	Suckers.
8	Trout.....	Eels.....	Whitfish.
9	.....	Whitefish.....	Black bass.
10	.....	Trout.....	Trout.

*Herring 52,111 lbs., long-jaws 112,887 lbs.

In 1885 the suckers and perch were included with the miscellaneous fishes and that indefinite class stood at the head of the list. In 1890 and 1893 the two species mentioned were separately enumerated, and in those years the miscellaneous fish fell to near the bottom of the series.

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The relative importance to Canadian fisheries of the nine principal species at four different periods beginning with 1880, is brought out by the following table in which the several forms are enumerated in the order of the quantity caught:—

	1880.	1885.	1890.	1895.
1	Whitefish	Herring	Herring	Herring.
2	Herring	Whitefish	Whitefish	Grass pike.
3	Trout	Trout	Grass pike	Wall-eyed pike.
4	Wall-eyed pike.	Grass pike	Black bass	Black bass.
5	Grass pike	Black bass	Trout	Whitefish.
6	Black bass	Wall-eyed pike.	Wall-eyed pike.	Trout.
7	. . . . .	Sturgeon	Sturgeon	Sturgeon.
8	. . . . .	Eels	Eels	Eels.

WHITEFISH (*Coregonus clupeiformis*).

Status.—This species, once abundant in Lake Ontario, is now not at all common on the United States side. In 1893 the fisheries yielded 45,380 pounds valued at \$2,787 giving it ninth place in the amount and fourth in the value of the catch. In 1890 it was also ninth in the catch, and in 1885 sixth, but during the early period of the fishery it was first in importance.

On the Canadian side it was first in 1880, second in 1885 and 1890, and fifth in 1895, the catch in the latter year amounting to only 126,650 pounds.

Distribution and movements.—This species is taken on all parts of the United States shore, but is caught most abundantly in Jefferson, Monroe and Oswego Counties. On the Canadian side it appears to be most abundant in the Bay of Quinté, where it occurs only in the fall.

Whether there is any migration or movement of the fish from one side of the lake to the other is not known, although there is some evidence of such a movement around the ends of the lake. The whitefish come ashore in the spring and fall, but during the warm and cold seasons of the year they retire to the deeper water.

Most of the whitefish are caught in gill nets, which are fished in depths of 10 to 20 fathoms. In the spring and fall they are doubtless taken by this means in shoaler water, and at those seasons they are obtained in seines wherever used, although Chaumont and Three-mile Bays appear to embrace the principal seining grounds. Formerly they were caught in seines off the Genesee River in June, but there has been no fishery for them at that place in recent years.

Spawning.—The spawning season begins late in October and extends into December, the principal time being probably during the last 20 days of November. They spawn in different parts of the lake, wherever suitable conditions prevail.

Decrease.—The general opinion of all engaged in the fisheries on Lake Ontario is that the whitefish supply has suffered great depletion. This, according to the testimony of the fishermen, began early in the history of the fishery, some dating it back as far as 1860. On the United States side the catches in the several years for which we have statistics were as follows:—

	Lbs.
1885.....	90,711
1890.....	148,771
1893.....	46,767

The following table gives the catches on the Canadian side at intervals of five years since 1870:—

	Lbs.
1870.....	621,400
1875.....	660,400
1880.....	729,900
1885.....	364,100
1890.....	405,350
1895.....	126,650

Prior to 1870 the catch appears to have been somewhat larger. A consideration of the complete returns between 1868 and 1895 shows that there has been a number of periods of good fishing interspersed with periods of a decreased catch, but the general tendency has been downwards and the catch in 1895 was the smallest ever recorded. Taking the lake as a whole, there has been a vast decrease in the abundance of the whitefish during the time covered by the statistics, and the falling off had already manifested itself when the first inquiries were made.

LAKE HERRING OR CISCO. (*Argyrosomus artedi.*)

Status.—This is one of the most abundant fishes of the lake, but its exact status cannot be determined because the bloater whitefish or “long-jaw” has generally been associated with it in the statistical returns. In 1893, the only year in which it was separately enumerated in the United States catch, 52,111 pounds, valued at \$1,466, were obtained. On the Canadian side no distinction is made between the cisco and the long-jaw.

Distribution and movements.—The cisco is found in all parts of the lake, but occurs in shallow water or near shore only during the spawning time in the fall. During the rest of the year they remain in the deeper water. So far as we have been able to learn, there is no movement of the species up and down the lake.

The fishery for the cisco is carried on chiefly during the spawning season in November. The principal catch is made in gill nets, which are set in gangs of six to ten nets each, in depths of a few feet to 75 feet, but generally less than 40 feet. At the eastern end of the lake trap nets are set for this species in the fall, and seines are also used for them in the same locality and at the same season. During the spring a few are caught in the seines incidently to the fishery for other species.

Spawning.—The spawning time is in November, chiefly during the last half of the month. The fishing usually begins in October but is most general about the 5th to the 10th of November by which time the fish are said to be ripe.

The spawning grounds are in relatively shallow water near shore and on the shoals. The bottom called “finger-rock” is said to be the kind usually selected by the fish. The grounds, so far as they are definitely known, are on the south side of Point Peninsula, about Gredier and Stony Islands, and in Chaumont Bay, Three-mile Bay and Bay of Quinté, but principally at the western end of the lake.

Decrease.—There has been an important reduction in the abundance of this species and likewise a notable decrease in the average size of those taken in this lake. Owing to the fact that the statistics on the United States side until recently, and on the Canadian side invariably, include the bloater with the herring, it is not possible to consider the matter from a statistical standpoint.

LONG-JAW OR BLOATER. (*Argyrosomus prognathus.*)

Status.—This recently described species of whitefish is one of the most important food fishes of Lake Ontario. The catch in 1893 amounted to 112,887 pounds, valued at \$2,977, which places it third in importance of the catch of that year. This species is known to the fishermen under several different names of which “bloater” and “bloat” are the ones most often heard at the eastern end of the

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lakes, although "bloater whitefish" and "long-jaw" are occasionally used there. Bloaters of small size are not always distinguished by the fishermen from the cisco, and in the earlier statistical reports both species were confounded under the name of cisco or herring.

Distribution and movements.—The long-jaw seems pretty generally distributed throughout the lake. It is not known to come into shallow water, however, but seems to be confined to the greater depths. It is known to all the fishermen along the New York shore, but is taken by them only in depths of 200 to 400 feet. As most of the deep water is closer to the south shore than the north shore, this species is much more frequently obtained by the United States fishermen than by the Canadian. During the winter they are believed to retire to the deepest parts of the lake.

Size, weight, &c.—The maximum length is probably over 20 inches, the largest we have seen measuring $15\frac{1}{4}$ and $15\frac{3}{8}$ inches, but the average is considerably less than this. The larger ones observed weighed less than $1\frac{1}{2}$ pounds, but examples weighing as much as 5 and 6 pounds have been reported.

Spawning.—There is considerable difference of opinion among the fishermen as to the spawning habits of the species. Examples taken 17th May, 1892, contained immature roe, except one fish in which the eggs were fully ripe. They have been found in immature condition in April and more or less ripe from the middle of June into July.

Decrease.—From a statistical standpoint, nothing can be said respecting the changes in abundance of the species. The general opinion is that there has not been a decrease.

LAKE TROUT (*Cristivomer namaycush*).

Status.—The lake trout has occupied the lowest position, as regards size of catch, in the list of market fishes in United States waters during each year in which statistics have been taken, only 6,204 pounds have been obtained in 1893. On the Canadian side of the lake, they are more important, having ranked third in the catches of 1880 and 1885, fifth in 1890, and sixth in 1895, when 109,300 pounds were caught.

Distribution and movements.—The distribution of the trout along the shores of Lake Ontario is much less general than it was in the past, and they are now rarely taken in many places where they were formerly abundant. At the present time, so far as the fishery is concerned, they are practically confined to the eastern and north-eastern parts of the lake, most of the catch on the United States side being made in Jefferson County, while in Canada, almost the entire output is accredited to Prince Edward County, which lies between the Bay of Quinté and the lake. The fishery is carried on principally in the fall in the shoaler parts of the lake, but a few trout are also caught incidentally in the spring. There is no fishery in the greater depths except for "long-jaws," and the nets used for that species have not a sufficiently large mesh to take the trout in any numbers. At one time trout were caught during the summer in depths of 300 feet on set-lines, but at present this method is not followed.

Spawning.—This species spawns on rock bottom in shoal water in the fall, probably from September to December.

Decrease.—Since 1880 the decrease of the trout has been remarkable, as will be seen from an inspection of the following table, which shows the annual catches in United States waters during the years in which returns have been made:—

	Lbs.
1880.....	569,700
1885.....	20,510
1890.....	41,010
1893.....	6,204

We are not convinced that the large decrease in the catch between 1880 and 1885 was due entirely to decrease in the abundance of the fish; although we have no definite information to that effect, it may have been caused in some degree by a change in the activity of the fishery, induced by a reduction in the trout supply. In Canadian waters the statistics show a more gradual decrease, which in our opinion measures more accurately the rate of decrease in the species. The catch there at intervals of five years beginning with 1870 is given in the following table:—

	Lbs.
1870.....	621,400
1875.....	660,400
1880.....	729,900
1885.....	364,100
1890.....	405,350
1895.....	126,650

WALL-EYED PIKE (*Stizostedion vitreum*).

Status.—This species is variously known in Lake Ontario as wall-eyed pike, yellow pike, blue pike, doré, &c. Many fishermen regard the blue pike or black pike as a species quite distinct from the yellow pike, a belief apparently not borne out by any structural differences.

On the United States shore the wall-eyed pike ranked first in importance in 1893 and fourth in 1885 and 1890, although in both of those years the catch was larger than in 1893, when it amounted to 216,745 pounds, valued at \$8,317. These figures, however, include the sauger and the grass pike but, after eliminating those species, it is probable that the value of the wall-eyed pike alone would exceed that of any other species.

On the Canadian shore, in 1895, it ranked third, with a catch of 245,750 pounds, nearly the largest ever made on that side of the lake. In 1890 and 1885 it stood sixth and in 1880 fourth by size of catch.

Distribution and movements.—The wall-eyed pike is distributed throughout Lake Ontario, but is apparently most abundant in those parts near the St. Lawrence River and Niagara River, and in the Bay of Quinté. In the vicinity of the Niagara River it appears that the so-called blue pike is the common form and the only one of which the statistics take cognizance, two-thirds of the United States catch of that variety being there recorded. At the eastern end of the lake, near the St. Lawrence River, practically all of the wall-eyed pike, ranked as such in the statistics of 1893, were caught, and in addition about one-fourth of the total catch of blue pike was obtained in the same region. Between Jefferson County on the east and Niagara County on the west few wall-eyed pike are caught. The great majority of the blue pike are taken in gill nets, while all noted as “wall eyes” were secured in pounds and traps.

The fish come into shoal water in the spring for the purpose of spawning and remain there until late in October, when they pass into the deeper parts of the lake. The most important grounds for the trap net fishery for wall-eyed pike on the United States shore are in Chaumont and Three-mile Bays and among the islands at the eastern end of the lake. Some fish are also caught there in gill nets, but this fishery is more important in Niagara County, where the “blue pike” abounds.

Spawning.—Very little accurate information could be obtained as to the spawning habits. From the best gained it appears that the fish come out into shoal water along the shore and about the islands early in the spring for spawning purposes. Extensive spawning grounds are said to exist in Chaumont and Three-mile Bays. The state hatchery at Clayton has been obtaining its wall-eyed pike eggs from there, but the supply has never been as great as desired. It is pretty certain that good spawning grounds occur around nearly all the islands at the east end of the

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lake and in the head of the St. Lawrence River. There is no spawning beds in Black River Bay or in the lower part of Black River, probably on account of the pollution of the water from the mills above Watertown.

Considerable difference of opinion exists among the fishermen as to the time of spawning, but April, May and early June probably cover the entire period. Indeed it is doubtful if more than an occasional straggler spawns as late as the first of June. There is a belief among many fishermen that the so-called blue pike spawns later than the wall-eyed pike, and that those found spawning in June or even as late as July are all blue-pike. However this may be, it is pretty certain that the bulk of the species spawns in April.

Food.—The species seems almost entirely piscivorous. Of many examples examined, nearly all contained fishes of some kind or other and scarcely anything else. The species found oftenest in their stomachs was the alewife. Among others seen were various minnows, young yellow perch and young suckers. No young whitefish, trout or lake herring were seen in their stomachs.

Decrease.—In the opinion of the fishermen the so-called yellow pike has decreased, as a whole, in United States waters during the last few years, but they believe that the "blue pike" is increasing. Some of the fishermen, particularly those in Chaumont and Three-mile Bays, consider that only local decreases have occurred, that the species have actually decreased in those bays because they have been overfished, but that elsewhere in the lake, in the bays and along the shores, it is still abundant, as could be shown if commercial fishing were allowed. This opinion is not without reason, and it is more than probable that this species is still really more abundant in Lake Ontario than recent statistics indicate.

On the United States side the catch was much heavier in 1890 than in 1885 or 1893, but as this is also true of all other species it was doubtless due either to unusually good seasonal conditions, or to some relaxation in the legal restrictions or in their enforcement. On the Canadian side there has been a constant increase in the annual catch of this species, and in 1893, 1894 and 1895 it was heavier than ever before. The apparatus has, at most, increased less rapidly than the catch, and the opinion that the wall-eyed pike has not decreased in the lake at large appears well founded.

STURGEON (*Acipenser rubicundus*).

Status.—In 1893 the sturgeon held fourth place in the size and value of the catch in United States waters, the amount taken being 125,293 pounds, valued at \$4,987. In 1890 it ranked second and in 1885 third in the quantity caught. On the Canadian side none were recorded in 1880, but in 1885, 1890 and 1895 it stood seventh in the size of catch.

Distribution and movements.—The sturgeon occurs throughout Lake Ontario and the St. Lawrence River. On the United States side nearly 80 per cent of the catch in 1893 was made in and near the St. Lawrence River, and about half of the remainder near the Niagara River. The former region included Chaumont Bay, Three-mile Bay and the waters about Grenadier, Stony, Duck and Galloo Islands, as well as the surreptitious fishing in Henderson Bay and about the mouth of Black River. On the Canadian side the conditions are reversed, and the bulk of the catch is made at the western end of the lake, largely in and near the Niagara River. The sturgeon are caught on both sides of the lake by means of gill nets, pounds, seines and set-lines, but owing to the amount of illegal fishing it is impossible to secure even approximate information concerning the matter. The gill nets, however, are the most important.

Spawning.—Very little is definitely known regarding the spawning of the sturgeon in Lake Ontario. There is no unanimity of opinion among the fishermen either as to time or place. The bulk of the evidence, however, seems to indicate that the usual spawning time is in June.

Decrease.—The sturgeon appears to have decreased greatly since 1880, the following table showing the catch for several years since then in United States waters:—

	Lbs.
1880.	545,283
1885.	386,974
1890.	490,000
1893.	125,293

It is supposed that the increase noted in 1890 was due to the more active fishery resulting from the increased demand which grew up subsequent to 1885.

On the Canadian side of the lake the catch is smaller, but the statistics likewise show a great decrease, as exhibited in the following table of the annual catch:—

	Lbs.
1885.	84,700
1890.	41,600
1895.	39,290

ALEWIFE.

The alewife is supposed not to be indigenous to Lake Ontario, and the manner of its introduction is not known, but it now seems to be quite firmly established there, and is exceedingly abundant. It has no market value, although it is used to some extent as bait and fertilizer, and is supposed to furnish a large part of the food supply of the lake trout, wall-eyed pike and other species. It is said to spawn along the shores and to some extent in the creeks during the spring. This species has attracted special attention on account of the remarkable mortality which annually affects the schools. Large quantities of the dead fish become stranded upon the shores to the great annoyance of the inhabitants, and the fishermen believe that the pollution of the water and fouling of the bottom by this cause has had much to do with the depletion of the whitefish.

FISHING METHODS.

Although fishing began in Lake Ontario with the earliest settlement of its shores, it has never been carried on with the same energy or with anything like the same amount of apparatus as in the other great lakes. The appliances now in use, or which have at some time been employed, are seines, pound nets, trap nets, fyke nets, gill nets of various meshes, set-lines and spears.

Seines.—We have evidence that as long ago as 1807 seines were used for the capture of whitefish. They did not come into general use, however, until about 60 years ago, and seem to have been fished only in the spring and fall. They were first employed in April, or as soon as the ice moved off the shore, when the catch would be mostly wall-eyed pike. As the spring advanced whitefish would be taken in increasing quantities up to about the end of May or beginning of June, when all fish seemed to move off shore and operations would end. The fishing was entirely abandoned during the summer months, as the whitefish, the only species particularly sought for in those days, could not then be taken with the seines. The early settlers were not regular fishermen, and no doubt their time was mostly taken up with their clearing and farming operations. There was no inducement to them to adopt any other methods of fishing or to follow the fish into deep water, as they were always confident of making a certain and easy fishery when the fish came inshore either in the spring or fall. The seines were once more brought into use about the end of September; during the early fall more trout would be caught, and as the season advanced into November all the catch would be whitefish and herring, but the latter had little or no commercial value in those days. The same seining methods and seasons were followed on both sides of the lake. As far as can be gathered, the principal seining grounds, on the United States side, were between Cape Vincent

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and the mouth of the Oswego River; while on the Canadian side most of the fishing was carried on along the shores of the Prince Edward County peninsula, and for some distance westward. Though most of the seining was done within the regions above defined, the same methods were followed wherever suitable beaches occurred and the fish were known to approach the shore. Seining grounds had always to be prepared beforehand by removing all obstacles and obstructions from the bottom, so as to allow the seine to be hauled smoothly.

This method of fishing was pretty generally practiced down to 1860, since which date there has been a gradual falling off. The present regulations of the state of New York, which allow no commercial fishing within a mile of the shore except in Chaumont Bay, have practically put an end to their use on that shore, while in Canada they are no longer licensed. They had, however, fallen into disuse before the enforcement of any regulations against them, as in most localities the fish were not found inshore in sufficient abundance to pay. Besides wall-eyed pike, whitefish, herring and trout, they also were the means of taking bass, sturgeon and all the coarser fishes.

Seines are usually made with a 2 to 3-inch mesh in the bunt, and a 4 to 5-inch mesh in the wings. They are about 20 feet deep at the centre, narrowing towards the ends, and are from 20 to 200 rods long. They are generally hauled with the aid of a windlass. It is claimed by some that black bass are not caught in the seines, and by others that many are so taken; much likely depends upon the season and locality at which they are fished.

All the evidence procured shows that in the best days of fishing by this method some enormous hauls were made, single seines being credited with from 5,000 to 7,000 barrels in a season. There are also reports of from 20,000 to 30,000 whitefish being taken at a single haul. Salmon were obtained in large numbers during the spring seining in April up to about 45 years ago. An occasional one is still caught.

Gill Nets.—These nets first came into use about 1847. The method gradually became more general, and about 1860, as the seine fishery began to fail and a purely fishing population developed, a regular gill net fishery grew up. Its maximum as regards the whitefish was reached between 1870 and 1880, since which time there has been a gradual and steady falling off in the amount of gill netting used for both trout and whitefish.

Three general grades of nets are in use; a strong coarse net of from 9 to 11-inch mesh for sturgeon, a medium sized mesh of $4\frac{1}{2}$ to 6 inches for whitefish and trout, and a small-meshed net of from $2\frac{1}{2}$ to 3 inches for herring and cisco. As the Canadian statistics do not discriminate between the various grades, it is impossible to show the exact quantities of each in use. The amount of herring gill netting has not decreased.

When gill nets were first used they were employed entirely for whitefish and trout. Originally 100 rods was considered a long gang, and the nets were lifted every morning. They were fished in from 50 to 100 feet of water. As the fish became scarce, from 300 to 400 rods were used, the nets were set in deeper water and were left out longer. Whitefish and trout gill nets are from 12 to 15 meshes deep, and are seldom or never set in more than 150 feet, as beyond that depth these fishes are rarely found, the bloater or long-jaw being taken in their stead. The practice is to fish in the shoaler water spring and fall, the whitefish and trout remaining in deeper water during July and August.

Herring gill nets were not introduced until some years after this method of fishing for whitefish and trout had become general. For herring they are usually set in from 30 to 100 feet. The nets are made deeper than in the larger meshed ones, as it is claimed by the fishermen that the herring swim higher. The season usually opens towards the end of September and continues through October and November, as the fish move gradually inshore to the spawning grounds. Trout gill nets are usually made of slightly coarser twine and with a larger mesh than those fished for whitefish, though many fishermen use the smaller meshed nets for both. In some localities wall-eyed pike and grass pike are taken in the whitefish nets, the

practice being to use old nets for this purpose, as they are apt to get torn and damaged in releasing the fish. Whenever small sized gill nets are fished over hard bottoms where bass are running in June or July, a good many of this species may be secured thereby. The bloater or long-jaw is taken throughout the season in from 200 to 600 feet of water in the smaller meshed gill nets such as are fished for whitefish in the shoaler water.

Sturgeon gill nets are fished at the extreme ends of the lake, principally at the eastern end in New York waters and at the western end in Ontario waters. From two to twelve nets, each from 10 to 30 rods long, compose an ordinary outfit. Four or five nets are usually set in a gang in an average depth of about 35 feet, the best grounds being generally near shore. The practice is to lift them daily.

Pound nets.—Pound net fishing has never been carried on as extensively in Lake Ontario as in any other of the great lakes. Generally speaking, the bottom is too hard for the easy driving of stakes in localities where these nets could profitably be fished. They are also, no doubt, rather costly for the class of fishermen who operate on the lake. At one time from 30 to 40 pounds are reported to have been fished in Chaumont Bay and vicinity, but at the time of our inquiries only one net of this class was being fished in the lake. When employed they were made somewhat smaller than those in general use elsewhere, and they were never set in deep water or in long strings. The catch consisted mainly of wall-eyed pike and whitefish during the spring, and of whitefish, trout and herring during the fall. A few sturgeon were caught, but it does not appear that these fish were ever taken as abundantly by the pounds in Lake Ontario as they have been elsewhere. Black bass also do not seem to have been taken extensively by this means. There is no general desire at present to have this method introduced again.

Trap nets.—These small submerged nets have taken the place of the pound to some extent. The fact that they are less costly and can be set on any bottom has led to their extended use; they require no stakes and can be set or removed bodily. They are chiefly fished for wall-eyed pike, but if placed in deep water will also take whitefish, herring and trout. They are not licensed on the Canadian side.

Fyke nets.—These nets are generally employed for bullheads and course fish in the eastern end of the lake about Wolf Island and in the Bay of Quinté. If fished in May and June on suitable bottoms they would catch wall-eyed pike and bass, sturgeon are rarely taken in them.

Pound nets, traps, seines and fyke nets have been fished to a much greater extent at the eastern end of the lake than elsewhere, as the conditions are there much the most favourable for their use.

Set-lines.—Set-lines are extensively used for sturgeon, and are also employed for channel cat, ling and eels. The sport fishes such as maskinonge, black bass and wall-eyed pike are not taken by this means, as only dead bait is used.

Spears.—Spears are not now employed, but at one time their use was quite common, especially for the capture of salmon, which frequented most of the rivers and streams discharging into the lake from either shore. There was no market fishery for them after they had entered the streams, but they were speared for domestic use and large quantities were killed in this way, chiefly at night with the aid of a jacklight. Many more were taken than were required for food, and there was great waste in consequence. The Indians, who were then numerous, also speared them for food and to a small extent for barter.

EXTENT AND CAUSES OF DECREASE.

Of the species which are mainly fished for by the commercial fishermen of Lake Ontario, whitefish and trout have greatly decreased; herring and sturgeon have fallen off to a considerable extent, but there is no perceptible failure in the wall-eyed pike, bloater and black bass. Only a few fishermen on the south shore of the

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lake carry on a distant gill net fishery in deep water for the bloater or long-jaw, and wall-eye pike and bass are not taken extensively by the market fishermen.

Lake Ontario was undoubtedly the first of the great lakes in which a considerable commercial fishery was established, and as in the other lakes, the earlier fishery was made entirely for whitefish, the trout, herring, wall-eyed pike and sturgeon being taken only incidentally. As the whitefish began to fail, however, other branches of the fishery grew up. As the country opened up and the population increased, a purely fishing community was developed, especially in the neighbourhood of the best fishing grounds. At first all the fish not intended for immediate local consumption were salted. As the demand for fish at other seasons than the spring and fall, and also the facilities for handling and delivering them increased, gill net fishing came to be resorted to. This began about 1847, and the use of such nets rapidly increased, until by 1860 an extensive offshore fishery by regular fishermen was being carried on. Already a diminution in the quantity of whitefish and trout coming in shore in the spring and fall had been perceived, and the seine fishery was declining.

Pound nets were never fairly tried on the north shore, but at the eastern end of the lake, of Jefferson County, a good many were employed as early as 1860. They were introduced about 1850 by fishermen from the sea coast of Connecticut. Their use was at no time general with respect to the lake as a whole, and it was soon found that trap nets, which could be set without stakes, answered the same purpose and were more economical and convenient.

Fyke nets have been used since the earliest records, but have always been fished in the mouths of creeks and in shallow bays. The coarse fish taken in them have not decreased, and they have had nothing whatever to do with the almost practical extinction of the whitefish and trout.

Lake Ontario is the only one of the great lakes in which we find an alarming decrease in the trout. As this falling off has taken place conjointly with that of the whitefish and is apparently due to the same cause, it will best suit our purpose to treat of them together.

The conditions we have to deal with in Lake Ontario are similar to those met with in Lake Superior. The area in which whitefish and trout occur is small compared with the total area of the lake. Whitefish are not often found in more than 40 fathoms and they are generally fished for in less than 30. Trout range into slightly deeper water, but are generally fished for at about the extreme depth of the whitefish. In Lake Superior we found the extreme limit of the trout to be about 60 fathoms, beyond which practically nothing but siscowet were taken. In Lake Ontario, the bloater replaces the siscowet in the deep water fishery, which is prosecuted from the south shore out into depths of 200 to 600 feet. On the north shore there is no distinct fishery for this species, though a few are taken in nets set at the deep water limit of the trout. The total area of Lake Ontario, excluding the Bay of Quinté, is 7,194 square miles, while the area between the 50-fathom curve and the shore amounts to only 3,753 miles, the area beyond the 50-fathom curve being 3,442 square miles. Thus, we find that the actual area to which the trout, whitefish and herring are limited amounts to only about one-half the total area of the lake.

As the deepest water is in the southern half of the lake, and the 50-fathom curve follows the south shore at an average distance of only five to six miles, the area on which whitefish, herring and trout might be taken in United States waters is naturally very small. The testimony of those interviewed as well as the statistics indicate that no very extensive fishery was ever carried on along this shore, and that the whitefish and trout gave out early. On the northern side of the lake the average distance of the 50-fathom line from shore is twice as great, thereby affording a correspondingly larger fishing area. This accords with the fact that the fishery has been more extensive, and as the boats seldom go more than eight miles from land, they do not reach the depth at which the bloater is found.

At each end of the lake there is also a shallow table on which a considerable fishery has always been made, and on which the bulk of the fishing is being carried on to-day, the principal species taken being herring and wall-eyed pike.

With a knowledge of the above conditions and of the practices of the fishing when it was at its height, it is easy to account for the early and nearly complete collapse of the fishery for whitefish and trout, which were chiefly caught out by the seines at an early period. There does not seem to have been any regular migration of these fish lengthwise of lake. They occurred along a narrow border of the lake and simply moved to feeding grounds in the spring and to spawning grounds in the fall, wherever the shoal water was suitable. There they were most abundant, and on those areas we still find the remnant of them.

The following tables shows the condition of the fishery for whitefish and trout on the north shore of the lake in 1868, the first year for which we have any reliable statistics, as compared with 1895:—

	1868	1895
Whitefish.....	1,156,200	126,650
Trout.....	612,000	109,300

There was seasons between those dates when the fishing seems to have rallied but, on the whole, the tendency has been steadily downward. The evidence indicates that the fishery in United States waters began to decline long before the first statistics were taken. As a further proof of the present scarcity of whitefish and trout in Lake Ontario, if any were needed, it may be stated that the United States Fish Commission was unable, in the fall of 1896, to procure on either shore of the lake a supply of eggs for the hatchery at Cape Vincent, while the Canadian Department of Fisheries has for years procured its supplies for the hatcheries at New Castle and Ottawa from Lake Erie and Georgian Bay. Most of the fishermen interviewed about the Bay of Quinté, where the bulk of the whitefish and trout is now caught, were of opinion that the present supply was being kept up solely by artificial means.

While it is likely that the extensive spawning grounds of the whitefish in the head of the Bay of Quinté have been injured by the deposit of saw-dust and other refuse brought down from the mills located on the large streams which empty into the head of the bay, and that the same character of pollution may have contributed to a minor extent in damaging the spawning beds in the bays at the eastern end of the lake, there can be no doubt that the chief cause of the decrease of the whitefish and trout was the overfishing by seines in the early days of the fishery, and that this decrease had commenced before either gill nets or pounds were introduced. The extensive gill net fishing which was carried on from 1870 to 1880, most extensively during the same season as the fall seining and when the fish were converging on their spawning grounds, must also have aided in the work of destruction begun by the seines, and this was particularly the case in the Bay of Quinté. We are led to believe that the most extensive spawning grounds for whitefish in the lake are at the head of this bay. The bay is long and narrow and a large number of fish begin to run into it from the lake as early as September. At this time many who had been fishing in the lake, move into the bay, in the sheltered and confined waters of which immense fleets of gill nets are set directly in the path of the fish to their spawning grounds. This fishing continues to the end of October and is particularly destructive.

The pound nets cannot have materially contributed to the present scarcity of whitefish and trout. Trap nets have only been fished in the bays at the eastern end, for wall-eyed pike, herring and coarse fish, and their influence at most has been purely local. Whitefish, trout and herring are not taken in fyke nets.

A question deserving of serious consideration in this connection is whether the continued decrease of the whitefish, herring and trout is not being materially aided by the absence in practically all parts of the lake except Chaumont Bay of those

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sedentary fisheries by pound nets, trap nets, fyke nets and seines, by means of which the supply of the coarser and predaceous fishes is kept down in the other lakes. The laws on both sides of the line are essentially prohibitory of all such fishing methods, which, in our opinion, could, under proper restrictions, be employed without detriment to the sporting interests, and at the same time probably to the great advantage of the more important market fishes.

Among the fishermen there seems to be a pretty general impression that much of the decrease of the whitefish has been due to the presence of the alewives which, dying in great numbers, sink to the bottom and foul the feeding grounds. That this was not a primary factor is shown by the fact that the decrease of both the whitefish and trout began long before the introduction of the alewives, and there is no reason to believe that it has an important influence at the present time.

The decrease of the sturgeon has been greatest on the New York shore. This is due to the fact that the methods of fishing there employed have been such as would naturally take the sturgeon more abundantly. On the Canadian shore the fishery has never been as extensively prosecuted. Prior to 1882 no record was kept of the quantity taken as they then had no market value and when captured in the seines were destroyed and thrown away. There was a sudden drop in the catch between 1882 and 1885, due no doubt to the circumstance that about 1883 the use of seines fell off greatly. Most of the sturgeon are fished for in the shoal water at the extreme ends of the lake, where they are taken with large meshed gill nets and set-lines.

The herring also show a considerable decrease. The fishery for this species, now carried on almost entirely with small-meshed gill nets, was not prosecuted to any great extent until that for the whitefish and trout had ceased to be profitable. When seines were extensively used large hauls of herring were made as they came inshore to spawn on practically the same grounds as the whitefish, and at about the same season. The catch was then salted. The gill net fishing for herring began to be extensive about 1884. It is most prominent at the western end of the lake and in the Bay of Quinté. On the Canadian shore the mesh used is from 2 to 2½ inches, the larger size being also that more commonly used by the New York fishermen. As herring are generally fished for in shoaler waters than whitefish, considering the limited area over which they are taken, there can be no doubt the fishery has been overdone. It is chiefly prosecuted in the fall when the fish are on the way to their spawning grounds and during the time that they are actually upon them. On the Canadian shore the size of the mesh has been gradually reduced and many complaints are made that the herring now being marketed are much smaller than they used to be. When pounds were fished in the eastern end of the lake large catches of herring were made in them.

A very small amount of the Lake Ontario herring is marketed fresh, and there is not much demand for such small herring in this condition. Large quantities are slightly smoked for immediate use, the balance generally being salted.

There is no indication of a decrease of the wall-eyed pike. The catch during 1890 in United States waters was much greater than in either 1885 or 1893. This was due to the fact that a much greater amount of apparatus was employed in that year.

As no seines, pounds, traps, fykes or gill nets are allowed to be fished within a mile of the New York shore, except in Chaumont Bay, and as pounds, traps and seines are not fished on the Ontario coast, it follows that the wall-eyed pike are being pretty well protected. The bulk of the catch is made in gill nets and by sportsmen with hook and line.

The only distinct fishery for the bloater is in the deep water off the southern shore, where it is conducted on a very limited scale with gill nets. It should be capable of considerable development, as these fish are known to occur in great abundance in depths of 200 to 600 feet.

No regular commercial fishery is carried on for the black bass, and when taken in the nets of fishermen, it is by accident. The regulation which prohibits the use of any form of net along the greater part of the New York shore within one mile of the land, was adopted with the view of protecting this species. While doing this, it

also virtually prohibits the capture of the wall-eyed pike, grass pike, perch, suckers' bullheads, eels, and the remainder of the predaceous and coarser fishes. On the Canadian shore, all commercial fishing in the lake is done either with gill nets or set-lines, a few fyke nets being used in the shoal waters of the Bay of Quinté. Here, again, the bass are most thoroughly protected. The statistics, consequently, show no decrease in this species, while the testimony of all persons examined by us tends to prove that the bass were increasing. A register kept at one sporting resort showed that more bass were taken by the sport-men stopping at that particular hotel, than were caught by all the commercial fishermen in the lake.

RECOMMENDATIONS.

In view of the extent to which the supply of both whitefish and lake trout has become exhausted in Lake Ontario, any regulations looking to the protection and increase of those species, in order to be effective, should be decidedly stringent. With respect to the fisheries for them and for the other important fishes of the lake we recommend as follows:—

1. That a close season be adopted for both the whitefish and lake trout from the 15th day of October to the 31st day of December, between which dates they shall not be fished for or taken in any manner.
2. That in the Bay of Quinté the close season for whitefish extend from the 1st day of October to the 31st day of December, and that the use of herring gill nets in that bay be prohibited during November.
3. That the minimum size of mesh in the gill nets fished for whitefish and trout be fixed at 5 inches, in the herring gill nets at $2\frac{1}{2}$ inches, and in the sturgeon gill nets at 11 inches.
4. That the quantity of gill nets used in connection with each fishery be restricted within proper limitations.
5. That the use of baited set-lines for sturgeon be permitted, but that the capture of that species by means of naked hooks or grapplings be prohibited.
6. That all sturgeon measuring less than 4 feet long, taken by any means, be returned alive to the water.
7. That a close season be adopted for the black bass from May 1 to June 15; that all black bass measuring less than 10 inches long, by whatever means taken, be returned alive to the water; that the number of bass taken by each rod per diem be limited to twenty, and that the number of rods to each boat be limited to two.
8. That it be permitted to fish fyke nets and trap nets in the inshore waters of the lake, for the capture of the coarser fishes, between the 1st of October and the 30th of April, within proper limitations as to number and under such restrictions as shall prevent their being set on the spawning grounds of whitefish, trout or herring, or in such manner as to interfere with the spawning movement of those species.
9. That the mesh in the bag of all trap nets and fyke nets measure not less than $2\frac{1}{2}$ inches in extension when in use.
10. That the use of seines on or about the spawning grounds of any of the important fishes during their spawning season be prohibited.
11. That the joint efforts to increase the supply of whitefish and lake trout by artificial means be continued, and that the scope of that work be increased to the fullest extent possible. It is recommended that the planting of the fry be not restricted to one part of the lake, but be extended to as many of the important spawning areas as possible.
12. That the throwing into the water of fish offal, including dead fish taken from the nets, of city garbage and of all other substances deleterious to fish life be prohibited. That steps be taken to prevent injury by the waste from saw-mills, gas works, oil refineries, &c., especially in tributary streams containing spawning grounds of important fishes.

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LAKE ERIE.

DESCRIPTION OF THE LAKE.

From a fishery standpoint Lake Erie is especially noteworthy because of its relative shallowness as compared with all the other large lakes of the chain, a feature which has determined its greater proportionate richness in aquatic products. The deepest water, reaching a maximum of 35 fathoms, occurs in the neighbourhood of Long Point, Ontario, and off the coast of Pennsylvania and of the western end of New York, the depths elsewhere not exceeding 14 fathoms. Westward of a line connecting Point Pelee with the entrance to Sandusky Bay, moreover, the maximum limit of depth is only seven fathoms, this shallow area or platform being characterized by numerous reefs and islands and containing the best defined spawning grounds of at least two of the more important species. Throughout the deeper parts of the lake the bottom consists chiefly of clay, with considerable areas of sand and mud; toward the margins, clay, sand, gravel and mud occur, with occasional rocky patches near the shore.

Owing to the shallow water, the seasonal changes of temperature have a more pronounced effect than on any other of the great lakes, ice forming to a greater extent in winter, and the summer heat being more severely felt. This diversity of physical conditions induces extensive periodical movements on the part of several species, which greatly influence the seasons and methods of the fisheries in different places and render difficult the harmonizing of the many interests concerned therewith.

The area of Lake Erie is about 10,000 square miles, making it next after Lake Ontario, the smallest of the great lakes. Its inferiority in that respect, however, is compensated for by the fact that it affords opportunities for fishing throughout its entire extent, and during some years the catch has been greater than the combined catch of all the other lakes of the system.

MARKET FISHES.

The statistical investigation of the fisheries in the United States waters of Lake Erie in 1893 took notice of fifteen varieties of market fishes which are recognized by the fishermen, but between which the latter do not always discriminate in making a record of their catch. Other kinds, taken in very small quantities, were considered collectively. In the table which follows the fifteen varieties separately accounted for are enumerated under three heads in a manner to illustrate their relative importance, based upon (1) the price per pound as paid to the fishermen, (2) the extent of the catch marketed, and (3) the value of the catch. The higher grades, with one exception, retained practically the same relations in the Canadian fisheries of 1893, but the coarser grades were not there separately enumerated.

FISHES CAUGHT in the United States waters of Lake Erie and Marketed in 1893—

	Arranged by Price per Pound.	Arranged by Size of Catch.	Arranged by Value of Catch.
1	Black bass	Herring	Herring.
2	Whitefish	Blue pike	Blue pike.
3	Lake trout	Saugers	Whitefish.
4	Wall-eyed pike	Yellow perch	Saugers.
5	Pike	Sheepshead	Wall-eyed pike.
6	Sturgeon	Suckers	Yellow perch.
7	Catfish	Whitefish	Sturgeon.
8	Blue pike	Wall-eyed pike	Catfish.
9	German carp	Sturgeon	German carp.
10	White bass	Catfish	Suckers.
11	Saugers	German carp	Lake trout.
12	Yellow perch	Lake trout	Black bass.
13	Herring	White bass	Sheepshead.
14	Suckers	Black bass	Pike.
15	Sheepshead	Pike	White bass.

But few changes have occurred in the relative extent of the catch of the higher and preferred grades of fishes since 1885, when the first complete statistics of this subject were taken by the United States government. This fact is brought out by the following table, based entirely upon the figures for the United States.

1885.	1890.	1893.
Herring.....	Herring.....	Herring.
Blue pike.....	Blue pike.....	Blue pike.
Saugers.....	Saugers.....	Saugers.
Sturgeon.....	Whitefish.....	Whitefish.
Whitefish.....	Wall-eyed pike.....	Wall-eyed pike.
Wall-eyed pike.....	Sturgeon.....	Sturgeon.
Black bass.....	Black bass.....	Lake trout.
Lake trout.....	Lake trout.....	Black bass.

Marked changes, however, have taken place in the actual amount of the catch of several species, and some of the inferior grades have attained much greater prominence owing both to the decreased abundance of the better kinds and to the increased demands of trade.

The output of the Lake Erie fisheries has always been much greater in United States than in Canadian waters, as shown in the following table, which gives the total weight of the catch of fish for each of three years, the only years for which such a comparison is possible:

Year.	United States.	Canada.	Total.
	Lbs.	Lbs.	Lbs.
1885.....	51,456,000	7,605,000	59,061,000
1890.....	64,850,000	7,890,000	72,740,000
1893.....	42,968,000	9,410,000	52,378,000

The principal species from a commercial standpoint are the whitefish, herring, pike-perches, and sturgeon, of which the valuation of the catch in 1893 was about 85 per cent that of the entire lake catch. Of the remaining species the majority are either relatively scarce or inferior in quality, but the catfishes and yellow perch are conspicuous features of the fishery. Although regarded primarily as a sporting fish the black bass is also taken incidentally, in small quantities, for market.

WHITEFISH.

Status.—The whitefish ranks first in quality and market value among the commercial fishes of Lake Erie, and is, therefore, the one most highly regarded by the fishermen. It was the principal object of the early net fisheries of the lake, and for a considerable period composed the greater part of the output. It has, however, suffered great depletion, until in 1893, owing in part also to the development of the fisheries in other lines, the value of the catch amounted to only about 9 per cent of the total yield of all species.

Distribution and movements.—The principal habitat of the whitefish is the deeper waters in the eastern part of the lake, to which it seems to be mainly confined during the greater part of the year. Two regular movements, one occurring in the

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spring the other in the fall, greatly increase the area of its distribution during limited periods. There is practically no fishery for this species in January, February and March, at which season it has never been brought under observation. The gill netters, mainly from Dunkirk and Erie, generally begin to set for whitefish between the first and middle of April, and continue their operations until the middle or latter part of December following. This deep water fishery has never been extended west of the region off Ashtabula, Ohio.

The gill net grounds extend mainly from about five miles off shore to the middle of the lake, the depth ranging from about 12 to 30 fathoms and the bottom consisting of clay and mud. There is a greater or less movement of the fish within these limits, of which the fishermen have cognizance and which seem to be influenced by changes in the season and weather. In the early spring the best fishing is said generally to be obtained eastward of Dunkirk in relatively shallow water, the body of fish working westward and into deeper water as the season advances, and again returning to the deeper water as the winter comes on. It is probable, however, that the early spring distribution in abundance is more wide spread than the above would indicate, judging from the extent of territory which the fishermen may then occupy. The extent of the gill net catch varies greatly with the season, caused partly by the condition of the water and partly by the withdrawal of a portion of the fish as explained further on. The season opens with a large catch, which continues into May, but then falls away until June, when scarcely any fish can be obtained. This circumstance is attributed by the fishermen chiefly to the formation of a slime on the bottom, which also covers the nets and makes it difficult to handle them. These conditions may persist for a week or two in July, when good fishing revives, especially in the deeper waters, in which the best catches of the year are made during August and September. The remainder of the season affords much poorer returns, as a whole, than the summer, due undoubtedly to the spawning run which takes a large proportion of the fish away from this region.

The two seasonal movements above referred to are both shoreward and towards the western end of the lake, and it is during their continuance that the pound net catch is made. The spring movement occurs mainly during the latter half of April and in May, although a few stragglers may be found in June. It is felt along both shores as far as the Bass Islands and Kingsville, Ont., but on the south side of the lake it is most pronounced, east of Ashtabula. It extends but a short distance on to the western platform, where only small and irregular catches are now obtained about the Bass Islands and Kelley's Island, although formerly they became more abundant there.

The fall movement is much heavier and much more widespread than the spring, and is actuated by the breeding instinct, which leads the fish to seek spawning grounds, to a large extent, at a great distance from their normal habitat. It begins on a small scale in September, during which month a few individuals are sometimes captured in the pound nets on the platform. It does not become pronounced, however, until in October, and, including the up and down run, continues through November and more or less into December, although very few fish are taken during the last-mentioned month. That is to say, the pound net catch seems to be obtained chiefly, if not almost entirely, from the up run, making it possible that the bulk of the down run keeps farther offshore. The fall run strikes in along both shores, the same as the spring, but at the western end of the lake the fish now become widely distributed over the platform, and a large number pass through the Detroit River into Lake St. Clair. There is considerable difference in the dates of the appearance of the fish at different places, especially on the platform, but this diversity is of only local significance. It is not improbable that during the western movement a certain proportion of the fish also proceed through the deeper waters until they reach the platform, but nothing positive has been learned regarding this matter, as the schools are never followed by the gill netters, as in the case of the herring.

After the whitefish reach their spawning grounds on the western platform, they give rise to an extensive local gill net fishery of very limited duration. During their passage up the Detroit River, mainly in the latter part of October and the early part

of November, they are caught by means of seines, and in Lake St. Clair, a few are taken in the pound nets.

It is interesting to note that during the spawning period a large body of fish still remains in the deeper water, where the gill netters continue to take them, though in smaller quantities than in the summer and early fall.

Spawning.—The entire distribution of the spawning grounds of the whitefish in Lake Erie is not known. During the spawning season a part of the fish remain in their normal deep-water habitat, but it is not probable that they spawn there. The regular fall movement carries a very large body to the western platform, where many well-defined spawning grounds occur. These are chiefly rocky reefs and shoals, characterized in part by the water-worn surfaces of the common limestone of the region, the so-called honey-combed rock. Hard, gravelly and sandy bottoms in some places are also said to serve the same purpose, but this fact has not been entirely substantiated. The distribution of the grounds on the platform is from the neighbourhood of Kelley's Island to near the Michigan shore, on both sides of the boundary line. Some of the best known are two shoals north of Kelley's Island; the reefs and rocky shores about and in the neighbourhood of North Bass, Middle Bass, Rattlesnake and Green Islands; the reefs about the Hen and Chickens, Niagara Reef, and occasional patches off the mainland shores. The depth ranges mostly from about 4 to 20 feet, but is sometimes greater. It is in these places that the gill net fishing is carried on during the spawning time, and mainly here and in the Detroit River that the eggs have been obtained for the artificial propagation of the species. The fish taken in the Detroit River are mostly bound from Lake St. Clair, although the river itself is said to contain one or more spawning places.

It seems scarcely credible that the great stock of whitefish which has characterized the deeper waters, where the catch has many times exceeded that of all the remainder of the lake combined, can have been maintained solely through the agency of that body of fish which reaches the western platform, and it is possible that extensive spawning areas will sometime be discovered farther east. One small ground is known to be located between Dunkirk and Westfield, N.Y., and two others are reported off Port Dover and Port Burwell, Ont.

The spawning time varies somewhat in different years, dependent on the conditions of the weather, and also with respect to the locality. Our information on this subject is mainly limited to the platform, where the dates have been accurately determined in connection with fish-cultural operations, as follows: Ripe eggs have been obtained, but only rarely, as early as the latter part of October, the first being taken generally in the early part of November. Spawning may continue into the first week of December, but the last eggs are seldom secured later than December 1, generally a few days before that date. The bulk of the eggs have usually been obtained between the 10th and 25th of November, but sometimes beginning as early as the 5th or 6th and continuing as late as the 28th, which dates may be considered to mark the limitations of the main part of the spawning season. These figures are based on the averages for several years and for the different grounds where eggs are procured for the hatcheries. In any one place the bulk of the spawning may be, and generally is, completed in a much shorter space of time, from 5 to 10 days. They begin to fish for the hatcheries on the Detroit River in the latter part of October, but the fish are not then ripe and are penned until the eggs mature.

Size.—The general run of the whitefish taken in Lake Erie ranges from about $1\frac{1}{2}$ to 5 or 6 pounds, but seldom exceeds 4 or 5 pounds. This applies to all parts of the lake, but the average size may differ more or less in different places or in the catch by different kinds of apparatus. The species, however, attains a weight of 12 pounds and more, and some have been reported weighing as high as 20 pounds, but these extreme sizes are now practically extinct. Individuals weighing 8 or 9 pounds are considered very large for Lake Erie at the present time.

It has been impossible to ascertain satisfactorily the average size of the fish in the catch of any one fishery. In several fares landed by the gill net tugs at Dunkirk in August, 1894, the average by actual weight was found to be between $2\frac{1}{2}$ and

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3 pounds, only a very small number weighing as low as $1\frac{1}{2}$ and $1\frac{3}{4}$ pounds, while the largest weighed about 5 pounds. According to the statements of the fishermen, the average weight on the platform ranges all the way from $2\frac{1}{2}$ to 4 pounds, these figures, which are only estimates, being based in part upon the pound net and in part upon the gill net catch.

The dealers would prefer to handle no whitefish weighing less than about $1\frac{1}{2}$ pounds, and some would place the minimum size suitable for market as high as 2 pounds.

From the observations of fish-culturists, the smallest fish from which eggs may be obtained on this lake weigh from $1\frac{1}{2}$ to 2 pounds. In that event the general catch of whitefish on Lake Erie may be expected not to include immature fish, and the minimum size desired for market would about correspond with their earliest mature size, $1\frac{1}{2}$ to 2 pounds. It is questionable, however, especially in the case of a rapidly decreasing product, whether its extensive capture in the first year of maturity should be allowed.

It is claimed by some that very large quantities of immature whitefish are caught in certain places, but the evidence in respect to that matter lacks confirmation. According to the testimony, comparatively few whitefish weighing under $1\frac{1}{2}$ pounds reached the platform, the number being somewhat larger in the spring than in the fall, but at no time great enough to make their capture a question for serious consideration. Nothing is definitely known regarding the general distribution and habits of the young, but they are supposed to remain chiefly in the deeper waters of the lake. Many are reported to be taken in the herring gill nets still in that region, and also in the pound nets on some parts of both the north and south shore, but the men actually concerned in those fisheries deny that the quantity is ever excessive. The subject is important and should be further investigated.

DECREASE.

There has been a great falling off in the abundance of the whitefish in Lake Erie since the early days of the fishery, as shown by both the statistics and the testimony of witnesses, its relative extent, as compared with the other species, being exceeded only by that of the sturgeon and catfishes. The history of the decrease in United States waters cannot accurately be told because of the incompleteness of the returns, but on the Canadian side figures are available for each of the past 26 years. The statistics which have been taken of the United States catch give the following totals for each of four years, viz:—

	Lbs.
1880.....	3,333,000
1885.....	3,531,000
1890.....	2,341,000
1893.....	1,292,000

The year 1885 shows a slight increase over 1880, and represents the maximum catch for which figures are extant. The reduction from that time was 34 per cent to 1890, and 63 per cent to 1893.

Analyzing the returns so as to locate the changes in the catch with respect to conditions surrounding the fishery in different parts of the lake, we obtain the results shown in the following table:—

	1885.	1890.	1893.
	Lbs.	Lbs.	Lbs.
From Vermillion westward	1,009,400	891,962	651,180
Ohio, east of Vermillion	373,000	373,620	287,944
Pennsylvania and New York.....	2,149,455	1,075,869	353,286

As brought out by this table, the percentages of decrease for 1890 and 1893 as compared with 1885, in each of the three districts named, have been as follows :

1. From Vermillion westward : 1890, 11 per cent ; 1893, 35 per cent.
2. Ohio, east of Vermillion : 1890, none ; 1893, 22 per cent.
3. Pennsylvania and New York : 1890, 49 per cent ; 1893, 83 per cent.

The most extensive decrease has, therefore, been manifested in that part of the lake where the deep water gill netting has been the main feature, and where comparatively small amounts are obtained by pound nets. The next rate of decrease is at the western end of the lake, where the pound nets attain their maximum development as to numbers, and where, in 1893, the catch by gill nets on the spawning grounds was less than one-sixth the total catch of that district. The least decrease was shown by the central portion of the south shore, where the size of the catch is also smallest, where the pounds, the principal method of capture, are for the most part scattered and relatively few in number, and where the fishing season for whitefish is of shortest duration. They come on this shore only during a brief period in the course of their spring and fall migrations, a transient visitor, passing from or toward their normal place of habitat.

The figures discussed above represent the actual catch in the several years without reference to the amount of apparatus employed. From the early period of the fishery the number of pound nets and the quantity of gill netting increased rapidly and continuously, but the amount of each has been reduced in recent years. The number of pounds was very much greater in 1890 than in 1885, and there were at least 200 more in use in 1893 than in 1885. The decrease in the catch of whitefish by pound nets has, therefore, been coincident with a marked increase in the amount of apparatus. In 1890 the pound catch comprised 40 per cent of the entire catch by all methods, but in 1893 it had increased to 60 per cent, owing to the reduction in the quantity obtained by gill nets.

Much less explicit information is available respecting the gill net fishery at the eastern end of the lake. At one time, mainly before detailed statistics were taken the amount of whitefish gill netting employed from Erie, Pa., was very great, and the catch of whitefish by that means was very large, much exceeding that by all methods throughout the remainder of the lake. It is stated by local authorities, although the statistics fail to furnish the exact date, that the development of this fishery and the taking of a large catch continued to about 1885, when, owing to a rapid falling off in the abundance of the whitefish, most of the fishermen who had previously engaged in its capture turned their attention to the herring. As the fishery declined at Erie it was taken up at Dunkirk, where it has increased several fold since 1885, but most extensively since about 1890. The only other port from which deep water gill netting for whitefish is prosecuted by steamers is Ashtabula, Ohio, but it is there of slight importance compared with Erie and Dunkirk.

While the quantity of gill netting employed in the deeper water increased considerably between 1890 and 1893, the falling off in the catch of whitefish by that means between those dates amounted to 67 per cent, showing that the decrease continues and that the fishery is still being conducted on too large a scale.

The Canadian catch of whitefish, which has been made almost exclusively in pound nets, shows many and great fluctuations in amount during the period from 1872 to 1894, but during recent years the total annual catch has been larger, on an average, than in the earlier period of the fishery. This increased catch, however, has only been secured through a steady increase in the amount of apparatus employed, the proportionate annual catch to each pound net having declined almost continuously to the present time. This fact is strikingly illustrated by the following table, which gives the average annual catch per pound net for five year periods, except the last entry which covers only three years :

	Lbs.
1872 to 1876	10,036
1877 " 1881	4,160
1882 " 1886	2,678
1887 " 1891	1,728
1892 " 1894	1,151

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DECREASE IN LAKE ST. CLAIR AND THE DETROIT RIVER.

The Canadian statistics show a marked decrease in the catch of whitefish in the Canadian waters of Lake St. Clair since 1889, and a greatly fluctuating catch previous to that date. There has also been a corresponding decrease on the Michigan side of the line. There is no standard by which to measure the extent or rate of this decrease, but as the fish which frequent these waters enter them from Lake Erie, and only during the spawning movement in the fall, it is natural to suppose that the extent of the run each year is influenced by the abundance of the fish in the larger lake.

OPINIONS OF THE FISHERMEN RESPECTING DECREASE.

All fishermen who have had a long experience in the fisheries of Lake Erie acknowledge that there has been a very marked decrease in the abundance of whitefish since early times. It is also quite universally agreed that this decrease has continued down to a comparatively recent date. Strangely enough, however, and in the face of the statistical returns, which they themselves have furnished, the figures being taken from their own books where such are kept, many of the fishermen are strongly of the opinion that during the last few years just preceding 1894 the average catch has remained constant or has even slightly increased. This result they attribute very generally to the work of the hatcheries. It is impossible to reconcile their views in this matter with the evidence above discussed, which undoubtedly has the greater weight of authority.

LAKE HERRING.

Status.—The herring (*Argyrosomus arteđi*) is by far the most abundant of the market species inhabiting Lake Erie, and the fishery to which it gives rise is much the most conspicuous one, as regards the extent of catch, on the entire chain of lakes. Since 1879, at least, the output annually from this lake alone has constituted from fifty to eighty per cent of the entire yield of herring from all the lakes combined, while within the limits of the lake itself, during the same period, the herring catch has composed from about thirty to sixty per cent of the total catch of all species. Moreover, notwithstanding its inferior price, the value of the catch annually has been equal to from thirty-three to forty per cent of the value of the total catch in Lake Erie.

This species first owed its prominence chiefly to the decrease in the whitefish, which induced the fishermen to make a special feature of its capture. In the early days of the fishery, the mesh in the pound nets was of sufficiently large size to permit the escape of herring, and the gill net mesh was mainly adapted to the whitefish. The improvements in facilities for transportation have also helped to stimulate the herring fishery, and the opportunities now afforded for preserving and shipping the catch long distances in a fresh condition have opened up an almost unlimited market. The cheapness of the product, which brings it within the means of the poorer classes, has also been one of the most important factors in producing this wide demand. Through these circumstances, the herring has come to have a more widely distributed market than any other of the lake species, and its preservation is considered to be of more moment to the fishermen of Lake Erie than that of any of the others. The fact that the herring run larger, as a rule, in Lake Erie than in the other lakes to the north and west, is likewise in its favour.

Distribution and movements.—The herring has the same general distribution and migratory habits as the whitefish, but seems to be more widely disseminated during most parts of the year. During the summer and winter it is mainly restricted to the deeper waters in the middle of the lake in its eastern half and along the northern shore east of Rondeau, although a small body is found in winter on the western platform.

From the deep water region of even temperature there are two great migrations into the shoaler and more changeable portions of the lake. In the spring when the shoal waters become warmer the fish emerge from their winter habitat and move shoreward and upon the edge of the platform, evidently in search of food. The volume of this migration is less than that of the fall run and is more fluctuating and irregular. The movement is felt along both shores as far west as Leamington and the eastern side of the Bass Islands, and the herring, therefore, constitute a considerable portion of the spring catch of the pound nets within the limits mentioned. Their presence is generally first noticed early in April and occasionally large lifts are made in the latter part of that month, although west of Vermillion and probably on other parts of the shore the best fishery is in May. Some herring are caught in June, but by the first of that month the bulk of them have left the United States coast for deeper water, although they remain on the Canadian shore east of Point Pelee throughout the summer.

During the summer months the gill net tugs from Cleveland and eastern ports find them in deep water well out in the lake, the best season off Erie, the principal seat of this fishery, being from the middle of July to the middle of September, the maximum catch being made in August.

The fall migration corresponds in a general way with that of the spring, although the incentive is different. The fall run is most pronounced and uniform in its movements on the shores west of Point Pelee and Vermillion. Large bodies of herring are seeking spawning grounds on the platform over which they become widely distributed, a small part of the schools also finding their way through the Detroit River into Lake St. Clair.

On the middle southern shore the fall movement is ill-defined and irregular, and the fishermen, theorizing upon this fact, suppose that the bulk of the fish move up the Canadian side of the lake until deflected by Point Pelee, many of the pound netters holding that the United States waters are so obstructed by gill nets that no other course is open. West of Vermillion and around the islands there was formerly and is still to some extent, a small run of large non-spawning fish during the latter half of September and early in October. The main fall run appears about or subsequent to the middle of October and continues until the latter part of November or into December, but the best fishing is obtained on the platform during November when the fish are spawning. While it is at its height there is a substantial falling off in the gill net catch in the deep water at the east, which is ample evidence that a large proportion of the herring in the lake take part in the migration.

Only indefinite information has been obtained of the return or eastward movement of the herring after spawning. Some of the eastern tugs which resort to the western end of the lake in the fall have been known to fish out of Huron as late as January, when some fish were still being caught.

In Lake St. Clair herring are caught at all seasons except the summer, but whether the spring fish are some which have remained after spawning in the preceding fall cannot be stated.

Spawning.—As shown above the herring, therefore, execute the same general spawning movements as the whitefish. The distribution of their spawning grounds on the platform, however, is less restricted, and they are unquestionably not confined to the reefs and rocky bottoms when discharging their eggs. There is also no doubt that spawning grounds of great extent occur east of the platform, although they have not been located. It would seem impossible for the comparatively small number of fish which have visited the western spawning grounds in recent years to have kept up the main supply on so large a scale, and it is stated that since the decrease began large bodies of herring have spawned off the south shore between Huron and Fairport, an event previously unheard of.

The spawning time of the herring is not as definitely known as in the case of the whitefish, with which, however, it agrees approximately. The bulk of the spawn is cast between about the 10th and the end of November, but some spawning may take place shortly before and after those dates.

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Size.—The herring of Lake Erie are larger than those of either Lake Huron or Lake Superior. There is some variation, dependent upon the season. During the spawning run the fish taken at the western end of the lake average 11 or 12 ounces, but those obtained near Sandusky in September range from 11 to 25 ounces, the average having been about 19 ounces in 1894. The minimum weight of the herring marketed is about 8 ounces, but the average is everywhere larger than this. The pound netters on both the north and south shores record the capture of smaller fish at times and some are taken occasionally in the gill nets at the eastern end. The catch of under sized herring, however, is not of considerable proportions, and such fish are never put upon the market.

Decrease.—In that part of the lake west of Huron, the fishermen agree that there has been a decrease in the abundance of the herring, the most of them dating the beginning of the falling off in about 1890 or 1891. Regarding the middle section of the south shore there is a difference of opinion; while in Pennsylvania and New York all the fishermen interviewed, with one exception, refused to acknowledge the occurrence of a decrease, although admitting that more netting was required to catch the same quantity of fish.

The total herring catch by all methods in United States waters for the several years when the statistics were collected is shown in the following table:—

1880.....	11,774,400
1885	19,354,900
1890.....	38,868,283
1893.....	20,931,076

Considered as a whole, therefore, the herring catch increased in size until 1890 or thereabouts, the exact year not being determinable owing to the lack of figures for intermediate periods, having practically doubled in the course of each of the two half decades ending with that year. Having reached its maximum about 1890, it then fell off to the extent of nearly 50 per cent during the succeeding three years, the catch for 1893 having been almost identical with that for 1885.

Taking into consideration the extent of fishing in connection with the herring, we find that the number of pound nets in use was about 50 per cent greater in 1890 than in 1885, and was still about 30 per cent greater in 1893 than in 1885. Moreover, the amount of herring gill netting kept increasing at a comparatively rapid rate down to 1893. A much greater quantity of apparatus was, therefore, required to make in 1893 the same catch that was reported in 1885.

Analyzing the catches by districts we obtained the results presented in the following table, which shows the amounts taken on different parts of the United States coast during each of three years:—

	1885.	1890.	1893.
	Lbs.	Lbs.	Lbs.
1. From Vermillion westward.....	12,860,700	18,841,613	6,174,392
2. Vermillion to Conneaut.....	3,014,900	10,207,040	6,667,788
3. Pennsylvania and New York	3,480,200	9,819,630	8,088,896
Total	19,354,900	38,868,283	20,931,076

In the statistical investigations of 1890 and 1893, the catch of herring was enumerated separately for each of the two principal fishing methods, pound and trap nets on the one hand, and gill nets on the other. Only a relatively few thousand pounds of herring were taken by any other means. While a separate enumeration was not made in 1885, it is still possible to use the returns for that year to some extent in completing the comparisons made below.

The district west of Vermillion is the extensive pound net region. Here the total catch increased 50 per cent in 1890 as compared with 1885; but in 1893 it fell off 66 per cent as compared with 1890 and 50 per cent as compared with 1885. In 1885 practically all of the herring were obtained in pounds; in 1890 the catch by this method had increased 33 per cent, with at least an equal increase in the apparatus; while during the next three years the catch decreased 87 per cent with a decrease of not over 20 per cent in the number of pounds. Only a small quantity of gill nets was employed in this district in 1885, but in 1890 the catch by this means had reached over 2,000,000 pounds and in the next three years a further increase in the catch of 87 per cent had taken place. The increased catch by gill nets in recent years resulted from a vast increase in the apparatus, stimulated by the visits of tugs from eastern ports.

Between Vermillion and Conneaut there is only a moderate pound net fishery, but there has been a constantly increasing number of gill nets. We find here an increase of 233 per cent in the total catch between 1885 and 1890, but in 1893 there was a decrease of 40 per cent as compared with 1890 and an increase of 50 per cent as compared with 1885. In this district there was a decrease in the pound net catch between 1890 and 1893 of about 56 per cent, the amount of apparatus showing no diminution. The gill net catch also shows a decrease amounting to 24 per cent between 1890 and 1893, notwithstanding a heavy increase in the amount of netting.

In Pennsylvania and New York the catch of herring in pound nets is too insignificant to call for attention in this connection. The catch by means of gill nets, however, is very important, and this branch of the fishery shows a decrease of 17 per cent between 1890 and 1893, with a very considerable increase in the amount of netting used. The total catch increased greatly, however, between 1885 and 1893, owing to the change from the whitefish to the herring fishery, as explained above.

The conditions of the fishery in United States waters may be summarized as follows:—With an increase in the number of pound nets from 1885 to 1890, there was a large increase in the size of catch. From 1890 to 1893, with a reduction in the number of pound nets amounting to between 12 and 15 per cent, the catch fell off 81 per cent. There was a very large increase in the total gill net catch from 1885 to 1890, accompanying an increase of perhaps 40 per cent, more or less, in the amount of netting. In the three succeeding years the amount of gill netting continued to increase to the extent apparently of nearly 40 per cent, but during that time the catch began to fall off. It is evident that there has been a large decrease in the abundance of herring in Lake Erie. This decrease has been felt in all parts of the lake, but to the greatest extent by far in the extreme western part, where the greater proportion of the pound nets are located.

The heavy decrease or abrupt falling off in the catch began at Port Clinton in 1890, at Huron in 1891, and around the islands in 1892, although a smaller decrease was more or less manifest for a varying period preceding those dates.

On the Canadian side of the lake the fishery, both by gill nets and pounds, has always been small compared with the United States shore. The Canadian fishermen are of the general opinion that the herring has suffered no decrease except in one or two places, due to local causes.

The Canadian statistics show a steady increase in the total catch from 1869, when the first returns were made, until 1885, inclusive. Since then the increase in the pounds has been steady, amounting to 64 per cent in 1894. While the amount of gill netting has fluctuated, there has been, upon the whole, a steady increase which amounted, in 1894, to 661 per cent. In only four years since 1886 has the catch been greater than was recorded in that year, and an examination of the records shows that while the total catch during the period mentioned has been fairly maintained, this has been possible only through a great increase in the amount of apparatus.

The fall run of herring into the Detroit River and Lake St. Clair, was formerly very large, but it is now insignificant. The Canadian statistics indicate a falling off from 1,256,000 pounds in 1886, to 18,000 pounds in 1893.

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WALL-EYED PIKE.

Status.—The fishermen of Lake Erie differentiate the wall-eyed pike (*Stizostedion vitreum*) into two varieties, the yellow or gray pike and the blue pike. These varieties are distinguished principally by their colour, but large individuals, even when of a decidedly blue colouration, are invariably ranked with the more valuable yellow pike, while the market makes practically no distinction between the small ones. The annual catch of the two varieties combined is exceeded in extent and value by that of the herring alone of all the species found in the lake.

Distribution and movements.—The wall-eyed pike is found throughout the entire extent of the shore line on both sides of the lake. It is generally stated that the yellow pike is most abundant on the western platform, from which the blue pike is said to be almost totally absent. The run of the large fish usually begins early in April and continues generally until May 1, lasting in abundance very rarely after May 15. A few are taken throughout the remainder of the spring and they also occur in small numbers in the fall. They are captured in small quantities by both the whitefish and herring gill netters of Erie and Dunkirk, chiefly in the spring, but also to some extent in summer and fall. About 80 per cent of the large fish recorded in the statistics as wall-eyed pike are caught in the pound nets.

To the eastward of the platform a run of smaller wall-eyed pike, usually classed as blue pike, occurs in the spring. They do not approach the shores closely enough to be taken in the pounds until about the middle of May, considerably later than the spawn run of "yellow pike," and they continue in greater or less abundance, according to locality, until the end of the spring season, and occur again in the early fall. The gill netters of Cleveland and eastward find the "blue pike" usually during the first two weeks in April, before the run reaches the pounds, and they continue to catch them irregularly until December. In the spring the best catches are made in gill nets in April and early May; they are again abundant in September or October, and the maximum for the year is reached in November. These fish, sold as blue pike, are smaller than the spring fish on the platform, but in their importance to the gill netters they are not exceeded by any other fish except the herring, with which they may be more or less associated in the spring.

Spawning.—The spawning grounds of the yellow pike occur in the bays and streams as well as upon the reefs and along the greater portion of the shore, but principally at the western end of the lake. The vicinity of Maumee Bay appears to be the most prolific spawning ground in Lake Erie, and the Thames River holds similar rank in the Lake St. Clair region. The eggs are deposited between the latter part of March and the early part of May, but mainly during April. There is no satisfactory evidence respecting the spawning of the "blue pike," although several fishermen claim to have witnessed it during the latter part of April and early in May.

Size.—The yellow pike ranges in size up to 15 and 18 pounds, but few such fish are caught. The first grade of fish comprises those weighing upwards from about 1 pound, the second grade includes fish between $\frac{1}{2}$ pound and pound, while the third grade embraces all below $\frac{1}{2}$ pound. The smaller grades are sometimes sold as "No. 2" and "No. 3," at others as saugers and again as "blue pike," according to the demands of the markets. On the Canadian side the average size is said to be larger.

The gill nets and hooks and lines take fish of a fair average size, but the other forms of apparatus catch a very large proportion of small fish, many weighing only 4 or 5 ounces, all of which are marketed.

The "blue pike" is said to be smaller than the "yellow," probably because the large ones are always designated under the latter name.

Decrease.—The fishermen at the western end of the lake claim that for several years prior to 1894 a decrease was noticed in the yellow pike, but in the spring of that year they were present upon some parts of the shore, especially in the vicinity of Maumee Bay, in as great quantities as ever.

Concerning the blue pike the weight of testimony is not indicative of a decrease although fluctuations have occurred from time to time. So lax is the discrimination and so dubious the distinction said to exist between the two varieties, that it is impracticable to attempt the discussion of the decrease except as regards the species as a whole.

The statistics of the catch for three years in United States waters are as follows:—

	1885.	1890.	1893.
	Lbs.	Lbs.	Lbs.
From Vermillion westward.....	2,309,100	2,659,044	2,017,071
Vermillion to Conneaut.....	2,473,300	3,205,430	3,327,011
Pennsylvania and New York.....	5,809,225	3,730,162	2,560,720
	10,593,625	9,594,636	7,904,802

These returns show a decrease in the catch of about 25 per cent between 1885 and 1893, and of about 15 per cent between 1890 and 1893. That the decrease in the abundance of the species is greater will be understood when it is recalled that during the longer period mentioned there was a heavy increase in all kinds of apparatus in which the wall-eyed pike is captured. The falling off was greatest in the eastern part of the lake, while along the central part of the south shore there has been a considerable increase in the catch. In the spring of 1894 there was a heavy run of large yellow pike at the extreme western end of the lake, which made up the deficit above noted in that year, but as this influx was not elsewhere observed the fact does not invalidate the conclusion that there has been a general decrease in the species between 1885 and the present time.

On the Canadian shore there has been a steady increase in the size of the catch, due, however, to an increase in the amount of apparatus used.

SAUGER.

Status.—The sauger (*Stizostedion canadense*) stood third in the relative size of the catch made in the United States waters in 1885, 1890 and 1893, and in the last mentioned year it ranked fourth in the total value of the catch. Its status on the Canadian side is uncertain as it is not there enumerated separately in the statistics. The extent of the United States catch cannot be stated correctly owing to the habit of the fishermen of frequently including the small blue and yellow pike in the same category as the sauger.

In 1893 the pound nets took over 58 per cent of the total catch for the United States side, the balance being obtained by means of gill nets, seines, fyke nets and hooks and lines, named in the order of their importance in this fishery. Much of the catch credited to the pounds doubtless consisted of the wall-eyed pike, but what proportion cannot be told.

Distribution and movements.—The sauger is distributed along the entire shore of Lake Erie, but appears to be much less abundant in Canadian than in United States waters. It seems to belong essentially to the shoal waters, at least during such times as it is accessible to the fishermen, a fact exemplified by its abundance on the platform. During most of the year, however, the whereabouts of the bulk of the saugers is not known.

As soon as the ice leaves in the spring they are found in abundance on the platform and along the shore west of Vermillion, being at that time the object of an important gill net fishery. Gill netting for saugers begins at Vermillion and soon

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after extends westward, a fact which leads the fishermen to the conclusion that there is a westward movement of the schools. This run, whatever may be its course, continues during the first three weeks in April, although the species is taken in small numbers in the pound nets until the close of the spring season. When the pounds get in early on the platform they are the means of obtaining large quantities. There is a smaller shoreward movement in the fall, and the pound nets in some places make good catches, although never so large as in spring. During the winter many are caught through the ice in the hook and line fishery on the western platform.

Spawning.—The extensive spring movement is undoubtedly connected with the passage of the fish to their spawning grounds, the extent of which is not accurately known. They undoubtedly spawn along the shores at the extreme western end of the lake, and it is supposed that they do so also in other shallow places on the platform as well as more sparingly further east. The exact time of spawning has not been determined, but the season is supposed to end by the middle or latter part of April.

Sizes.—The sauger rarely exceeds 1 to 1½ pounds in weight and 15 inches in length. The average size of the fish marketed is not over 11 to 13 inches or about ½ pound. The gill nets take a larger average size than the pound nets.

Decrease.—From the statistics it is impossible to determine if there has been a decrease in the abundance of this species. The catch in Canadian waters is not enumerated separately. With respect to United States waters, the largest catch (5,466,000 pounds), is recorded for 1885. The amount fell off to 4,179,000 pounds in 1890, notwithstanding that the quantity of apparatus had increased. In 1893 the catch was larger (4,531,000 pounds) than in 1890, although the number of pound nets was somewhat less than in the earlier year. There has, however, been a decided increase in the extent of the tug gill netting for this species, which may readily explain the larger catch in 1893, even though a decrease in abundance had taken place. In 1893 the catch by pound nets was 58 per cent of the total catch on the southern side of the lake. The species was taken in other kinds of apparatus as follows, in the order of the size of the catch: gill nets, seines, fyke nets and hooks and lines.

With very few exceptions, the testimony of the witnesses who were interviewed on this subject was to the effect that a decrease had taken place, but no one gave any definite information about it.

The difficulty in dealing with the statistics arises from the fact that a proper discrimination is not always made between this species and the smaller sizes of the yellow and blue pike, which are frequently lumped with it, all being recorded under one name, presumably that which at the time composes the main part of the catch, whether blue pike, No. 2 or 3 pickerel, or saugers. It is quite certain, however, that a decrease in the abundance of the species, as a whole, has taken place.

STURGEON.

Status.—The sturgeon (*Acipenser rubicundus*) is one of the higher priced fishes of the lake, its value being augmented by the importance of its secondary products, caviar and isinglass; the demand for it exceeds the supply and its capture, therefore, profitable to the fishermen. On the United States side the bulk of the catch is made in gill nets, 527,000 pounds, having been taken by that means in 1893, 178,000 pounds in pound nets and 88,000 pounds by hooks and lines.

Distribution and movements.—Practically all that is known respecting the movements of the sturgeon is that they resort to certain places in the spring for spawning purposes, and most of the catch is made at that season. They occur then along the entire shore, but are most abundant at the extreme eastern end of the lake, off Erie County, New York, where the catch since statistics have been taken has always exceeded that of all the remainder of the United States shore. Outside of this locality they are now most plentiful on the Canadian side, where the catch has been

better maintained. The vicinity of Point Pelee and Pelee Island has been the most favoured one in Canadian waters. They enter Detroit River in the spring and at the same season occur in some numbers in Lake St. Clair. Many are taken on the Canadian shore of Lake Erie in summer, but the fall catch is everywhere smaller than the spring. Their whereabouts in winter is not known, but they are occasionally caught on hooks and lines fished through the ice.

Sturgeon are taken by means of pound nets, gill nets, seines, and baited and naked hooks. Pound nets were formerly the most important of the appliances employed for their capture, but since 1885, at least, more than half of the annual yield of Lake Erie has been taken by means of gill nets off the shores of Erie County, New York. The localities in which the sturgeon is taken by other means are discussed in connection with the apparatus and fishing methods.

Spawning.—The spawning season begins early in May and continues into June. The exact location and extent of the spawning grounds are not known, but some parts of Lake St. Clair the lower portion of the Detroit River, the vicinity of Point Pelee and Pelee Island, and the shores of Erie County, New York, appear to be resorted to for that purpose. It is probable that fish under 4 feet in length do not spawn.

Sizes.—The maximum size of the sturgeon in Lake Erie is about 150 pounds, but individuals weighing from 90 to 100 pounds are considered large at the present time, and the average good-sized fish weigh about 60 pounds. The market recognizes two sizes, those over 4 feet long and those under that length, the latter being known as "halves" and bringing only half price. In some places and at some times, at least the "halves" compose from one-third to one-half the pound net catch.

Decrease.—The sturgeon has suffered a relatively greater decrease in abundance than any other species in the lake. In the early history of the pound net fishery they were caught in vast quantities, but being in no demand they were regarded as a nuisance and destroyed wholesale.

The statistics of the Canadian catch antedate those of the United States, the species being first recorded in the former in 1879. From that time until 1887 there was a yearly increase, but subsequently there has been a nearly steady decrease, coincident with an increase in the number of pound nets from 143, in 1887, to 204, in 1894. Comparing the catch of the pound nets during the four years 1887 to 1890, with the similar period ending with 1894, we find that the catch per net has decreased 36 per cent. On the United States side the decrease has been greater, the catch falling from 4,727,956 pounds, in 1885, to 2,078,907 pounds, in 1890, and 793,800 pounds, in 1893, a total decrease of 83 per cent during the entire period. The decrease has been manifested in all parts of the lake, but was greatest in amount if not in proportion in Erie County, New York. There has been a heavy decrease in the Detroit River and Lake St. Clair, but owing to the irregularity of the fishing methods there employed it is impossible to estimate its extent.

BLACK BASS.

Status.—From a commercial standpoint the black bass is of very little importance in Lake Erie, and it demands attention in this connection, principally on account of its qualities as a game fish.

Distribution and Movements.—In the fall, and perhaps to some extent in the spring and summer, the black bass appears to be somewhat gregarious, and it occasionally happens that at such times large catches are made in the various forms of fixed apparatus, pounds, trap nets and fyke nets. The sport fishing is carried on principally in the early summer when the larger and finer fish are caught, but there is some angling also in the fall. There are no definite migrations of this species, but there is a movement of small and medium sized fish along shore in certain places.

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The black bass is found in all parts of the lake and in most of the waters tributary thereto. In the streams, bays and marshes the large-mouthed species occurs, but the small-mouthed species is confined to the lake proper.

Spawning.—The black bass spawns in shoal waters during the spring and early summer, the large mouthed in the streams and pools in the marshes and bays, the other species around the shores of the lake. With the latter the season appears to begin in the latter part of May and to continue until July 1, the large-mouthed bass spawning somewhat earlier. The breeding fish form shallow saucer-shaped depressions or nests in which the eggs are deposited, the parent remaining on guard until the young are hatched. The fish are readily captured at such times by seines, "snags," spears, and other poaching methods. The young remain in shoal water for a considerable time, and we saw specimens from 2 to 5 inches long caught in the minnow seines in August, although they are apparently not used for bait.

Size.—The fish caught by the sportsmen in the island region average from 12 to 16 ounces, while those taken by the pound net men weigh from 16 to 18 ounces on an average. More fish under 8 ounces in weight were seen in the sportsmen's strings than in the catch of the pound nets. The size is said to be decreasing.

Decrease.—The decrease in the abundance of black bass in Lake Erie has been extensive. Formerly large catches were made in various forms of fixed apparatus, but such are now rare. In the statistics for 1885 the black bass were not separately enumerated, but the subsequent returns show a reduction from 248,418 pounds in 1890, to 105,602 pounds in 1893, a falling off of over 42 per cent in three years. The decrease per unit of apparatus during this period was 50 per cent in the pounds, 40 per cent in the fykes and 60 per cent in the seines. On the Canadian side we find a decrease of about 50 per cent in the catch of bass per pound net between the four year periods ending with 1886 and 1894 respectively, and still greater changes would be shown by a comparison with earlier years.

Detroit River, Lake and River St. Clair.—On the Detroit River some bass are caught on hooks and lines, and a few in seines with the whitefish. In Lake St. Clair, they are obtained principally in seines, but also in fyke nets, and, to a limited extent, in pound nets. On the River St. Clair, seines are the principal means of capture, although some are speared on their spawning beds by Indians and others. In the vicinity of Algonac and the St. Clair Flats, there is a rather extensive hook and line fishery by sportsmen, a very large proportion of the catch consisting of the large-mouthed bass.

MISCELLANEOUS FISHES.

Catfishes and bullheads.—The catfishes caught for market on Lake Erie are the silver or spotted cat, *Ictalurus punctatus*, and the yellow cat, *Ameiurus lacustris*; the bullhead is the *Ameiurus nebulosus*, and is considered inferior to the former two. Most of the catfishes are taken by hook and line and by the pound nets, but the greater part of the bullheads is secured by means of fyke nets and seines. The hook and line fishery for the catfishes was formerly of considerable importance, but of late years both species have fallen off greatly in abundance, making the fishery much less remunerative, and fewer men now engage in it.

In United States waters, the decrease of the catfishes has exceeded that of any other species with the single exception of the sturgeon. Statements to this effect were made at practically all of the fishing stations on the south shore, the depletion in many cases being such as virtually to amount to the extermination of the species for commercial purposes. The statistics tend to confirm the testimony of the fishermen, the figures of the catch showing a decrease of over 72 per cent from 1885 to 1893. From 1890 to 1893, the decrease averaged about 57 per cent for each of the fishing methods employed. The depletion has been quite uniform for the entire United States shore, with the exception of Chautauqua County, N.Y., where a slight increase in the catch was observed.

Lake Trout.—This species affords only a very limited fishery in Lake Erie, and is practically confined to the deep water of Pennsylvania and the western extremity of New York. Almost the entire catch is made by tugs from Dunkirk, but small quantities are obtained by vessels from Erie, Ashtabula and Fairport. Gill nets having a 5½ inch mesh are used specially for the trout, but a few are taken occasionally in the whitefish gill nets, and very rarely one may enter the pound nets. During the spring and summer they seem to be scattered over the deep water area near the eastern end of the lake, but in October they begin to collect in a body preparatory to spawning, and in that month and until the middle of December the entire catch is made. There is a spawning reef located near the shore between Dunkirk and Westfield, N.Y.

The trout are said by some of the fishermen to have been much more abundant at one time than they are now, but their statements lack confirmation. There appears to have been a recent decrease, however, which the statistics indicate to have amounted to 23 per cent in 1893 as compared with 1885.

Yellow Perch.—This species is very abundant and furnishes a large catch, but it is not held in much esteem by the fishermen. It is one of two species which show a large increase in the amount sent to market between 1885 and 1893, but this has undoubtedly been due to an increased demand rather than an actual increase in abundance. The perch is one of the most rapacious of the lake fishes, and feeds extensively on the young of other food species. There is, therefore, no demand for its protection.

Miscellaneous.—The remaining species taken in the fisheries of Lake Erie, the white bass, the various species of the sunfish family, grass pike, maskinonge, suckers, sheepshead, carp, etc., do not require to be discussed in detail in this connection.

FISHING METHODS AND PRACTICES.

The diversity of conditions existing in Lake Erie, together with the great variety of its food fishes, has led to the employment in its waters of a diversity of fishing methods. The principal ones are represented by the pound nets and gill nets, the former typical of the sedentary apparatus and suited only to the shallow margins and the platform, the latter changing constantly in position and chiefly made use of in the deeper waters. The bulk of all the catch has, for many years, been secured through the agency of these appliances, which may be said to combine the requisites for reaching practically every part of the lake's resources. The other means of capture are advantageous under certain, and generally limited conditions, and their chief merit among the fishermen in most cases is the inexpensiveness of the outfit. Such are the trap nets, fyke nets, seines, and hooks and lines. The trap nets are used in about the same character of location as the pounds; but they are smaller than the latter, and may readily be moved from place to place. The fyke nets are mainly adapted to inclosed waters and marshy areas; they are often built of larger size than is customary elsewhere, which greatly increases their capacity. Seines are now employed on only a very small scale in some of the bays and rivers, but found especially effective during the spawning run in certain of the latter. Hook and line fishing is mainly carried on at the two ends of the lake, both hand-lines and set-lines being utilized. The use of spears has never been extensive, and scarcely anything is now done by this means.

POUND NETS.

Description.—The pound nets consist each of a leader, heart, tunnel and crib, composed of netting, which is usually supported on stakes driven into the bottom. The leader is a straight barrier running off from the shore and serving to intercept the fish and direct them toward the opening into the crib, which they reach through the heart and tunnel. The crib is square, and is inclosed at the bottom and on all sides except at the point of entrance.

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The pounds are set either singly, or, more usually, in strings of two or more, with the inner end of each succeeding leader starting from the back of the next inner crib. On the United States side of the lake there are several such strings, forming practically continuous barriers 5 miles in length, and reaching from 6 to $7\frac{1}{2}$ miles from shore. Sometimes, as in the island region, on the platform the inner end of the inshore leader is attached to the shore, but there is usually an interval of from 10 rods to 2 miles, according to location. As a rule, the inshore leader is longer than the others, and may vary from 50 to 175 rods in length.

In Maumee Bay and Sandusky Bay the leaders are usually about 30 rods long, but elsewhere, excepting the inshore one, they vary from 40 to 70 rods in length, although a few are more extensive. There is at present a tendency to use shorter leaders, and 50 rods now appears to be the most approved length. As the leader is designed to extend from the surface to the bottom, its depth is, of course, adapted to the depth of water in which it is fished. The diameter of the crib varies from 11 to 30 feet, the smaller sizes being used close to shore and in the bays, and the larger ones, from 24 to 30 feet square, in the more open waters of the lake. The cribs have about the same depth as the water where they are used, varying from 6 feet to 8 or 9 fathoms.

The mesh in the leaders measures mainly from 6 to 7 inches, the extreme range being from 4 to 8 inches. There is now a tendency, however, to increase the size, and most of the new nets in the island region have 8-inch leaders, which fish as well as the smaller ones, besides being cheaper and holding more readily in a current. The hearts and tunnels have usually a 4 or 5-inch mesh. On the Michigan shore the mesh in the cribs is generally $2\frac{1}{2}$ inches, although a few are reported to have a larger size. East of Maumee Bay the customary sizes are $2\frac{1}{2}$ and $2\frac{1}{4}$ inches. The figures given above represent in all cases the new netting, but in tarring and during use the twine shrinks to such an extent that there are probably few cribs in any part of Lake Erie in which the mesh measures over 2 inches in extension, and in many it is as small as $1\frac{1}{2}$ inches.

On the Canadian shore the pound nets are constructed essentially the same as in United States waters.

In Lake St. Clair the length of the leaders varies from 20 to 100 rods, the majority being between 50 and 70 rods long. The mesh measures from 6 to 8 inches in the leaders, from 4 to 5 inches in the hearts and tunnels, from 2 to $3\frac{1}{2}$ inches in the cribs.

History, number and distribution.—Pound nets were used for the first time in Lake Erie about 1850, being built almost simultaneously in Maumee Bay and in Sandusky Bay. During the 20 years following the introduction of this method of fishing the increase in the number of pound nets was slow, especially to the east of Port Clinton. Misunderstanding as to the status of the owners of the shores in the matter of riparian rights deterred the fishermen from entering upon the fishery with the vigour which they afterwards displayed but after the question was decided by the courts in 1871 the industry grew rapidly.

There is no record of the number of pound nets fished in Lake Erie prior to 1880, but in that year the number was placed at 758, more than half of them being located west of Port Clinton, Ohio. The first detailed statistical survey of the lake was made in 1885, when at various seasons no less than 1,147 pound nets were in use, and we have estimated that 1,050 of these were employed during the fall, the season of greatest general activity in this fishery.

The pound net fishery, especially in the vicinity of Huron and Sandusky and on the Michigan shore, appears to have reached its climax about 1890, at which time, however, many of the fishermen were so heavily in debt that they were compelled to sell out to the dealers who were generally their creditors. This caused a reduction in the number of pounds, although a few of the fishermen have since increased the amount of their twine in an endeavour to compensate for the falling off in the average catch. After a thorough consideration of the subject, we consider it fair to assume that about 1890 there were from 1,500 to 1,600 pounds fished on the United States side of the lake during the fall season, a somewhat smaller number being used

in the spring. In the fall of 1893 the number was 1,296, and in the spring of 1894, 944. In 1894 there appeared to be a tendency to further reduce the quantity near Sandusky, but, on the other hand, a number of fishermen between the Detroit River and Locust Point contemplated adding to their outfits.

Briefly then, the number of pounds fished in United States waters in the fall of 1893 was about 250 more than during the corresponding season of 1885, and from 200 to 300 less than in the autumn of 1890.

Most of the pound nets on the United States side are located west of Cleveland. The western part of the lake is pre-eminently a pound net region, the character of the bottom and the depth of water being best suited to that form of apparatus. On the platform lying west of a line drawn from Sandusky to Point Pelee the conditions are such that pound nets may be built almost anywhere without reference to the land, and this fact has made it possible to place them in close proximity to the off-shore reefs on which the whitefish spawn.

It is upon this platform and upon the gradually sloping main shore between it and Avon Point that we found the longest strings of pounds. One near Locust Point containing thirty-two nets, and another near Huron had thirty nets in a line, the outermost being seven and a half miles from shore. There are others almost as long. East of Cleveland there have never been many pounds, and the conditions are such that there never will be nearly as many as further west. This part of the lake is better adapted to gill net fishing.

On the Canadian side pound nets were introduced later than on the other shore, and they have never assumed anything like the importance which they have reached in the United States. They are located mainly around Pelee Island and along the shore west of Long Island, although a few are scattered eastward as far as Point Abino. The longest strings are between Port Stanley and Point Pelee, where, in 1893, there were eight stands of three pounds each and 13 of two each, the others being set singly.

The number of Canadian pounds licensed at different periods since 1880 is as follows: 1880, 54; 1885, 132; 1890, 197; 1894, 204. The first licenses were granted in 1869, and since then the number has grown steadily.

Seasons.—The pound net fishery on Lake Erie is confined to two distinct seasons spring and fall, separated by intervals of several months. The summer close season is conditioned by the absence of fish along shore at that time and by the deleterious effect of the warm water upon the twine. The state of Ohio prohibits fishing with nets between June 15 and September 15, a period when the pounds would not be used even if the fishery were legalized. The winter close season, extending from the latter part of November to about April 1, has received no legal sanction anywhere on the lake, being enforced only by the appearance of ice or by the apprehension thereof.

The time of beginning in the spring is determined by the condition of the weather, the aim of the fishermen being to set their twine as soon as possible after the ice has left. The seasons vary greatly from year to year, but on the United States shore April 1 appears to be the average date of commencement. In most parts of the lake the nets are removed from about June 10 to 15, but on the Michigan shore many are taken out by May 1. With the exception of Maumee Bay, the southern part of the Michigan shore and Pennsylvania, fewer nets and shorter strings are fished in the spring than in the fall.

In the fall the time of starting is fairly regular, although it may vary slightly, owing to the whim or judgment of the fishermen. In Ohio, as before mentioned, the law forbids fishing before September 15, and in the other states they conform voluntarily to same general season. As some time is required to set the nets, it is usually nearly October 1 before fishing fairly begins. The nets are usually placed further from shore in the fall, or, at least, the strings are then extended, as at that season the principal aim is to catch whitefish and herring which remain further out in the lake.

In Canada no summer close season is observed except west of Point Pelee; the law does not require it and the water is generally so much colder on the north side

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of the lake that the twine is not seriously affected. The nets are usually set during April, and fish, with one or two interruptions for tarring, until November 1, a close season having been enforced during that month for the protection of the whitefish since 1892. Previous thereto, the fishermen were required to return to the water all whitefish caught during November.

Character of catch—From end to end of the United States shore the sauger is the first species caught in the pounds in the spring. The heaviest catch of this species takes place in the vicinity of Maumee Bay and thence eastward as far as Ottawa City. In this district practically nothing else is taken until April 15, but in the island region a considerable quantity of perch is obtained with the saugers. East of the platform the sauger catch is not so important, although large numbers often occur as far east as Cleveland. After the sauger, and frequently mixed with them in the latter part of April, there is a run of wall-eyed pike throughout the entire platform region, where it is the most important species taken in the spring fishery, especially between Monroe and Port Clinton. The heaviest run occurs in the latter part of April and early in May. From Sandusky and Kelley's Island eastward the blue pike appear in limited numbers in April, but do not reach the maximum until the latter part of May and in June. They are usually still abundant when the twine is taken out.

On the east side of the Bass Islands and at Kelley's Island small quantities of whitefish and herring occur during May and early June. This run appears to extend as far east as Dunkirk at least. Between Sandusky and Cleveland the herring fill in the gap between the saugers and the heavy run of blue pike, but east of Cleveland the herring and blue pike occur together, sometimes the one and sometimes the other predominating from day to day. In the latter region the whitefish occur in somewhat limited numbers from April to the end of fishing, being more abundant near Erie than elsewhere.

The four species mentioned are the important ones taken in the spring, but a number of less valuable ones are mixed with them. Among these may be mentioned, white bass, sheephead, sunfish, perch, suckers, carp, black bass, etc. At Pointe Mouillee, Mich., and in Pennsylvania and New York the sturgeon is taken in the pounds more frequently than elsewhere on the United States side.

The first lifts of the pound nets in the fall reveal a miscellaneous assortment of fish, most of the species being of little value. Named somewhat in the order of their abundance these are sheephead, wall-eyed pike or blue pike, perch, white bass, suckers, carp and saugers. The catch of small wall-eyed pike and blue pike is very large, and fewer large ones are caught than in the spring. In some places, as in Maumee Bay, there is often a good run of saugers late in the season, and on some parts of the Michigan shore the wall-eyed pike was the most important species in the fall of 1893.

The important fall fishery, the one which was formerly expected and now hoped for, is that for herring and whitefish. West of Cleveland a few straggling bodies of herring are usually caught prior to October 15, after which they gradually increase in abundance, but it is not until the first week of November that the maximum is reached. In a general way, it may be said that the heaviest run occurs between November 5 and 25, although the time varies somewhat with the locality and the season. The herring catch at the western end of the lake has been a failure for some years. East of Cleveland comparatively few herring are obtained in the pound nets in the fall.

On the platform and at Huron and Vermillion, a few whitefish are taken in October, but the heaviest run comes on in November, when this species passes westward to spawn on the platform. East of Cleveland the whitefish catch in the pounds is irregular, but in a few places good hauls are occasionally made.

On the Canadian shore, as far west as the vicinity of Rondeau, the herring appears to be the principal species taken in the pound nets throughout the year, but west of Point Pelee they are caught but sparingly in the spring and usually not at all in the summer. In the platform region good runs sometimes occur in October, but the heaviest bodies are present during November when the pounds are not

fished. The wall-eyed pike is an important fish along the entire shore, and on the platform it supplants the herring as the dominant species in the pound net catch. Most of them caught before 1st July and after 1st September, being most abundant west of Point Pelee in the spring. Whitefish are taken in limited quantities along the whole shore and at all seasons, but mostly in the fall, although the November close season interrupts the catch of this species.

At Port Dover, Rondeau, Point Pelee and other places, sturgeon are obtained in some numbers during June, July, August and September. This species was formerly exceedingly abundant. The sauger is of comparatively little importance on the Canadian shore, and the miscellaneous fish are about the same as are taken in United States waters.

Catch in Lake St. Clair.—In Lake St. Clair the nets are fished during an average season, from 20th April to 20th June, and from 20th September to 20th November, on the Michigan shore; and from 20th April to 1st November, with an interval in summer, on the Canadian side.

The first species taken in the spring are wall-eyed pike, red horse, sturgeon, herring and perch. Near the discharge of the lake the sturgeon is the most valuable fish caught at that season, although they are much less abundant than formerly. Comparatively few herring are now obtained, although they were once common, and the whitefish catch is small. In the northern part of the lake the most important species are perch and pickerel, catfish, mullet, red horse, sturgeon, black bass and white bass.

At the southern end of the lake red horse are often extremely abundant in the fall, but as the water grows cooler wall-eyed pike and whitefish are taken. The latter comes about October 15 and remains about three weeks, some of them spawning towards the end of their stay. Herring are now rarely caught and the sturgeon is less abundant than in spring. The catch of miscellaneous fish is similar to that of the spring fishery.

Relations of Mesh to size of Fish.—The regular mesh used in the pounds is such that large numbers of small fish are taken, the principal commercial species which suffer in this respect being the pike-perches and the catfishes. In 1894 a detailed examination was made of the character of the catch on the United States shore from Toledo to Vermillion, including the island regions, and on the Canadian shore between Point Pelee and Rondeau. In all of these places great quantities of small wall-eyed pike are taken. On the Canadian side the majority of these weighed between 8 and 11 ounces, and at least 15 per cent were as small as from 2 to 5 ounces. On the United States shore the average was about 8 ounces in all places where observations were made during September, and at Huron at least, there was no increase in the average weight up to the end of the season. In Sandusky Bay large numbers of small catfish, weighing 6 or 7 ounces each, are caught in the bay pounds. The most of them are thrown overboard alive, but many are inevitably destroyed, as we had opportunity to witness.

Many small fish of other species are taken, and we were told that young whitefish are caught to some extent in the pound nets off Erie in the spring, but we were not on the ground at the proper time to determine the validity of this assertion. One lot of sturgeon from between Point Pelee and Rondeau, consisted of 81 fish over 4 feet in length and 30 under 4 feet long, and the capture of these small ones is constant in most places where pound nets are used.

To prevent the capture of these small fish several methods of regulation have been suggested. The gill net fishermen almost universally propose that the mesh in the cribs of the pounds be increased, and the pound net men quite generally oppose such a measure. The latter base their objections upon the ground that the small fish, in their efforts to escape, would gill, and that, furthermore, were the mesh made large enough to permit the escape of young wall-eyed pike, it would also be large enough to permit the escape of the adults of some other species, as for instance, the sauger.

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The testimony upon this subject was voluminous and contradictory, and in order to reach conclusions based upon definite data an experimental net was fished at Huron in the fall of 1894, through the courtesy of the Wickham Company, and at Kelley's Island in the following spring, through the kindness of the Sandusky Fish Company, the observations in both cases being made by a representative of the United States Fish Commission. The net was similar to those regularly in use, except that the crib had a mesh of $2\frac{3}{4}$, 3, and $3\frac{3}{8}$ inches in the back and two sides respectively.

In both localities it was demonstrated beyond doubt that this net would liberate most of the small fish, particularly the pike-perches, which would have been retained in cribs of the usual dimensions. It was found, however, that some of the mesh used by too large as a one-pound wall-eyed pike could escape through it. The chief objection to the net, however, was the large number of fish which gilled in it, especially in the larger meshes. This was particularly true of the herring, for whereas the regular nets gilled but one-eighth per cent of the catch, the experimental net gilled 49 per cent. In the case of the wall-eyed pike, it was not quite so bad, but it was found that the relative proportions of gilled fish were 3.1 per cent, and 40 per cent respectively, although in this case such a comparison is hardly a fair one because the special net liberated more of the fish which entered it. Assuming that the number of wall-eyed pike entering the two nets was the same, gilling was $2\frac{1}{2}$ times as bad in the special net as it was in the regular one.

We find that most of the herring entered the mesh during lifting, but in the case of all other species the majority entered before the net was lifted. The fish gilled in the regular net were all small, those gilled in the special net were nearly all of reasonable size for marketing, though the herring were often so injured and discoloured as to make them objectionable to dealers and consumers. It was found that when heavy lifts of herring were made the proportionate number gilled was larger than when the lifts were smaller, and had the fishery reached the dimensions of former years, the facts collected would have been still more adverse to the employment of a larger mesh than $2\frac{3}{4}$ inches. The compulsory use of such a mesh would amount to a total prohibition of pound netting in most parts of the lake, as the time occupied in extracting the fish from the meshes would inordinately increase the cost of operation. Whether a $2\frac{3}{4}$ -inch mesh could be used profitably and conveniently was not demonstrated, and we, therefore, consider it inexpedient, in the present state of our knowledge, to require a mesh of more than $2\frac{1}{2}$ inches in the cribs of pounds and other fixed apparatus.

Actual trial by fish commission representative shows that even where a man is especially detailed for the purpose, it is impossible to promptly sort out the small fish from a large pound net catch. It is, therefore, impossible to return the fish to the water in a living condition even should the fishermen have the best of intentions in that respect. If the landing of undersized fish were prohibited, they would be sorted out at a time when it best suited the convenience of the fishermen, which would inevitably be too late to allow more than a very small number of the young to live, the very object of the regulation being, therefore, defeated.

Time between lifting and condition of catch.—The pound nets are lifted or fished daily excepting during stormy weather, when the boats are unable to go out. In general, the catch is secured in good condition, practically all of the fish being alive when taken into the boat, but in bad weather there are occasionally some dead ones, and after a storm sufficiently severe to dismantle the net, the proportion is often considerable. Such extreme cases, however, are rare.

GILL NETS.

Gill nets are employed on Lake Erie chiefly for the capture of whitefish, herring, pike-perches and sturgeon, but other species are taken incidentally in the same connection, and special fisheries of minor extent are carried on for the lake trout and German carp. Practically three classes of these nets, based on the size of

mesh, are recognized, namely, a small meshed net adapted to the herring and pike-perches; a net of medium-sized mesh suited to the whitefish, and a large meshed net for the sturgeon. The several branches of the fishery will be discussed in accordance with that classification.

SMALL-MESHED GILL NETS.

Description.—The small-meshed nets are used in Lake Erie for herring, saugers, wall-eyed pike, etc. They usually have a mesh measuring from 3 to 3¼ inches in extension. On the United States side the more common size is 3½ inches while in Canada the minimum size is fixed by law at 3 inches, but probably many nets having a smaller mesh than 3 inches are actually employed on both sides of the lake. Being constructed of linen there is little if any shrinkage in the twine. The length of individual nets varies from 200 to 400 feet, the longer sizes having come into use in recent years. They are about 20 meshes deep, hanging between 3 and 4 feet when set, and are now invariably furnished with corks and leads.

The tugs are generally provided with three gangs of nets, of which, during cold weather, two are fishing and one is ashore drying on the reels. One gang is lifted each day and taken ashore, being replaced by a dry one, so that each fishes two days before being lifted. In the summer when the fish die and spoil more rapidly, only one gang is fished at a time, so that each net is lifted every day and the captured fish are brought more promptly to market. The tugs fish from four to six miles of netting in a gang, so that in cool weather they will have, on an average, from eight to twelve miles of netting in the water at all times.

The boat rigs are more variable in size, but in general they use about one-half as much netting as the tugs fishing in the same region. On account of their dependence upon sail power, the boats remain closer to the shore and consequently have a shorter season, owing to their inability to follow the fish to the deeper parts of the lake. The fishing grounds of the tugs varies, with the position of the fish, from within a few miles of land to well out in the lake.

In all cases the nets are set on the bottom and the fishermen depend upon actual trial to locate the schools, there being no surface indications of their presence.

History, quantity and distribution.—The small mesh gill net fishery is of recent development as compared with the fishery for whitefish. Its statistical history is difficult to trace owing to the different bases upon which the returns have been made in different years, but in this connection we are principally interested in its present magnitude and in the question of its increase since 1885.

The irregularities in the seasons at different places render it impossible to state with accuracy the number of nets fished at any given time, but the largest number which it was possible to fish under the conditions prevailing on the United States side in 1893, is estimated at about 5,750,000 feet, of which 3,750,000 feet are allowed to the tugs and 2,000,000 to the boats.

In 1893 the number of tugs was 77, but in 1890 there were probably only about one-half as many, and the number of small boats was probably about the same. Upon this basis the number of nets fished in the two years would be about as follows:—

1890.....	3,875,000 feet.
1893.....	5,750,000 “

This makes an increase of about 48 per cent between the years mentioned, an estimate which is probably not too large when we consider that there was, during the same period, a tendency to increase the size of the rigs fished by each tug. Between 1885 and 1890 there was also a large increase, but its extent cannot be stated even approximately.

The amount of gill netting used in Canadian waters since 1884 has varied irregularly from 50,000 to 270,000 feet. The increase has not been a steady

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one, although there were more nets in 1894 than ever before, and since 1889 there have never been less than 127,000 feet. No tugs are used in gill netting on that side of the lake.

Considering the lake as a whole, a conservative estimate would place the small mesh netting in 1893 at double the amount used in 1885. This fishery is carried on from practically all fishing points on the United States shore, but is most extensive in the region east of the platform. In the ports adjacent to the platform there were 34 tugs fishing in 1893, while east of that region there were 43, the nets being in about the proportion of 5 to 7. The foregoing figures, however, do not fairly represent the relative importance of the two regions, as the nets are fished during a longer season at the east than at the west end of the lake, the total number of months fishing by the tugs being equivalent to 107 and 300 respectively. The difference in the boat fishery of the two regions is still more pronounced in favour of the east, although the relations cannot be statistically expressed. Erie is by far the most important gill net centre, followed by Cleveland, Sandusky and Dunkirk, in the order named.

The boats on both sides of the lake usually fish near home, but the tugs change their headquarters from time to time in accordance with the change in position of the body of the fish. It follows, that in the spring, and, to some extent in the summer, tugs from various ports between Toledo and Cleveland move down to the vicinity of Erie, while in the fall and during open winters eastern tugs may be found fishing out of Huron, Sandusky and Port Clinton.

In general, however, it may be said that while the region west of Huron is pre-eminently a pound net region, these portions of the lake east of that place are best adapted to gill nets and are the seat of the most important fishery by that means.

Seasons and catch.—Early in the spring an important gill net fishery, of short duration, is carried on for saugers, perch and wall-eyed pike. It begins as soon as the lake is clear of ice and continues to about the latter part of April, when a sufficient number of pounds have been set to supply fresh fish for market. The principal seat of this fishery is west of Vermillion, but in a less regular manner it extends further east. Saugers constitute the bulk of the catch between Toledo and Vermillion; on the Michigan shore and east of Vermillion wall-eyed pike are the most important species, while the perch is taken in greater or less abundance along the entire shore. This fishery is carried on by professional and semi-professional fishermen, farmers and boys, using small boats, and by tugs which may come to the west end from all parts of the lake.

A few herring are caught at Kelley's Island and Vermillion in the spring after the saugers leave, but in general the spring catch of this species is unimportant west of Cleveland. In the western end of the lake there is no important gill net fishery subsequent to the sauger run until fall, but at Cleveland and eastward the fishery with small mesh nets continues almost uninterruptedly throughout the open portion of the year, blue pike and herring being the principal species taken.

The spring fishery for herring is quite important, commencing about April 10 and lasting until about June 1, when an intermission until about July 15 usually occurs, owing to the collection of a slime upon the nets. Fishing is prohibited in Ohio waters between June 15 and September 15, but the tugs make a pretence of running out of Ohio waters during the close season, and as the facts in the case are difficult to determine, the law is practically a dead letter, as far as the gill nets are concerned.

No herring are caught out of Cleveland and adjacent Ohio ports during the latter part of September and all of October, but in November they are again taken at various places, especially off Avon Point. The fishermen from Erie and Dunkirk fish continuously from July 15 until ice forms, but during the latter part of October and in November the herring are scarcer there, owing to the spawning movement of a large part of the fish toward the west end of the lake. Late in the fall, therefore, some of the tugs from Erie and other ports run to the vicinity of Huron and

Sandusky, where they are joined by the local tugs in the important fall fishery for herring, which continues throughout November and in open seasons well into the winter.

On the Canadian side the nets near Long Point catch herring from April 1 to the middle of May, when the fish run into deeper water where the small boats used by the Canadian fishermen cannot follow them, although they are caught by the tugs running out from Erie. In the same locality the fall season begins during the latter part of September and lasts until December. During November about one-half of the catch is composed of wall-eyed pike, but throughout the rest of the fall season herring are the only species caught in any numbers. The few nets used near Point Pelee Island catch herring only during the fall at the same time that they are caught on the United States side of the platform.

WHITEFISH GILL NETS.

Description.—These nets are employed solely for whitefish and trout, the mesh varying according to the species sought. For whitefish the size almost invariably used is $4\frac{1}{2}$ inches in extension, although it is claimed by the fishermen of the island region that some nets measuring 5 inches are used upon the reefs in that vicinity. The only place from which $5\frac{1}{2}$ -inch mesh is handled is Dunkirk, New York. These nets are never employed in the whitefish fishery, but only in the fall for lake trout.

The nets used by the tugs measure about 40 rods long, but in the island region the general length appears to be 12 to 15 rods each. When set they are said to hang from 4 or 5 feet deep. In the eastern end of the lake leads are used, but on the rocky bottoms at the western end rings have been substituted in order to prevent the chafing of the foot of the net.

History, quantity and distribution.—The fishery with medium mesh gill nets began about the middle of the present century (at Erie in 1852) and thus antedated by a number of years the use of the small mesh nets. The number of nets employed in this fishery appears to have gradually increased until about 1886 when the whitefish began to grow scarce and most of the Erie tugs began to use a smaller mesh for herring and blue pike. Since about 1890 a number of tugs at that place have re-entered the whitefish fishery, and in the meantime there was a development along the same lines at Dunkirk, where this fishery has received increased attention of late years.

The tug fishery for whitefish is confined to that portion of the lake east of Ashtabula, the number of vessels engaged in it in 1893, being as follows:—

			Feet.
Ashtabula,	1	tug, fishing.....	40,000
Erie	6	do	200,000
Dunkirk	5	do	200,000
Buffalo	1	do	20,000
			460,000

In the same year there were about 500,000 feet of netting belonging to the boat fishery, although it is doubtful if over one-half of this amount was ever in the water at one time.

The Dunkirk tugs are engaged almost exclusively in catching whitefish until about the middle of October, when most of them, if not all, begin to take trout in the $5\frac{1}{2}$ -inch mesh nets. Some of the Erie tugs mentioned are also used almost entirely in the whitefish fishery, but others, with those located at Ashtabula and Buffalo, engage to a greater or less extent in the fishery with small nets. The bulk of the fishing is done east of the Ohio-Pennsylvania boundary in depths of from 12 to 30 fathoms, and from five miles offshore to well across the lake. It is only the tugs which traverse the greater distances, the boats remaining on the grounds near the shore and thus being able to fish less continuously.

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The whitefish nets are fished at all seasons in three gangs, two of which are in the water while the third is ashore drying. The gangs used by the large tugs out of Erie and Dunkirk consists of thirty-six nets, aggregating $4\frac{1}{2}$ to 5 miles each. The boats employ the same number of gangs, but there are only about one-half the length of those fished by the tugs.

Between Ashtabula and the platform there is no whitefish gill netting of importance. On the platform there are no tugs engaged in this fishery, but gill nets fished from boats are owned in the following places:—

	Men.	Nets.
Bass Islands.....	15	820
Kelley's Island	7	140
Port Clinton.....	6	320
Ottawa City.....	1	20
West Sister Island.....	2	40
Total.....	31	1,340

A few men from Vermillion also fish at North Bass Island, but it is safe to say that upon the entire platform there are not over 1,500 nets, measuring not more than 500,000 feet. This netting is used only during November, the spawning season. The nets appear to be nearly all in the water throughout the fishing season, and are always fished near the shore and in comparatively shallow water.

There is practically no large mesh gill netting fished on the Canadian side of the lake, although a few short lengths may be used occasionally.

Seasons and catch.—At the eastern end of the lake, the fishing begins about the middle of April and continues until the middle or latter part of December. August and September appear to be the best months of the year and the spring is rather better than the late fall. During June and more or less of July, the fishing seems to be indifferent, the reason given being that a vegetable slime collects at that time, probably influencing the fish to rise from the bottom, besides soiling the nets and causing their rapid destruction.

Early in the season the catch is largest to the eastward of Dunkirk, but in summer the tugs find the best fishing in the deeper parts of the lake, farther from land than the sailboats can venture with safety. During October and November the eastern fishery for whitefish falls off owing, no doubt, to the withdrawal of a large portion of the fish to the western end of the lake for the purpose of spawning. This diminution appears to be felt somewhat less at Dunkirk than elsewhere, owing to the presence of a limited spawning ground in that vicinity.

Throughout the entire season sketched above certain other species are caught with whitefish, the most important being wall-eyed pike of large size, the catch of these often amounting to from 10 to 15 per cent of the whitefish taken. Herring of various sizes are also caught, principally by the teeth, and, especially in the deep water in the summer, the worthless ling often causes the fishermen considerable annoyance.

During October the lake trout begin to move from the deep water to the rocky bottom between Dunkirk and Westfield, and in November and December heavy catches are made at that place in the $5\frac{1}{2}$ -inch mesh nets. This fishery is followed principally by Dunkirk fishermen who find it profitable during the last two months of the year. Formerly the Erie tugs monopolized this fishery, but since 1890 they have engaged in it only occasionally.

At the western end of the lake, the gill net fishery for whitefish is confined to November when the species come to spawn on the reefs and rocky bottom in the platform region. It is engaged in mainly by vine culturists and farmers, together with a few pound netters who may not be otherwise employed. It is carried on in shallow water, usually less than 20 feet deep, and continues about three weeks, generally between November 3rd and 28th. The whitefish taken are all large and spawning, and no other species appear to be associated with them in the nets.

Carp netting.—Within a few years the use of gill nets for taking the German carp has sprung up at several places along the south shore west of Sandusky. The size of the mesh is the same as the trout nets, namely, $5\frac{1}{2}$ inches. The total amount employed in 1893 probably did not exceed 50,000 feet.

STURGEON GILL NETS.

The sturgeon gill nets are made of relatively stout twine and the mesh measures from $11\frac{1}{2}$ to 13 inches in extension. They are about 6 feet deep, are set at the bottom not far from shore, and are tended by means of sail boats or row boats. The date of their introduction in Lake Erie has not been learned. Sturgeon fishing by this means appears to be confined to that portion of the lake lying between Irving and Buffalo, New York, where in 1893 there were 184,230 feet of this large mesh netting in use. It is employed principally by farmers, two men and 50 pounds of netting being the equipment of a boat. Until 1st May this species is caught on baited hooks, but about that date the gill nets are set and their use continues until July. They come into use again in September.

GILL NET PRACTICES.

Time out, condition of catch.—The time elapsing between the setting and lifting of the gill nets depends upon the season, the weather and the kind of fish for which they are used. The whitefish nets at the east end of the lake are allowed to remain in the water two days as a rule, and longer when Sunday or bad weather intervenes. Although unfavourable comments upon the quality of the fish so caught have been made, our observations disclosed that between 80 and 90 per cent of the whitefish landed at Erie and Dunkirk were alive when taken from the water, even after the nets had been fishing three days, and nearly all of the dead ones were firm and hard. The whitefish gill netting on the western platform is always conducted during cold weather, at which season the fish will keep longer and as the nets are set near the shore they can readily be reached at all times.

When fishing for saugers, wall-eyed pike and perch, the nets are out only one night, and, as the fish are hardy and the water cold, the entire catch is obtained in good condition. Most of the gill netting for blue pike is done at times when the water is not very warm, and, except when storms interfere, the fish are marketed in good order. At the eastern end of the lake, however, there is some complaint of the condition of the catch by the small boat gill netters during July and August.

The most serious charges in this respect relate to the herring gill net fishery, especially during the summer months. In warm weather the herring nets are left out only one day, but when the weather becomes cooler they are usually left out two or more days. It is generally agreed that the herring is the most tender fish caught in the gill nets and that they die and decompose very quickly. Observations made at several of the fishing ports and in the markets of Philadelphia and Pittsburgh showed that, while many of the gill net fish are in good condition, a considerable proportion were decidedly inferior to those taken in the pound nets. At Erie in August only one-third of the fish were in condition for immediate shipment in fresh condition. The balance were either salted or dressed before shipping. These fish were not spoiled, but merely soft and pallid and generally inferior to those considered as being of first quality. When dressed fish are received at the markets the cut edges are dark and the flesh is so soft that the bones protrude. There is no doubt that during colder weather the general condition of the gill net fish is superior to that described, but taken as a whole the gill net catch of herring is inferior in quality to that of the pounds.

Relations of mesh to size of fish.—The gill nets do not take nearly as large a proportion of young fish as do the pound nets. The mesh used for any species is supposed to be adapted to the size of fish suited to the markets. The principal dif-

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difficulty which arises in this connection is the capture of the young of the larger species in the nets intended for the adults of the smaller kinds. There is no complaint concerning the size of the herring and saugers, although small sizes of herring, and also of other species to some extent, often become entangled by the teeth. Many undersized wall-eyed pike, however, are taken in the small meshed nets.

In the case of the whitefish it is alleged that considerable quantities of the young are caught in the nets used for herring off Erie, Pa. This statement appears to be a reasonable one, but somewhat extended observations made during the summer and fall of 1894 did not confirm it.

TRAP NETS AND FYKE NETS.

History, number and distribution.—Fyke nets have been used in Lake Erie for a number of years, but the submerged trap net has been introduced during the last decade. Of the latter there were practically none in 1885, and the number in 1890 is not known, but in the spring of 1894 there were 152 in use. Considering the two forms of apparatus together, we find that there is a heavy decrease since 1885, a fact made evident by the following table:—

	1885.	1890.	1893.
Fyke and "Bay pounds".....	1,169	1,175	736
Submerged trap nets.....			152
	1,169	1,175	888

The fyke nets are all west of Vermillion, while the trap nets are all east of Loran, the two being, therefore, separated geographically although serving practically the same purpose in the fisheries of their respective regions. Sandusky Bay is the centre of the fyke net fishery, about 600 of the 736 recorded in 1893 being within twenty miles of that place, while the balance were scattered along the shore between Vermillion and Pointe Moullée, Mich. Most of the trap nets are near Avon Point, between Euclid River and Salt Creek, Ohio, and in Pennsylvania and New York. Both forms of apparatus are employed in shallow water, the fykes being used principally in the marshes and bays as well as in the open lake.

No traps or fykes are licensed or permitted on the Canadian side of the lake.

Description.—Both traps and fykes resemble the pounds in general principle through differing from them and from each other in the details of construction. The fyke net usually has a leader like a pound net, but is sometimes provided with wings instead; in lieu of a single tunnel there are often several, and instead of a square crib open at the top it has a cylindrical bowl supported on hoops and entirely submerged. Its advantage is that it is cheaper and may be handled by a smaller crew.

The trap net is essentially a small pound net with a covered or inclosed crib. Its several parts, leader, heart, tunnel and crib, are all connected and the entire structure is supported and held in place by anchors, floats and stretchers instead of by stakes driven in the bottom. Its advantages are its cheapness and the fact that it may readily be moved from place to place as the exigencies of the fishery may require. Considering its size and cost it is the most efficient piece of fixed or semi-fixed apparatus yet devised, it may be fished on any bottom and its rapid increase is to be expected.

In the fyke nets the leaders vary from 10 to 30 rods in length and have a mesh of 5 or 6 inches. In the hearts and tunnels the mesh is from 3 to 5 inches and in the cribs a portion is always as small as 2 inches. The leads of the traps are from 6 to 10 rods long and the size of the mesh in the several parts is in general similar to that found in the fykes.

Seasons and catch.—Both traps and fykes are fished much more extensively in the spring than in the fall, owing to the greater abundance of fish at the former season in the shoal waters. With the exception of a few fykes in Michigan and some trap nets in Pennsylvania, there is no summer fishing and no fykes are fished in winter excepting a few in the marshes along the Michigan shore.

In the spring and fall the catch resembles that made by the neighbouring pound nets; although there is a larger proportion of inferior fish and an almost total absence of sturgeon, whitefish and herring. The former are lacking because they are too large to enter the nets, and the latter because they rarely occur where most of the traps and fykes are fished. Trap nets are accused of catching large numbers of black bass, both large and small, and in proportion to their size they may be more destructive than the pounds. In Sandusky Bay and Portage River, and perhaps elsewhere, the fykes catch large quantities of young catfish, but with regard to other valuable species they take proportionately no more young than do the pounds.

Lake St. Clair.—The traps and fykes of Lake St. Clair are all north of Point Huron, in the shallow waters of Anchor Bay. In general, they resemble those used in Lake Erie, although some of them present minor differences. In the fall of 1893 there were 100 of these nets and in the following spring there were 83. Owing to legal restrictions there had been a decrease of 50 per cent since 1885 and of 32 per cent since 1890. The fishery is practically confined to the spring and fall, being more important at the latter season. Named in the order of their importance the species caught are perch, wall-eyed pike, catfish, mullet, red horse, black bass, and a few others.

SEINES.

History, number and distribution.—The first seine in the region bordering upon Lake Erie was used in Maumee Bay about 1815; others were employed on the Michigan shore, in Sandusky Bay and in other places about the same time. For many years this form of apparatus was used in the bays and rivers exclusively, no effort being made to fish them in the broader waters of the lake until 1850 to 1854, when the great abundance of the whitefish began to be recognized. Subsequently the pounds were found to be better adapted to the requirements of the open lake, and since 1865 the use of seines has again been mainly confined to the more inclosed and shallower waters. In 1893 the principal places where seines were employed were on the Michigan shore, in Maumee Bay, Maumee River, Portage River and Sandusky Bay.

The fishery is of insignificant proportions compared with that by fixed apparatus and gill nets, the number of seines on the United States side of the lake having been 71 in 1885, 44 in 1890 and 47 in 1893. The principal reduction since 1885 has occurred in Ohio west of Vermillion and in New York. Since 1882 the total length of the seines on the Canadian side has never exceeded 8,500 fathoms, and in 1894 there were only 6,200 fathoms.

Description.—In Michigan the seines are 12 to 50 rods long, on the Maumee River from 40 to 70 rods, on the Portage River from 20 to 45 rods, while in Sandusky Bay some of them are 120 rods in length. The 20-rod seines are about 8 feet deep in the bunt and 4 feet in the wings, and those 70 rods long are 15 feet in the bunt and 8 feet in the wings; the other lengths have somewhat proportionate dimensions. The mesh in the bag measures sometimes 3, but usually $2\frac{1}{2}$ inches, a large size is used in the wings, with the object of reducing the weight and cost and of permitting the escape of some of the small fish.

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Seasons and catch.—On the Michigan shore the seines are fished principally in winter, summer and fall. In the former season the fishery is confined to the marshes, the catch consisting of bullheads and perch. In the spring and summer the smaller seines are used in the mouths of small bays and creeks, catching carp, catfish, red horse and wall-eyed pike.

From 1st March to 10th April, and in the fall there are about 20 seines fished on the Maumee River between Toledo and the rapids. In the spring they take wall-eyed pike, catfish and red horse, together with a few black bass and grass pike, and often considerable quantities of worthless sheephead and moon-eyes. When there is an appreciable current in the river the wall-eyed pike run is often large, this species coming up the river to spawn. At Port Clinton, carp are obtained during the spring, and catfish during August. The catch in Sandusky Bay is similar to that made on the Maumee River and many young catfish and less valuable species are taken.

On the Canadian side the seines are hauled close to shore. They are employed only in the spring before the pounds are set and when the scarcity of fresh fish creates a demand for the inferior grades. The catch usually consists of suckers, mullet, bullheads and a few grass pike.

Lake and River St. Clair and Detroit River.—In the River St. Clair there are about five nets fished from May until about August 10. The principal fish obtained is the wall-eyed pike, and complaint is made that these are generally of small size. Black bass and several other species are taken in limited numbers.

In Lake St. Clair most of the seines are north of Port Huron, where they are fished in the spring and fall and to a small extent in winter. The species caught in the spring and fall are perch, which is the most abundant species, wall-eyed pike, catfish, mullet, red horse, carp, black bass, white bass, sunfish and a very few herring. In winter wall-eyed pike, perch and black bass are the principal species, the latter being sometimes taken in such quantities as to suggest its possible extermination.

On the Detroit River there is one sturgeon seine, 55 fathoms long, with a 4-inch mesh. It is fished from about May 12 to June 14, and in 1894 secured 225 sturgeon. The Michigan and Canadian fish culturists use seines for the capture of spawning whitefish, and certain farmers and others catch a few coarse fish by this means for their own use.

HOOKS AND LINES.

The hook and line fishery of Lake Erie may be classified under four heads, namely: winter fishing through the ice; spring and summer set-line fishery for catfish; line fishery for sturgeon; sport fishing.

Winter Fishery.—This is most important in the vicinity of Buffalo, where from 500 to 1,000 men are said to engage in it. These men have mostly other occupations than fishing during the remainder of the year. Each fisherman uses several lines connected with a tell-tale device, called a "tip-up," which gives notice when a fish is caught. The fishery is carried on from the time strong ice forms until it breaks up, usually from December until the latter part of February. The season's catch varies between 500,000 and 1,000,000 pounds and consists principally of blue and yellow pike, perch and herring, with a few sturgeon.

In the island region there is a winter fishery of somewhat different character, the fishermen using hand lines and being protected by canvas huts placed on runners. The catch amounts to several hundred thousand pounds yearly, and consists principally of saugers and perch, although wall-eyed pike and herring are also taken.

Winter fishing is also carried on upon a small scale at several other places, as at Erie, Pa., and Port Colborne, Ont.

Set-lines for catfish.—This fishery is declining. In 1890 it yielded 40 per cent, but in 1893 only 10 per cent, of the value of the line fisheries. The decrease was universal, and was due to the rapidly decreasing abundance of the catfish. This fishery was followed on all parts of the United States shore, but has never been considerable on the Canadian side of the lake. The length of line varies, the average number of hooks used by one fisherman being between 800 and 1,500. Two species of catfish are caught, the silver or spotted cat (*Ictalurus punctatus*) and the yellow cat (*Ameiurus lacustris*), the fishermen not always distinguishing between them.

Line fisheries for sturgeon.—The line fishery for sturgeon is confined to that portion of the lake lying within the state of New York, where it begins as soon as the ice leaves and continues until some time in June, although many abandon it for the gill net fishery about May 1. Two methods are employed—grappling and set-lines. The former can be used only when the fish are rolling upon their spawning grounds. The grapple consists of a three-pointed hook, which is dragged over the bottom and “driven home” with a jerk when it comes in contact with a fish. While this is not as destructive as the set-line grapnel used in the Detroit River, nevertheless many fish escape in a mutilated condition. The set-line fishery with baited hooks is more extensive. The lines are similar to those used for catfish but stouter, and two men fishing from a small boat use from 2,000 to 3,000 hooks. Most of those engaged in this fishery are farmers residing along shore between Irving and Buffalo. Besides sturgeon the set-lines catch other species, notably blue pike. The line fishery for sturgeon is insignificant on the Canadian shore.

Sport fishing.—The principal sport fish of Lake Erie is the black bass, including both the small-mouthed and large-mouthed species. Formerly a number of places on the lake, notably Erie, Pa., the Bass Islands, and various localities in Canada afforded famous fishing for these species. Considerable numbers of sportsmen are still attracted to the Bass Islands, but the fishing there, as elsewhere, has sadly deteriorated. The best fishing at present appears to be in the vicinity of Pelee Island and near Long Point.

Perch and wall-eyed pike are also caught for sport and occasionally a maskinonge is taken by trawling. The perch, wall-eyed pike and bass are usually fished for with live minnows, but the bass is sometimes caught on the spoon.

Lake and River St. Clair and Detroit River.—In these waters the line fisheries resemble those enumerated for Lake Erie. The principal one in the Detroit River is by means of the set-line grapnel for sturgeon. This apparatus consists of a stout line stretched across the spawning grounds and armed with naked three-pointed grappling hooks, so arranged that the sturgeon come into contact with them when “rolling.” The struggling fish become caught upon one or more of these and are painfully lacerated in the attempt to free themselves. In many cases they are firmly held, but often their struggles suffice to tear them loose, usually at the expense of serious injury, and when afterwards caught in the seines they are found to be shockingly mutilated. The injuries are such that many fish must die in consequence. The method is thoroughly reprehensible.

SPEARING.

At the present time spearing is an almost unknown method of taking fish in Lake Erie, but occasionally a few wall-eyed pike are speared through the ice there, and also in Lake St. Clair and the St. Clair River. It is stated that black bass are speared on the spawning grounds in St. Clair River.

EXPLOSIVES.

No explosives are used for the capture of fish in Lake Erie, nor in the waters connecting it with Lake Huron.

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SUMMARY OF CONDITIONS.

Owing to its more extensive fisheries and its exceptionally large variety of market fishes, Lake Erie presents greater difficulties in respect to the establishment of suitable protective regulations than any other of the great lakes. The subject is especially complicated by the association, generally, of several different grades and sizes of fishes on the same grounds, or the rapid replacement of one by the other, rendering it impossible to adjust the methods employed for their capture so as to insure the equitable protection of all, without imposing unjust or impracticable restrictions on the industry. The urgency for regulations other than those now in force is evidenced by the continued decrease in abundance of practically all the important varieties, while the discord produced by the five separate and wholly dissimilar codes, of laws which apply to this region, emphasizes the necessity for some unity of action. In order to treat the subject satisfactorily, however, and to insure the accomplishment of the best results, it must be divested of all unimportant elements and attention directed mainly to its more essential features.

The bulk of the catch consists of relatively few species, over 80 per cent in value of the total output for 1893 having been composed of the following forms, arranged in the order of their importance, namely, herring, wall-eyed pike, including the blue pike, whitefish and saugers. The yellow perch, sturgeon and catfishes follow next. The perch is but little esteemed; the sturgeon was once an important product, but the supply has been much depleted, and the catfishes are, for the most part, of rather local interest. Of some of the inferior kinds, such as the suckers, sheepshead, &c., large quantities are often taken, but the low price received for them and the fact that a considerable proportion of the catch may be rejected, makes them of relatively little consequence. There are also several species which are obtained only in small amounts. The black bass is the principal sport fish, but angling is also carried on to some extent for the yellow perch, wall-eyed pike and other species. The maskinonge, however, is rarely taken in the lake.

The greater fisheries of Lake Erie are, therefore, prosecuted for the herring, whitefish and pike-perches. Of the remaining species, the bulk is obtained as incidental features of the main catch, although it is not intended to imply that their capture is generally otherwise than desirable and profitable for the fishermen. Some of them, moreover, are the objects of local and special fisheries, this being especially the case with the sturgeon. The majority of the fishermen would be satisfied to confine their attention to the five forms first mentioned, or even chiefly to the whitefish and herring, provided their abundance could be maintained on a sufficient basis to insure a continuity of good catches. In our opinion, therefore, these are the species which demand the principal consideration, and, wherever necessary, the remainder should be subordinated to them. Any restrictions made in the interest of the former, however, may also be expected to benefit the latter in greater or less degree, but in some directions special regulations are desirable and can readily be provided.

The protection of the sport fishes, as represented by the black bass, presents unusual difficulties. This species is taken in the nets in company with the commercial fishes, and while commanding the highest market price, the small numbers obtained render it of no particular value to the fishermen, who would be satisfied to forgo its capture if it could be done conveniently, but no practical method of accomplishing that result has been suggested. Its rigid protection would involve restrictions, the carrying out of which would greatly interfere with the handling of the nets, and we are confident that strict compliance with such measures could never be exacted.

The whitefish occupies the first rank among the market fishes, and during all the earlier period of the fishery was its most conspicuous feature. It is still the species most highly prized by the fishermen, although it has fallen to seventh place in the extent, and to third place in the value of the catch. Its decrease is said to have been the primary cause of bringing the herring, a relative but much inferior form, into prominence, and for a number of years the latter species has been first in

both the extent and value of the entire lake output. The large size of the Lake Erie herring, its abundance in localities favourable for its capture at most times of the year, and the proximity of the grounds to important markets, have given it an advantage over the herring of other lakes and have stimulated the fishery for it to an unusual extent. Its preservation is, therefore, of more concern at present than that of any other species. The catch of yellow pike and blue pike, which are classed as varieties of the same species, the wall-eyed pike, is second only and not much inferior, to that of the herring, the blue pike being more abundant. The sauger, which is also one of the pike-perches, ranks fourth in the value of the catch. It is, to a large extent, the object of a special fishery in the early spring, when its value is greatly enhanced by the scarcity of fresh fish at that season.

Lake Erie is practically one continuous fishing ground, accessible and more or less lucrative to the fishermen in all parts. Such moderately deep water as occurs near its eastern end provides suitable conditions for certain of the more important species during the extremes of temperature, and from this area they spread out during the intervening periods, but most extensively at their spawning times. The shallow water or platform at the western end constitutes, with its surroundings, a grand spawning ground, to which a number of the species resort and on which they are captured during the breeding season, as well as during their passage to and from. In the shoal water, especially on the platform but also along the south shore, the high summer temperature drives most fishes away and causes the rotting of the nets, making fishing there unprofitable for several months. On the north shore, however, the water remains cooler during the summer, and fishing may unusually be carried on continuously during that season. The general gill net fishing is least interrupted by seasonal changes.

The character and distribution of the apparatus is determined in part by the physical conditions and in part by the movements of the fishes which they are designed to capture. Pound nets are the predominant feature of the platform and of the shallow water adjacent to it on the south shore. Introduced there over forty years ago, they have increased to an extent unparalleled in any other section of the country. Farther east on the south shore they are employed as far as New York State, but much less commonly, and many are rarely fished together in the same locality. Along the Canadian shore they are distributed rather evenly, but the number there is not one-sixth that in United States waters.

The principal gill net region is the body of the lake eastward of the platform. The longest season is furnished by the deeper waters, mainly off Pennsylvania and New York, but this branch of fishing is extended at times to most other parts of the lake, including the western platform, where, however, it cannot successfully compete with the pound nets except during the height of the run of certain species. Trap nets are used to some extent on the shores of Pennsylvania and eastern Ohio, and fyke nets to the westward of Vermillion. Seines are employed in some places, but they have been generally superseded by other methods, and are now important in only a few localities. The hook and line fishery is chiefly confined to the eastern and western ends of the lake, and is conducted on a relatively moderate scale.

On the Canadian side the market fishery is now practically restricted to the use of pound nets and gill nets, and is much inferior in importance to that in United States waters. The shore is not adapted to such extensive strings of pounds, and the gill net fishery is carried on solely by means of small boats.

The extent of the decrease among even the more important fishes cannot generally be determined specifically from the information which is available, but in some cases it has been so marked that its magnitude can readily be estimated. The causes of decrease are still more difficult to fix in detail, but the principal influences concerned therewith may be inferred with a reasonable assurance of reliability.

The early fisheries in Lake Erie were prosecuted almost exclusively for the whitefish, but at that period it was only taken close inshore and mainly, if not entirely, during its spawning run. After a time, however, the means of capture were rapidly multiplied, and the species was followed to its most distant grounds. During the warmer and colder months it inhabits chiefly the deeper waters in the

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eastern part of the lake, where an extensive gill net fishery has long been established, and where, for some years, by far the greater part of the market supplies was obtained. In the spring and fall its migratory instinct causes it to seek the shallow waters along both shores and at the western end, in all of which situations it is taken by the pound nets in large quantities. During the fall or spawning movement it reaches certain reefs on the platform, and there provides the opportunity for a special gill net fishery of short duration.

The statistics show a falling off in the annual output of the whitefish in United States waters during the past ten years amounting to over 60 per cent. This decrease has been greatest in the gill net region at the east; next extensive in the western or pound net region, and least pronounced in the intermediate district where the smallest catches have been made. In Canadian waters, where it is taken almost exclusively in pound nets, the decrease has been almost, if not equally, as great as on the south shore; and Lake St. Clair has felt the depletion in like degree, as its supplies are derived from Lake Erie.

The decrease on the south shore undoubtedly began sometime before it was brought out by the statistical inquiries; on the north shore it was manifested by the pound net catch as early as 1874. It is said, however, to have been first severely felt at the eastern end of the lake, where the fishery seems to have reached its maximum development about, or shortly before, 1885. Owing to the extent of the depletion at that time, most of the gill net fishermen abandoned the pursuit of this species and turned their attention to the herring, but the fishery has again increased, and appears to be carried on once more upon as large a scale as the supply will warrant. The pound net fishery at the western end attained its maximum development about 1890, its later growth at least being characterized by a continuous decrease in the whitefish catch.

The depletion has unquestionably been the result of overfishing by both the pounds and gill nets, no other form of apparatus having figured prominently in connection with this species in recent years. Too many nets have been employed, and too large a quantity of the adult fish has been removed from year to year. In the deeper waters constituting the normal habitat of the species, the fishery by gill nets was persistently carried on upon a most extensive scale, and without restrictions, during practically the entire open season of each year. The fish are there confined within a comparatively limited area, under most favourable conditions for their capture. It was there that the largest catches were made, and a study of all the evidence presented tends to confirm the assumption that the greater part of the decrease actually took place in that region, with which it has also been identified by the statistical returns. The arrangement of the pound nets is with reference to the shoreward and westward movement of the species in the spring and fall. These appliances extend across the pathway of the fish at such frequent intervals, and intercept their passage so extensively by whatever course they take, that it is almost surprising any should reach their spawning grounds. On the reefs, moreover, while depositing their eggs, they are again the objects of a gill net fishery, and the schools which enter the Detroit River and Lake St. Clair have been decimated by the seines and pound nets.

In the earlier days the gill net mesh was larger than it is at present, and the reduction in its size was made in order to adapt it to the smaller average size of the fish, the larger sizes having, apparently, been more generally caught off. This modification of the mesh must certainly be regarded as indicative of a certain amount of decrease in the abundance of the fish, and its adoption shows that the tendency to push the fishery beyond a proper limitation had its beginning many years ago. We have failed to secure satisfactory proof, however, that the decrease has been materially aided by the capture of the actually young or undersized fish, as has occurred with some of the other species. Very few young whitefish are ever seen on the platform or elsewhere in the pound net region at the west end. It is reported that many fish of that character are taken in some of the more eastern pound nets and also in the herring gill nets when employed in the deeper waters. That such may be the case is not improbable, but the subject requires further investigation before the evidence presented to that effect can properly be weighed.

To what extent the pollution of the water may have influenced the decrease of this species it is impossible to say, but at the most it can not have ranked as a very potent factor in comparison with the fishing practices above referred to.

Many of the fishermen are confident that in recent years the decrease of whitefish has been checked through the agency of the hatcheries, but their statements in that regard are not sustained by the statistical returns. It is probable, however, that except for the assistance of artificial propagation the amount of decrease would have been much greater.

The herring did not become an important object of the fisheries until a very much later date than the whitefish, but with the decrease of the latter it has attained the principal position in the lake catch. This species has essentially the same distribution and movements as the whitefish. It lives in the deeper waters during the greater part of the year, but appears to occupy there a wider area, and even during the extremes of temperature may be found in small numbers on the western platform. Its spring and fall migrations are practically identical in character and extent, and its spawning season does not differ materially from that of its larger relative. The platform contains important, if not its principal, spawning grounds, although there is every reason to suppose that the species also spawns extensively further east, but in what locality has never been determined.

The fishery for the herring is conducted by the same methods as for the whitefish, and upon the same basis, but it long ago reached a much greater magnitude, due in part to the greater abundance of this form and in part to the increased demand for the products of this lake. The pound and gill nets are the principal appliances by which it is captured, but, unlike the whitefish, the larger part of the catch was until recently obtained in the western part of the lake through the agency of the pound nets.

The maximum catch indicated by the statistics for United States waters was made in 1890. In 1893 the total quantity obtained was nearly 50 per cent less, although the amount of gill netting in use was much greater, and the reduction in the number of pound nets had been comparatively small. In the latter year the catch was largest in the eastern part of the lake, smallest in the western part, and between the two in the intervening region. In the eastern district the catch was somewhat smaller in 1893 than 1890, but not sufficiently to be indicative of an actual reduction in the supply except for the great increase in the extent of fishing. The bulk of the decrease had taken place on the platform and in the closely adjacent region, although a heavy falling off was also manifested along the central part of the coast. The pound net catch was the only one which suffered at the west, the gill nets having been even more successful than in 1890.

In looking for the cause of decrease in the western catch, we find that during several years prior to 1890 this species was being taken by the pound nets in certain places in somewhat reduced numbers. Then came an abrupt and very pronounced falling off, which was first manifested at Port Clinton in 1890, at Huron and Vermillion in 1891, and about the Bass Islands, and Kelley's Island in 1892. This sudden drop occurred immediately after the extension to the platform region of the heavy gill net fishery which had previously been confined to the deeper waters. The tugs belonging at eastern ports had started the practice of following up the schools of herring during their fall or spawning movement, and, deriving great profit in that connection, they were joined by the local tugs in operating both on the surface of the platform and adjacent to its eastern border. While the evidence clearly indicates that the pound net fishing had previously been excessive in respect to this species, we cannot doubt that the final change was the direct result of the recent gill net methods.

It has been impossible from the information obtainable to determine in precisely what manner this condition was brought about. The statistics do not favour the view that the decrease has been produced simply or solely by the taking out of too many fish. The prevailing opinion among the fishermen is to the effect that the course of the schools has been diverted by the many nets, which prevent their reaching the surface of the platform except in relatively small numbers, and causes

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them to occupy other than their customary grounds in the late fall. It is said that large bodies have been seen spawning in recent years off the south shore between Huron and Fairport, where such an occurrence was previously unknown, but the statements in that regard lack confirmation. A very reasonable deduction is that, being prevented from reaching their proper spawning grounds, their eggs are largely deposited in situations not suitable for that purpose, with the result that the productiveness of the species has been much impaired.

The Canadian statistics, which are taken annually, show a comparatively uniform catch of herring along the north shore since 1885, coincident, however, with a very large increase in the amount of apparatus, both pound nets and gill nets, by which they are taken.

There is no evidence of the destruction of an appreciable quantity of the young herring, which seem never to be present in the pound net regions except in small numbers, and in the deeper waters would escape capture in the gill nets, except as they occasionally become entangled in the twine. Overfishing and the practices before described, so far as can now be determined, must be held accountable for practically the entire decrease which has been observed.

The wall-eyed pike, represented by its nominal varieties, the yellow pike and blue pike of the fishermen, follows next after the herring in the extent and value of the catch in Lake Erie. The yellow pike is supposed to belong more especially to the western shallow waters, and the blue pike to the deeper areas and the main body of the lake. There is evidence of a considerable decrease in the abundance of this species, which has been felt to a greater or less extent in the different fishing regions, but temporary local increases are sometimes noticed, which occasion doubt in the minds of some fishermen as to whether any change in the status of the supply has taken place. The pike has suffered less in this respect, however, than either the whitefish or the herring, notwithstanding that it is the object of a much more diverse fishery, being secured by practically every method which is here employed. The bulk of the catch, as with the species named, is obtained in the gill nets and in the pound and trap nets. The decrease has undoubtedly been due to overfishing, combined with the excessive capture of undersized fish, of which it is estimated that many hundred tons are taken and disposed of every year. The gill nets secure a larger average size than the pounds and other fixed appliances, and have, therefore, been less detrimental in this respect. No practical remedy can be suggested with regard to the latter means of capture, which are supposed to be adapted mainly to the herring and must necessarily be so constructed as to prevent the meshing of that species. A large proportion of the catch of the pike-perches is taken in connection with their spawning run in the early spring.

The policy of affording any measure of protection to the wall-eyed pike and its related species the sauger, has been strongly deprecated by many fishermen because of their well-known predaceous habits, and it is even claimed that the catching off of these forms in Lake Erie has produced an increase in the supply of herring. There is no ground for the latter belief, and no evidence that the herring were ever less abundant than at the period of their maximum catch a few years ago, as before explained. The statistics, moreover, credit the herring with a greater decrease than is apparent among the pike-perches.

The removal of any fish of supposed pernicious influence from so complex a fauna as that inhabiting Lake Erie, in view of our present imperfect knowledge of the conditions there existing, would at least be impolitic, and we cannot regard with favour the proposition, so often advocated, that every opportunity should be afforded to rid the lake of the fish-eating species. In a much smaller body of water it may at times be possible to adjust the balance of nature by artificial selection. In Lake Erie or in any other similar body, such a task would be fruitless, and any considerable change produced might cause more harm than good. The number of so-called predaceous species is quite large, and the inter-relations of these are such that we must expect the one to act as more or less a check upon the other. By removing one or any group of such species we may unwittingly provide for a more vigorous onslaught on the herring and young whitefish. The extensive fisheries which

have now been carried on for so long a period have undoubtedly tended to disturb the balance of nature originally prevailing in this lake. There is no way of preventing such an occurrence or of determining what the final outcome may be, but with the light we now possess on the subject, we consider it unwarranted to deliberately sacrifice any species which occupies an important position in the fisheries or may continue to be a source of profit to the fishermen.

The saugers, which come next after the wall-eyed pike in the size of catch, occur most abundantly along the south shore west of Vermillion and about the islands on the platform, where they are the object of a special gill net fishery in the early spring, and continue to be taken later by the pound nets. The statistics show no material decrease in the output in recent years, but a large increase in the means employed for their capture. As with the wall-eyed pike, the gill nets catch the larger average size of fish, and as this species is smaller than the other, practically only the adults are secured in this manner. The pound nets, however, are very destructive of the young.

Originally one of the most common fishes of the lake, the sturgeon has suffered relatively more depletion than any other. It was formerly a very prominent feature of the pound net catch, especially before its value had been recognized and while its capture was regarded as a nuisance. The fishermen at that time destroyed it in immense quantities, and when a market had been found the supply was already much reduced. It has continued to be taken by the pound nets and has also been made the object of a special fishery by means of gill nets, hooks and lines and seines.

The species is at present most abundant at the extreme eastern end of the lake, and elsewhere more plentiful along the northern than the southern shore. The principal cause of decrease and the one which has been longest in operation has been the pound net fishery, but the statistics show a continued and heavy diminution in the supply where gill nets and hooks alone are now employed. The sturgeon is classed among predaceous fishes by many fishermen, but in what degree it merits this distinction we have been unable to decide. In the absence of more conclusive evidence as to the extent of its destructiveness, and for the reasons stated in connection with the wall-eyed pike, we regard the species as deserving of such protection as can be granted it without detriment to the more important branches of the lake fishery. Its size and hardness permit of the return to the water alive of all immature individuals which may be taken by any method, and much good can undoubtedly be accomplished by this means, as a large proportion of the pound net catch especially consists of the small fish. It is important, furthermore, that the extent of the special fisheries for the species should be materially reduced, and the gill net mesh should be so regulated in size as to prevent, so far as possible, the capture of any individuals below the generally accepted standard of four feet in length. We consider, moreover, that the use of naked hooks or grapnels on the spawning grounds is a pernicious practice which should not be tolerated.

The black bass is the principal game fish of Lake Erie, and the sportsmen demand for it the fullest measure of protection. We fail to see, however, how its preservation can be provided for on a comprehensive basis, owing to its constant association with many of the market species. The commercial fishermen would be entirely satisfied to exclude it from their catch, were it possible to do so, but we find that any plan having that object in view would be entirely impracticable, for reasons which are elsewhere explained. There is no way of preventing the entrance of the bass into such appliances as the pound nets, trap nets and fyke nets, and once so taken their return to the water alive must depend upon the caprice of the fishermen, however stringent may be the regulations put in force. We would, however, urge the protection of the species during its spawning period, as well as during its younger stages or until it has attained what may be regarded as a fair size for capture. Whether such provisions would be effective or not can only be determined by experience. Special regulations may be found advisable in some localities, such as the prohibition of certain kinds of apparatus or a modification of the methods, but all such arrangements must be based upon a knowledge of the local conditions and requirements.

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It is not essential to discuss the remaining fishes in this connection. A few of them, such as the catfishes, are of considerable importance, while others which are taken only in small quantities are still desirable features of the catch. In some instances special measures might be suggested for their preservation, but their protection as a whole should, in our opinion, be subordinated to that of the more abundant and important species in which the fisheries of the lake are chiefly concerned. Any steps taken in the interest of the latter will incidentally operate to their advantage, and to some extent in like degree.

The apparatus employed in the fisheries of Lake Erie, named in the order of the value of the catch by each in 1893, are gill nets, pound and trap nets, hooks and lines, fyke nets and seines. Over 85 per cent of the total output was secured through the agency of the gill nets and pounds (including the traps), which shows them to be by far the most important of the fishing methods.

Although the fishery on this lake was chiefly carried on in early times by means of seines, it received its first decided impetus through the introduction of the pounds, which is said to have taken place about 1850 or soon thereafter. The first of these nets was established at the western end, where the conditions are especially favourable for this method of fishing, and where their number in United States waters has increased in an unparalleled degree. Along the remainder of the south shore and on the Canadian shore they have been used much less extensively. The maximum number in United States waters appears to have been reached in about 1890, when it amounted to about 1,500, nearly twice the quantity fished in 1880. By 1893, however, it had fallen off to about 1,300, and a further reduction was contemplated. On the Canadian side there were 11 pounds in 1869, from which date the number increased quite steadily to 210 in 1892, decreasing to 202 the next year.

On the south shore it is the common practice to set the pounds in continuous strings, made up of a variable number of nets, extending out from the shore a greater or less distance, dependent upon the conditions existing in each locality. In some instances these strings have contained as many as 30 or more nets and have reached a length of five or six miles, and although such cases are exceptional the proportion of long strings is very great. While this method of multiplying the nets is followed to some extent elsewhere, it is carried to the greatest extreme on the western platform and in the closely adjacent region, where the expanse of shallow water is especially favourable for this purpose. Placed at right angles to the shore line, these strings constitute a rapid succession of rigid barriers to the passage of all fish working along the coast, whose movement is thereby checked or diverted, no gaps being provided except in the rare cases demanded by navigation. On the Canadian side no more than two or three pounds are ever arranged in a string, and they are generally fished singly. The individual leaders measure generally from 50 to 60 rods, but the inner ones may be much longer, according as the depth of water dictates. The mesh is usually large enough to permit the passage of small fish, but it is doubtful if much advantage is gained by this circumstance. The wall of netting changes the direction of the schools, which as a rule, turn and follow outward toward the opening into the nearest crib. It is here that every precaution is taken against escape, by reducing the mesh to the smallest dimension that can conveniently be handled, this being done chiefly to prevent the gilling of the smaller sizes of fish.

The harmfulness of the pounds is measured by their capacity for removing large quantities of many different kinds of fishes without discrimination, especially when the nets are multiplied as they have been in these waters, and their destructiveness of the younger stages. Custom has regulated the length of the leaders in conformity with what is supposed to be a safe distance over which the more important species may be expected to follow in a single line when diverted from their regular course. The effectiveness of the strings is insured by inserting the cribs at relatively short intervals. Along an abruptly sloping shore the fish may be expected to move in somewhat compact bodies, but to spread out as they reach a more gradual slope or a level surface, such as is presented by the platform. Advantage has been taken of this habit in arranging the distribution of the pound nets. Experience has taught the fishermen where the schools can most profitably be intercepted, and sharp com-

petition, unrestrained by any regulations, has led to their extension in all directions, so that it seems little less than marvelous that any considerable number of the migratory species should be able to reach their spawning grounds.

That the pound net fishery as a whole has been greatly overdone is evidenced by the fact that several years ago it ceased to be profitable on the scale on which it was and still is conducted. From the standpoint, therefore, both of the fisherman and of the objects of his industry, it requires an entire revision, but it is certain that nothing effectual can be accomplished without recourse to heroic measures. The reduction in the number of nets should be sufficient to produce a decisive result. Furthermore, only a limited number should be allowed in any one place; the length of the strings should be lessened and their continuity broken, and access by the whitefish to their spawning reefs should be interrupted to as small an extent as possible.

The capture of immense quantities of young or undersized fish by the pound nets is the most serious feature connected with their use, in view of the fact that there is no practical means of preventing it under the present conditions of the fishery. It is considered very essential that the mesh of the crib should be small enough to prevent the gilling of an appreciable quantity of the fish taken, as otherwise the net is difficult to lift and many fish are rendered unfit for market. Where only large fish occur, or where it is desired to obtain only a large grade, between which and the next grade below there is considerable difference in size, a mesh can be selected that will assort them conveniently. Such was the case in respect to the early pound net fishery on Lake Erie, when only whitefish were in demand, and when a mesh as large as 5 inches was sometimes employed. At present, however, the desirable part of the catch is largely composed of herring and pike-perches, all of which run much smaller than the whitefish, and the several species may be found more or less associated together at times in the same localities. In order to accommodate the mesh to these forms, it has been reduced mainly to between 2 and 2½ inches, but it becomes still smaller through shrinkage while in use. A larger mesh than 2½ inches, it is claimed by the fishermen, cannot be employed except to such great disadvantage as practically to prevent the profitable continuance of the fishery.

Recent experiments, conducted under our supervision, show that a 3-inch mesh will gill large quantities of adult herring, both before and during the lifting, many of which are found to be unfit for market when the net is raised; it will also allow wall-eyed pike, weighing over a pound, to pass through and escape. A 2½-inch mesh caused the gilling of fewer fish than the 3-inch mesh, but of more than in the customary size used near it in the same locality. It would undoubtedly serve to liberate a large proportion of the small pike-perches, which are the most objectionable features of the catch and which it is very desirable to preserve. Its advantages should be further tested under proper auspices, but until that has been done, we feel constrained to recommend nothing larger than a 2½-inch mesh for the cribs, but that should be the size after shrinkage and when the nets are actually in use. This would be a very decided improvement upon the present practice, and would not fail to secure the release of many small wall-eyed pike and saugers, which are now marketed at an inferior price. Young whitefish and herring do not seem to be present in appreciable quantities in the principal pound net regions.

An alternative method of preventing the destruction of undersized fish by the pound nets is to provide for their return to the water alive, as the catch is being transferred from the net to the boat. Were such a measure feasible, it would prove a fortunate solution of this vexed question, and leave the size of mesh to be settled at the convenience of the fishermen, but we consider the proposition to be entirely impracticable as regards Lake Erie or any body of water having such complex and extensive fisheries. Under all ordinary circumstances, the fish will remain alive and in good condition in the cribs for a considerable period, and were the catches uniformly small, the undesirable portions could be readily culled out, but such is generally not the case. The catches usually consist of a considerable quantity of material, and during good seasons may run constantly very large, representing

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several species, some of which may have no market value. As the fish are marketed in fresh condition, and any serious delay may cause their deterioration, if not their entire loss, the important question is to secure their transfer to the nearest railroad or steamboat landing with the least possible delay. Nothing will be allowed to interfere with the accomplishment of that purpose. Were the fishermen obliged to release the small fish alive, the latter would probably not be brought to shore, but in nearly every case, especially during the height of the season, the sorting would be deferred until the contents of the several cribs visited were emptied into the boat and the homeward trip had begun. Only the most hardy fish could survive such treatment under the most favourable circumstance. The enforcement of such a regulation could not be accomplished except through the constant vigilance of a large number of wardens, and were its provisions thoroughly carried out, we are confident that the pound net fishery would in a large degree become unprofitable. We are, therefore, convinced that the sorting out of the young fish is practicable only to the extent that can be arranged for by the enlargement of the mesh. So far as this measure fails to secure the ultimate result desired, namely, the maintenance of the supply of fishes represented by the young individuals in question, the remedy is to be found in the further curtailment of fishing operations.

In respect to the releasing of fish alive, however, we make exceptions in favour of the sturgeon and the black bass; in the case of the former because it is a conspicuous and hardy species, and of the latter because of the obligations due to the sporting interests. Neither of these species is now taken abundantly in the pound nets.

The trap nets and fyke nets are objectionable from the same standpoint as the pounds, in that they are very destructive of the young fish, but the mesh is practically the same in all. Whitefish and herring are taken only by the traps and in comparatively small quantities. The latter nets have been introduced in this lake within about ten years, and are now employed only to the eastward of Lorain, Ohio, on the south shore. There were 152 in use in 1893, but possessing certain advantages, especially as to the ease with which their position may be changed, their number is likely to be much increased. The fyke nets are confined to the western part of the United States shore, and are more adapted to the inclosed waters and marshy areas, where they catch many of the inferior grades of fish besides the pike-perches, black bass, etc. The quantity of these nets employed in some places, as in Sandusky Bay, is very large, and, under such circumstances, they have been responsible for a great amount of damage.

The gill nets employed on Lake Erie are separable into three general classes, namely, a small mesh appropriate for the herring and most of the pike-perches, a medium mesh for the whitefish, and a large one for the sturgeon. The gill net fishery for sturgeon is restricted to New York waters, where it is carried on in conjunction with the use of both baited and naked hooks. That it is being prosecuted on much too large a scale is evident from the continued rapid decrease in the abundance of this species. While the releasing alive of all sturgeon caught measuring less than four feet long is recommended, it is also deemed advisable to so regulate the size of mesh in these nets as to provide, so far as possible, for the voluntary escape of the smaller fish. Observations respecting the minimum size of sturgeon taken in the present mesh, which measures from 11 to 13 inches, are lacking.

Whitefish gill netting is limited to two regions, the eastern deeper waters and the spawning reefs on the western platform. In the former, it is carried on during practically the entire open season. This area is the common resort of at least the main body of the whitefish, and the species is present there at all times, although the quantity becomes much reduced during the periods of their shoreward movement in the spring and fall. Advantage was long ago taken of this circumstance to build up the most extensive of the gill net fisheries of the lake. Having been carried to excess, with the inevitable result of causing a serious depletion of the whitefish, it was mainly abandoned about 10 years ago. The temporary relief thus afforded was undoubtedly beneficial to the species, but the fishery as again increased in magnitude, while still much smaller than at a former period, it is evidently being con-

ducted on a much larger scale than the supply will warrant. The fishery on the spawning grounds is much less extensive and of short duration, but by many it is regarded as pernicious from the fact that it decimates and disturbs the fish while they are collected together within limited areas for the purpose of carrying out their most important function. The injury which may thus be done is mitigated, to a greater or less extent by the efforts made to secure the greatest possible amount of spawn for artificial hatching, and by the planting of the fry in the same waters.

The size of the mesh in the earlier whitefish gill nets ranged from 5 to 5½ inches. It has been reduced, through the catching off of the larger run of fish, to 4½ inches. While the latter size appears to take no whitefish below a suitable market standard, yet we consider that the maintenance of the species could best be secured by a return to the original practice.

In the small special fishery which is carried on for the lake trout, a 5½ inch mesh is used. Not considering it important to provide for the preservation of this species, no modifications in the extent or manner of its capture are suggested.

With the falling off in the supply of whitefish, the small-meshed gill nets grew rapidly in favour, until now the quantity employed is much greater than that of all the other kinds combined. Although used in practically all parts of the lake, their principal field is to the eastward of the platform, mainly in the deeper waters, the catch consisting chiefly of herring and blue pike. At the west end there is a special fishery in the early spring for saugers, wall-eyed pike and perch. The eastern fishery has steadily increased in magnitude, due to the exceeding abundance of the fish in that region, and to the practically unlimited demand for the cheaper grades, which has sprung up in recent years. As elsewhere explained, the catch of herring and blue pike in this section of the lake has only been maintained by the constant expansion of the fishery, and its extent for some time past has evidently produced an excessive drain upon its resources. Within a few years, moreover, the practice has grown up among the gill net tugs of pursuing the herring during their fall movement toward and over the platform. This innovation was immediately followed by an abrupt and very serious decrease in the abundance of that species throughout the western pound net region, which we feel confident was chiefly due to that cause.

Complaints are made that the summer gill net fishery produces an inferior quality of fish, and that many herring are wasted through their rapid decay in warm weather. It is also said that a great destruction of the same species is occasioned by the loss of nets in winter, and close times covering both seasons have been suggested as a means of obviating these troubles. This subject will again be referred to.

The size of mesh in this class of gill nets ranges mostly from 3 to 3½ inches, but is sometimes as small as 2½ inches. It is regulated by law to not less than 3 inches on the Canadian side, while in United States waters the favourite size is 3½ inches. Experience indicates that the latter size is best suited to the general run of fish, especially the herring, for whose capture it is chiefly used, and we consider that no smaller should be allowed, having in view the greater protection that would thus be afforded the young wall-eyed pike and saugers.

The number of seines now employed in the Lake Erie region is very small, but in some of the localities where they are still utilized much injury may be occasioned by them, especially on and about the spawning grounds of such species as the pike-perches and the black bass. In all such places their use should be restricted or abolished, but we have heard of no serious objections to this mode of fishing under suitable limitations and with a proper size of mesh.

The hook and line fishery is of relatively slight extent, although of considerable importance in some localities. It is carried on mainly for the pike-perches, yellow perch, catfishes, etc., in connection with which no unfavourable practices or conditions have been brought to our attention. It is possible that the capture of sturgeon by means of baited hooks, in conjunction with the gill net fishery for the same species, is being conducted on too large a scale, but the facts in this case can only be determined by further observations. We deprecate the use of naked hooks or

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grapnels for the sturgeon. The value of the sport fishery has greatly deteriorated in recent years, but we cannot suggest no means of securing for it any considerable measure of relief, as before explained.

We find that the principal causes of decrease among the important food fishes of Lake Erie have been excessive fishing in the case of all species, and the destruction of immense quantities of the young in respect especially to the pike-perches and the sturgeon. Relief is to be sought, first, through a reduction in the amount of fishing, and, second, by the correction of certain practices which may be regarded as pernicious. How far the extent of any fishery needs to be restricted in order to bring it within the limitations of its resources, must be decided upon an arbitrary basis until some means of measuring its capacity can be found. Up to the present time Lake Erie has never been studied with this object in view. We know, however, that the resources of all the larger fisheries on this lake have been over-taxed. Where the output has not actually diminished it has been kept up by the employment of a greater amount of apparatus, and, sooner or later, the inevitable result must follow. A decrease has been manifest in the case of all the important species, but to a greater degree with some than with others, dependent upon the length of time they have been fished for and the persistence with which they have been followed up.

The means by which all of these species have been chiefly taken are the pound nets and gill nets. One measure for their protection, and we consider it the most important one, is, therefore, a reduction in the amount of each of these appliances allowed to be fished in connection with each branch of the fishery. The pound nets must naturally be regarded as a whole, being set for whatever species may come their way. Their number is not excessive on the Canadian shore, nor generally on the eastern part of the south shore, so far as we can judge; but at the western end of the lake in United States waters their number has been multiplied beyond reason, and, in our opinion, it should be reduced at least one-half. The effect of such a change, in connection with the proposed shortening of the strings and breaking of their continuity, would undoubtedly soon be felt in an increase of the supply of fish and in greater individual prosperity among the fishermen who continue in business.

In some places the extent of the fyke net fishery also requires to be much restricted, and neither these nets nor the trap nets should be multiplied beyond a reasonable number in any part of the lake.

It is more difficult to determine what may be a safe and proper limitation for the different branches of the gill net fishery, but we think that each of them, namely for the whitefish, herring, pike-perches and sturgeon, is being carried on too extensively, and that a decided reduction is demanded, especially in the case of the whitefish, herring and sturgeon. It is questioned whether any regulation limiting the amount of gill netting can be effectively enforced, owing to the condition surrounding their employment. In the event of such a restriction being found impracticable, we would suggest that essentially the same result might be accomplished, by instituting one or more close seasons, to be so fixed as to time and duration as to offset, so far as possible, the overfishing at other periods. In this connection, however, it is important to bear in mind, that it is sometimes possible to so increase the magnitude of a fishery during the open season as practically to render ineffectual the shortening of its duration. We, therefore, consider that some restriction should be placed upon the extent of gill netting even in the event of a regulation by means of close seasons being adopted.

In case close seasons are provided for, the arrangement of their dates must occasion some trouble and give rise to much controversy. To be beneficial, they must occur at times when the fish could be taken abundantly and when to prevent their capture would accomplish some purpose. It is imperative that a sufficient number of the fish should have the opportunity of spawning to insure the perpetuation of the species. This is a leading principle in fishery regulation, and its observance is especially important in the case of those species which migrate along regular courses towards their spawning grounds. The whitefish is an example of

such a form, and we are confident that, could its protection from capture be insured during and just preceding the spawning period, a rapid increase in its abundance might be expected. Such a measure would require, however, that its capture in the pound nets at that season be also prohibited. As the whitefish composes only a small proportion of the pound net catch, and its release alive from those nets can not be accomplished, the fall season of the pounds would need to be greatly shortened, in which event their use at that time of year would become unprofitable in many cases. The question of expediency, therefore, arises in this connection, and, while we are confident that the fall close season is a proper and justifiable measure in regard to this species, we request for it a more thorough study of the conditions than we have been able to make. It would be most advisable to commence such a season in time to give the whitefish right of way during the greater part of the period of its western movement. Something, however, might be accomplished by a close season of even limited duration while spawning was in progress; and the prohibition of all fishing on and about the reefs would be of material benefit—provided, however, that fish cultural operations do not compensate for the losses otherwise made. Whatever may be done at the western end of the lake, however, it seems important that a restriction should be placed upon the extent of whitefish gill netting at the east end.

While the herring is similar in its habits to the whitefish, it presents sufficient differences to suggest another line of treatment. Its spawning grounds appear to be more widely distributed, not only on the platform but elsewhere as well, and its principal decrease seems to be traceable to a more definite cause. We see no objection to a fishery for the species during the fall by means of pound nets, restricted in the manner before proposed, and also by gill nets, but we consider the extensive use of gill nets on the platform at that season as exceedingly harmful and would urge its prohibition. If the gill net fishery for the herring is to be restricted by the establishment of a close season, we feel that the latter would be most justifiable at the time of year when the greatest waste of fish occurs, namely, the summer. At that season many herrings are undoubtedly destroyed in consequence of the high temperature, and a large proportion reach the market in poor condition. A loss is also said to occur in the winter through the destruction of the nets by storms and ice, but the fishery is then comparatively limited in extent, and less would be gained by stopping it. Many prominent fishermen have proposed a winter close season for both the pounds and gill nets, beginning November 10 or 15, which could not fail to insure some benefits to both the herring and whitefish.

We have been lead not to suggest a close season for the wall-eyed pike, except as they may be taken in the fisheries for the whitefish and herring, but we feel that so far as possible they should not be molested on their important spawning grounds.

As before explained, we deem it impracticable to attempt the protection of the young fish in general by releasing them from the nets, but we urge that their capture be guarded against to the fullest extent by a proper regulation of the size of mesh.

It has been and still is the common practice to throw overboard at once, while the net is being lifted or during the trip in, the rejected dead or undersized fishes, so far as that can be done conveniently. With large catches, these undesirable portions may be brought ashore and after culling carried out and dumped in the lake, unless some other means of disposing of them are found. The offal is also treated in the same manner, although the greater part of the fish are dressed on land. The quantity of refuse of this character which finds its way into the waters of the lake must be considerable, and while there is a difference of opinion regarding its effect, we believe that the practice must be more or less detrimental to the fishing interests. It is now prohibited on the Canadian side. Large quantities of city garbage are also dumped in the lake. We have not been able to ascertain what influence other kinds of pollution may exert in the lake proper, but some of its tributary streams and bays have been seriously affected by the drainage from large communities and manufacturing establishments situated thereon, and especially by the overflow of petroleum and of the waste products derived from the use of this oil. The spawning grounds of the pike-perches and of other species have apparently been greatly

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damaged in some localities by this cause. The dumping of dredged materials in connection with harbour improvements is said to have injured some of inshore fishing grounds, and the deterioration of the fisheries in the Detroit River has been partly charged against the heavy traffic which passes that way. The drainage of marsh lands has caused the extensive dying out in some places of grass pike, the large mouthed black bass and bull heads.

While no positive evidence of the success of fish culture on Lake Erie has been adduced, owing to the fact that the whitefish fry there planted represent the same variety which naturally inhabits the lake, we are confident that the supply of that species has been materially benefited thereby. As the advantages to be gained by this means must be measured by the quantity of young fish returned to the water, and as the stock of whitefish has been so greatly depleted, we strongly urge that the scope of the operations in this direction be increased to the fullest extent possible. We do not recognize the present need of propagating other species than the whitefish, unless it be the wall-eyed pike, which has already received some attention in that respect.

The pound net is the only form of fishing apparatus which might interfere with navigation in this lake, and it is not in the nature of a serious obstruction. Vessels may run across the leader of the net, which constitutes its major part, with little danger of sustaining injury, but the stakes, especially in dismantled pounds and when broken of just below the surface, have occasionally given trouble. The nets of this class are nowhere set in the course of through navigation on Lake Erie, but they do stand more or less in the way of vessels passing between most points on the south shore at the west end.

The proposed reduction in the number of pounds and in the length of the strings, together with the separation of the individual nets in the latter by broad gaps, will materially relieve the annoyance now resulting from this cause. It is desirable however, that the positions of passageways between nets be marked at night by means of lanterns in all places where they are likely to be much used. This course is now followed in some localities. All stakes should be entirely removed from the water at the close of the fishing seasons.

RECOMMENDATIONS.

Pound nets.—It is imperative that the extent of the pound net fishery, especially in the western part of the lake, be very materially reduced, and that the positions and distance apart of these nets be so regulated as to make ample provision for the free circulation of the several important fishes. Although further observations will be necessary before the limitations of so comprehensive a measure can be properly adjusted or its details perfected, we venture to offer the following suggestions respecting it:—

That the total number of pound nets in the lake be limited to 1,000. The reduction in the number is intended to apply mainly to the United States waters from Vermillion westward.

That the number of such nets set in a string be restricted to 6 on the United States shore, and to 3 on the Canadian shore.

That the length of the pound net leaders be restricted to 50 rods.

That in all strings the individual pound nets be separated by gaps between each crib and the next succeeding leader, which gaps shall be at least 50 feet wide and shall extend to the bottom.

That all pound nets or pound net strings be separated laterally by interspaces of at least one mile.

That no pound nets or strings of pound nets be allowed to begin in a less depth than 10 feet, or to extend out into a greater depth than 40 feet.

That in the vicinity of the islands at the western end of the lake, the length of pound net strings be further regulated in accordance with local conditions, but in no case should these nets obstruct more than $\frac{1}{3}$ the width of any channel or passageway.

That the use of pound nets be prohibited on any reef or ground on which whitefish or herring are known to spawn, or within a reasonable distance therefrom.

That the use of pound nets be prohibited in any locality where young whitefish may be taken in undue quantity.

That the mesh in all pound nets measure in extension at least $2\frac{1}{2}$ inches in the crib, after shrinkage.

That all pound net stakes be removed from the water within 30 days from the close of the fall fishing season.

Gill nets.—The mesh in the gill nets used for the capture of herring, wall-eyed pike, blue pike and saugers should measure at least $3\frac{1}{8}$ inches in extension, and the employment of any gill net having a smaller mesh should be prohibited.

A very large reduction is called for in the extent of fishing with the small-meshed gill nets, especially for the herring and wall-eyed pike. In case this cannot satisfactorily be accomplished by reducing the amount of netting employed, practically the same result may be reached by instituting a close season, which should preferably occur at the time of year when the greater waste of fish takes place.

We recommend that the use of the small-meshed gill nets be entirely prohibited west of a line connecting Point Pelee with Vermillion Light, between 1st July and 1st January.

In any locality where the small-mesh gill nets are liable to take an undue quantity of undersized whitefish, their use should be prohibited, at least during the period when such undersized fish are there present.

The mesh in the gill nets used for the capture of whitefish should measure at least $4\frac{1}{2}$ inches, in extension, and it is considered that a 5-inch mesh would be preferable.

The quantity of whitefish gill netting now employed appears to be excessive, in view of the continued depletion of the whitefish, and it should be restricted, unless the protection of the species can be better provided for by a close season.

The mesh in the gill nets used for the capture of sturgeon should measure at least 11 inches in extension.

It seems to us that the gill net fishery for sturgeon at the eastern end of the lake is being conducted on too large a scale, and that a reduction should be made in the number of nets employed, but a special investigation will be required to determine the proper means of regulating this fishery. The hook and line fishery for the sturgeon also needs to be taken into consideration in the same connection.

The use of any gill net within one-fourth of a mile of any fixed net, such as a pound net or trap net, should be prohibited.

Fyke nets and trap nets.—The mesh of these nets should conform to the same regulations provided for the pound nets. Their number should be restricted in accordance with the capacity or requirements of each region in which they are fished. A great reduction in the number of the fyke nets is demanded in several places.

Seines.—The dimensions of seines and the size of mesh therein should conform in each instance to the conditions under which they are employed. The mesh should in all cases, be sufficiently large to permit the escape of undersized fish, and the number of seines, as well as the manner of their use, should be properly restricted in all places.

It should be prohibited to fish seines on or about the spawning grounds of the black bass, the pike-perches or other important fishes during their spawning season or while the eggs and young fish continue to remain upon the grounds, and in all other places where the employment of this method would be unduly harmful.

Naked hooks for sturgeon.—It is recommended that the method of taking sturgeon by means of naked hooks or grapnels be prohibited.

Spears.—The use of spears for taking fish of any kind should be prohibited.

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Whitefish.—This species is the one most urgently demanding protection as well as efforts to rehabilitate the supply. A large reduction in the amount of apparatus used for its capture, accompanied by extensive fish cultural operations, may be expected to aid materially in replenishing the stock, but we venture to suggest that in our opinion, even greater benefits might be gained by the discontinuance of all fishing for the species during all or a part of its spawning season, as elsewhere explained.

Sturgeon.—All sturgeon measuring less than four feet long, taken by any means should be returned alive to the water.

Black bass.—All fishing for the black bass, including its capture by any means, should be prohibited from at least May 1st to June 15th, and all bass which may be taken in the nets during that period should be returned alive to the water. No black bass measuring less than 10 inches, taken by any method, should be retained or sold.

Pollutions.—The throwing into the water of fish offal, including dead fish taken from the nets, of city garbage and of all other substances deleterious to fish life should be prohibited. Steps should also be taken to prevent injury by the waste from gas works, oil wells, oil refineries, &c., especially in tributary streams containing spawning grounds of important fishes. It is recommended that in connection with all harbour improvements and other work of that character, due precautions be taken in disposing of the materials obtained by dredging, &c., to prevent injury to any fishing grounds.

Propagation.—A continuance of the joint efforts to increase the supply of whitefish by means of artificial propagation is strongly recommended, and it is urged that the scope of this work be increased to the fullest extent possible.

DETROIT RIVER, LAKE AND RIVER ST. CLAIR.

In Lake St. Clair we have, excepting the absence of rocky bottom, the same general physiographical conditions as are found on the platform at the western end of Lake Erie. The lake, with an area of 410 square miles, is essentially a broad shallow expansion of the great stream, composed of the St. Clair and Detroit rivers, flowing from Lake Huron to Lake Erie.

No gill net fishing whatever is carried on within its limits, the movable apparatus consisting solely of hooks and lines, spears and seines. The latter are now prohibited on the Canadian side, and most of those on the United States shore are used in the vicinity of Anchor Bay. Pound nets, fyke nets and trap nets are used, the first on both the Canadian and United States shores and the last two upon the United States side only.

The trap nets, fyke nets and seines in Anchor Bay are the cause of much contention between the Michigan Fish Commission and the sportsmen on the one side and the market fishermen on the other. A large part of the apparatus of the kinds specified is now fished in contravention to the laws of Michigan. The sporting interests in the lake are of considerable importance, and in the delta of the River St. Clair, the well known St. Clair Flats, there are several hotels and many cottages occupied during the spring and summer by persons attracted by the sport, fishing for black bass, perch, grass pike and the rare and highly prized maskinonge. The inhabitants of the neighbouring region supply the sporting population with boatmen and guides, and the produce of their farms and the financial interests represented are very considerable.

In Lake St. Clair the species which have decreased are the herring, whitefish, sturgeon, wall-eyed pike and black bass.

The herring and whitefish run into the lake from Lake Erie by way of the Detroit River, principally in the fall, but in the case of the former, to some extent

at least, also in the spring. The cause of their decrease is no doubt largely connected with the falling off at the western end of Lake Erie and the effects of beneficial regulations there would no doubt be reflected by an improvement in Lake St. Clair. There is no question, however, but that the former heavy fishery for these species in the Detroit River and Lake St. Clair was responsible for a considerable proportion of the decrease. At present the catch of whitefish, although insignificant as compared with former times, is said to be increasing slightly. To what extent the decrease in these species is due to the sewage discharged into the Detroit River from the city of Detroit cannot be stated, but it is not thought to be an important factor as compared with the others mentioned above.

The decrease in wall-eyed pike is less extensive than in the whitefish and herring and is due to a larger extent to local causes, overfishing with fixed appliances and seines and the catching of the young, and the same causes, taken in connection with the grapnel fishery in the Detroit River, have operated to decrease the sturgeon. The fishery for wall-eyed pike and sturgeon in Lake Huron and Lake Erie is not without effect upon the abundance of these species in Lake St. Clair, and an increase in either or both of the two great lakes mentioned would be beneficial to the fishery of the smaller lakes.

The decrease in the black bass is due apparently to excessive fishing, both by sportsmen and by professional fishermen using fixed appliances and seines. It appears that the nets, especially the seines, are most destructive to the black bass in the winter.

In the Detroit River the only commercial fishery is by means of seines and grappling hooks for sturgeon, though a few coarse fish are caught in seines by farmers in the spring. Formerly vast quantities of whitefish were taken in the river, but this fishery became much depleted and is now followed solely by the Canadian and Michigan authorities for the purpose of obtaining eggs for the hatcheries.

In the St. Clair River seines are used upon the Michigan shore for wall-eyed pike and they often catch large quantities of young ones. No nets are used upon the Canadian side. In this river the black bass are speared and seined upon their spawning grounds, and as there is considerable sport fishing at Algonac, St. Clair and other places, this is the cause of much complaint.

RECOMMENDATIONS.

In view of the above mentioned conditions existing in the waters connecting Lakes Huron and Erie, the following recommendations are made:

1. That the use of all nets, excepting seines employed in obtaining whitefish for the hatcheries and seines with not less than 4-inch mesh for catching sturgeon, be prohibited in the waters of the Detroit and St. Clair rivers.
2. That all fishing with seines, traps, or other forms of nets be prohibited in Lake St. Clair north of a line drawn from the mouth of the Clinton River in Michigan to the mouth of the Thames River in Ontario.
3. That the minimum size of mesh in the cribs of pound nets, trap nets and fyke nets be not less than 2½ inches in extension.
4. That no nets whatever be permitted to be used between the 31st day of October and the 1st day of December, excepting for the purpose of the hatcheries.
5. That a close season be adopted for the black bass from May 1 to June 15; that all black bass measuring less than 10 inches long, by whatever means taken, be returned alive to the water; that the number of bass taken by each rod per diem be limited to 20 and that a number of rods to each boat be limited to two.
6. That all sturgeon less than 4 feet long be returned to the water.
7. That all fishing with grapnels or naked hooks be prohibited, but that all other hook and line fisheries be permitted except for black bass between May 1 and June 15.
8. That the throwing into the water of fish offal, including dead fish taken from the nets, of city garbage and of all other substances deleterious to fish life be pro-

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hibited. That steps be taken to prevent injury by the waste from saw-mills, gas works, oil refineries, etc.

LAKE HURON.

DESCRIPTION OF THE LAKE.

Lake Huron occupies a central position in the chain of the Great Lakes. It is irregularly crescentic in shape, with the Canadian shore forming most of the outer or greater arc, and the lower peninsula of Michigan, its inner or shorter curve. This crescent lies so that its upper horn is directed westward, connecting with Lake Michigan at the Strait of Mackinac, while its lower point is directed southward and establishes communication with Lake Erie through the river and Lake St. Clair and the Detroit River. At its northern end, about 20 miles east of the Strait of Mackinac, Lake Huron receives the River St. Mary, discharging the overflow from Lake Superior.

On the north-eastern side, Georgian Bay, a large body of water lying entirely in Canada, is almost cut off from Lake Huron by the Manitoulin Islands and the long peninsula terminating in Cape Hurd. Somewhat below the middle of the western shore, Saginaw Bay, with an average width of about 20 miles, extends about 60 miles south-westerly into the lower peninsula of Michigan.

The greatest length, following the middle of the lake from the head of the St. Clair River to the Strait of Mackinac, is about 250 miles, and the greatest width, near the middle, about 100 miles. Toward each end the lake becomes much narrower, averaging about 35 miles across in its northern quarter, and for a somewhat greater distance in its southern portion measuring in general about 40 miles in width. Including Georgian Bay, it has an area of about 23,000 square miles.

The United States shores of Lake Huron include the coast of the upper peninsula from False Detour to the Strait of Mackinac, and the eastern side of the lower peninsula as far as Port Huron. Near the shore the bottom is variable in character, consisting of rocks, boulders, gravel, sand, clay and mud, irregularly distributed. Localities suitable for pound nets are scattered at intervals along shore, but are most numerous in Saginaw Bay.

Lake Huron is divided into two approximately equal areas by the so-called Big Reef, which extends continuously from Point Clark, Ont., to North Point, Michigan. North of the reef the lake has a maximum depth of 125 fathoms; the 30-fathom curve is rarely more than 6 miles from shore, and the 10-fathom curve generally from $\frac{1}{2}$ to $1\frac{1}{4}$ miles, except on the eastern side above Southampton, where there are numerous small reefs and islands and much shallow water. The southern portion of the lake is shallower; depths of 30 fathoms and less are more extensive, and the maximum depth is only 54 fathoms. The 10-fathom curve varies from 3 to 8 miles from shore, being most distant off the southern and eastern coasts.

The Big Reef has an average width of 5 miles, and is covered by from 9 to 30 fathoms of water, although a much greater depth is found on each side, especially toward the north.

IMPORTANT FISHES.

In the United States statistical reports relative to the fisheries of Lake Huron, fifteen species of fishes are enumerated. The variations in the relative catch of the

more prominent of these species in 1885, 1890 and 1893, are shown in the following table :—

	1885.	1890.	1893.
1	Trout	Herring	Trout.
2	Whitefish	Trout	Herring.
3	Herring	Perch*	Suckers.
4	Wall-eyed pike and grass pike	Wall-eyed pike and grass pike	Perch.
5	Catfish	Suckers*	Whitefish.
6	Sturgeon	Whitefish	Wall-eyed pike and grass pike.†
7	Black bass	Sturgeon	Catfish.
8	.....	Catfish	Sturgeon.
9	.....	Black bass	Black bass.

* Perch and suckers were not separately enumerated in 1885.

† The proportion of grass pike was less than 10 per cent.

The relative importance to Canadian fisheries of the five principal species in different years is brought out by the following table, in which the several forms are enumerated in the order of the size of catch :—

1880.	1885.	1890.	1894.
Whitefish. Trout. Herring. Wall-eyed pike. Sturgeon.	Herring. Whitefish. Trout. Wall-eyed pike. Sturgeon.	Trout. Herring. Whitefish. Sturgeon. Wall-eyed pike.	Trout. Herring. Sturgeon. Whitefish. Wall-eyed pike.

LAKE TROUT.

Status.—At the present time the lake trout is the most important species taken in the fisheries of Lake Huron. In 1893 it constituted about 29 per cent of the total catch and 44 per cent of the value of the fisheries on the Michigan shore. In Canadian waters it has also attained first rank in both quantity and value. It is caught chiefly in gill nets, and comprises 90 per cent of the total catch by that means in United States waters.

Varieties.—The fishermen recognize a number of varieties of the lake trout, the most of which, however, are not definable. One, occurring sparingly in the deeper water in the northern part of the lake approaches the siscowet of Lake Superior in fatness and quality. The bulk of the catch consists of two widely recognized forms, the deep-water trout and the large shoal-water or fall trout.

Distribution and movements.—If we except Saginaw Bay and the region south of the parrallel of Goderich, there is probably no time in the spring, summer or fall when vessels fishing out of the ports of either Michigan or Canada would fail to obtain trout in gill nets having the proper size of mesh. In the early spring they occur in moderate depths along shore on both sides of the lake, but after the middle of June they are mainly on the borders of the coastal platform and especially on the edges of the Big Reef. About the middle of September or a little earlier they move into the shallower water on the reefs and along shore, retiring to deep water late in November.

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The foregoing applies, in a general way, to the great body of fish. It is evident, however, that many remain in the deep water during the summer and fall, and at all seasons the species may be caught in rather shallow water. Even in winter, trout are taken through the ice in moderate depths off Iosco and Huron counties, Michigan, by means of sot-lines and gill nets, and in the neighbourhood of Detour by gill nets. There is similar diversity in the vertical distribution, independent of the depth of water. They appear at one time or another to swim at all levels from the bottom to the surface, although the nets are only set for them on the bottom.

The only pronounced movement appears to be shoreward and on to the reefs in the fall for spawning. At that time the trout do not seem to travel any considerable distance, but only to proceed from comparatively deep water to the nearest shallows. There are, apparently, at least two, and perhaps more, distinct bodies of fish concerned in this movement. The first or early run is composed of what the fishermen term shallow-water trout, and upon certain grounds these fish will run into 3 or 4 and sometimes even 2 feet of water. The later run does not approach so close to shore, and is more extensively represented on the reefs.

Spawning.—The spawning grounds of the trout in Lake Huron seem to be, in a measure, co-extensive with the general distribution of the species. That is, the fish spawn along the shores at all suitable places near which they are usually found at other times, and the spawning migration is probably a mere shifting of the fish from their accustomed summer habitats to some near-by reef or shore favourable for depositing their eggs.

There are no spawning grounds of importance on the Michigan shore south of Port Austin. On the Canadian side the most important regions for spawning trout are north of Southampton, and the south side of Grand Manitoulin. The former is one of the best localities on the lake for "shoal-water" trout. The greatest of all the spawning grounds in Lake Huron is the Big Reef, which stretches across the lake from North Point, Thunder Bay, to Point Clark, in Canada. During the summer the fish begin to congregate upon the edges of the reef, but in the height of the spawning season they seek the shallowest portions and are caught in great numbers by tugs from both sides.

In September, the time varying from the 15th to the 25th of the month, the shoal-water trout come ashore near Alpena, Port Austin and Southampton, and usually occupy about two weeks in spawning. The late run, which comes upon the reefs as well as along shore, spawns between about October 10 and the latter part of November, the season being somewhat later in the northern part of the lake than off Alpena and Southampton. This run is heavier than the preceding. The intervals between the several runs are not sharply defined, being bridged over by the belated fish of the earlier and the precocious individuals of the later schools.

Food.—The trout devour large numbers of herring, shiners, and other species, and it is said that a good many young whitefish are sometimes found in their stomachs.

Decrease.—The testimony of the fishermen respecting the question of decrease is exceedingly contradictory. On the Michigan shore, according to the statements of the majority, there has been a greater or less falling off in the supply, while in Canada the general opinion seems to be that the decrease, at the most, has been very slight and largely confined to the fall or shoal-water variety.

From a statistical standpoint, the history of the trout fishery in United States waters can be traced back only to 1885. The catch of trout in pound nets in 1885 is not recorded, but estimating it upon the basis of the statistics for 1893, the following table will give the relative catch by gill nets and other methods for each year recorded:—

	1885.	1890.	1893.
Gill nets.	2,336,000*	1,421,327	3,243,860
Other methods.....	203,780*	329,292	267,715
	2,539,780	1,750,619	3,511,575

* Estimated.

Our investigation shows that between 1885 and 1893 the average catch per gill net has fallen off but 6 per cent, while the averages for the years 1890 and 1893 agree quite closely. A comparison of the average catch by the pound nets in 1890 and 1893 would seem to indicate a falling off about 25 per cent in the shore trout within three years, but the data are not sufficient to serve as a satisfactory basis for conclusions.

The statistical returns for the Canadian side of the lake for 1880, 1885, 1890 and 1894, show the following catches to have been made in those years :

1880.....	469,000 lbs.
1885.....	712,954 "
1890.....	1,409,150 "
1894.....	1,563,270 "

These figures indicate a continuous increase in the size of the catch, but there was, as upon the United States side, an increase in apparatus also. The catch by pound nets may safely be ignored, as this form of apparatus is confined to the southern end of the lake where very few trout are taken. Assuming, therefore, that the entire catch was made in gill nets, we obtain the results shown in the following table :

Year.	Fathoms of Gill Net.	Catch per 100 Fathoms.
		Lbs.
1880.....	54,417	862
1885.....	61,253	1,162
1890.....	152,200	926
1894.....	222,650	711

Considering the lake as a whole, it is probable, although not proven, that a slight decrease in the abundance of the trout has taken place, and it may be assumed that this decrease has been greater in the catch of shoal-water trout, while the deep-water fishery has been fairly well maintained.

WHITEFISH.

Status.—On the Michigan shore, in 1893, the whitefish ranked fifth in the amount and third in the value of the catch. In 1890 it held sixth place in the amount and in 1885 second place. In the early history of Lake Huron it was the

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most important species. On the Canadian side it stood fourth in 1894, third in 1890, second in 1885 and first in 1880.

Most of the whitefish are caught in pounds. The following table shows the proportion taken by each form of apparatus in 1893 in United States waters:—

Pounds.....	76·1 per cent.
Gill nets.....	23·9 do

Distribution and movements—Whitefish are found along the entire shore of Lake Huron wherever the depth is less than 35 fathoms. They are taken at greater depths but sparingly, and the best fishing is usually in from 10 to 25 fathoms. They are most abundant in the vicinity of the Manitoulin Islands and the Straits of Mackinac, and in 1893 about 67 per cent of the total catch on the Michigan side of the lake was made, chiefly in pounds, in the four counties of Chippewa, Mackinac, Cheboygan and Presqu Isle. The vicinity of Drummond Island may be considered the most important whitefish ground in United States waters. Alpena county is next in importance to those mentioned, followed by Huron and Iosco. In the first two most of the fish are caught in gill nets, and in the last two in pounds. In the remaining seven counties this fishery is inconsiderable.

On the Canadian side most of the whitefish are caught in gill nets, although some are taken in the pounds south of Goderich during the latter part of May and early in June. The gill net grounds extend from Goderich to Cape Hurd, the best fishing being between Southampton and Stokes Bay. The pound nets at the Duck Islands also catch them, and gill nets are fished extensively in the same region.

The whitefish is rarely taken on the Big Reef or at any other place far from shore.

The movements of the whitefish in Lake Huron are, in general, less definite than in Lake Erie, being confined to shoreward migrations in the spring and fall. These migrations appear to be accompanied by no extensive progress along shore, except at Detour, where the spring run is said to have a general easterly direction, appearing first near Detour, and then passing down the north channel into Georgian Bay. In this region the catch is larger during May and June than at any other period, and, except where the fishery is carried on during the spawning season, this statement holds for the rest of the lake.

Little is known of the whereabouts of the whitefish during summer and winter, but that they are not all in deep water at those seasons is shown by the fact that they are caught in small numbers near Detour in the winter, and off Port Sanilac during the summer.

Spawning.—The spawning of the whitefish takes place almost entirely in the shore waters, principally between November 1st and 25th. No ripe fish are caught on Big Reef, and very few on Spectacle Reef. Spawning grounds are found at intervals on rocky or sandy bottom from Detour to Port Austin, and a small number of whitefish are said to spawn off Port Sanilac. The Canadian fishermen do not admit that there is much spawning anywhere on their shore, but a few fish are known to spawn at Cape Ipperwash, in the vicinity of Southampton, at the Fishing Islands and probably near the Duck Islands. This species sometimes deposits its eggs in depths of only 4 or 5 feet.

Decrease.—When the fisheries first began on Lake Huron, their principal object was the capture of whitefish which were then exceedingly abundant. According to the fishermen their numbers exceeded that of any other species, but it is doubtful if this statement is strictly true.

In all parts of the lake the fishermen are practically unanimous in the statement that the decrease has been very great. At Detour the low-water mark is said to have been reached about 1884; since then there is supposed to have been a yearly increase due to artificial propagation. There is little information as to the exact time of the failure of this fishery at other places, but, with the exception of Detour, the general impression is given that the decrease has continued to the present time.

Statistical evidence concerning the question in United States waters is available for only three years, 1885, 1890 and 1893, when the total catches of whitefish were as follows:—

1885.	1,425,380 lbs.
1890	1,033,158 “
1893.....	1,190,271 “

Compared with 1885, 1893 shows a decrease of about 16 per cent, and with 1890 an increase of 15 per cent, in the gross catch.

Dividing the United States coast into two regions, one embracing the four counties in the vicinity of the Strait of Mackinac, and the other including the rest of the Michigan shore, we obtain the following results, regarding the catch of 1885 as 100.

Counties.	1885.	1890.	1893.
Chippewa, Mackinac, Cheboygan and Presque Isle.....	100	72·6	99·8
All other counties.....	100	72·3	62·7

From the above figures it will be seen that the decrease from 1885 to 1890 was about equal in the two sections, but from 1890 to 1893 there was a further decrease from Alpena county southward, while in the northern four counties the catch was approximately the same as in 1885. The best statistical test of a decrease is a comparison of the average catches per unit of apparatus for the several years for which statistics are available. This is not possible for 1885, as the catches by the several means were not differentiated, and for 1890 and 1893 the records of the pound nets only can be used with any approach to accuracy. In the northern counties, where, as shown above, the total catch has increased since 1890, we find that during the same period there has been a decrease of from 27 to 68 per cent in the average catch per pound net, the corresponding decrease in all other portions of the lake being nearly 17 per cent.

The amount of the catch for each of four years in Canadian waters was as follows:

1880.....	762,000 pounds.
1885	921,543 “
1890....	442,020 “
1894.....	187,000 “

The following table shows the number of fathoms of gill nets, the number of pound nets and the catch of whitefish for each of the same years, computed upon the basis of 1880 as 100 per cent:—

Year.	Length of gill nets.	No. of Pounds.	Catch of Whitefish.
1880	100	100
1885	113	100	121
1890	279	463	58
1894	409	388	26

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It will be noticed that while the pounds in 1885 and 1894 are as 1 to 4, and the gill nets in 1890 and 1894 are in about the same proportion, the catch of whitefish in the same years is as 4 to 1. Notwithstanding, therefore, the quadrupling of the apparatus in the last fifteen years, the total catch has been reduced three-quarters.

There can be no escape from the conclusion that the decrease in this species has continued to the present time.

LAKE HERRING.

Status.—Since 1885 the product and the value of the herring fishery have increased both absolutely and relatively, and in 1893 this species ranked second on both sides of the lake. The pound nets make practically the entire catch, only a very small percentage having been taken by other means in 1893. The extent of herring gill netting in the lake is very small, and on the United States side these nets are used only in Sanilac county. The Menominee nets in Cheboygan and Mackinac counties caught about 10,000 pounds in 1893, but the whitefish and trout nets are altogether too large to mesh this species. Compared with Lake Erie the catch of this lake is insignificant, having amounted to only 2,732,628 pounds in 1893.

Distribution and movements.—The herring is not abundant in the northern parts of Lake Huron, although Mackinac and Cheboygan counties showed a largely increased catch of this species in 1893, more being caught in those counties than in any other locality north of Saginaw Bay. In 1893 the catch on the United States shore was distributed as follows:—

Locality.	Catch.	Percentage of total catch.
North of Iosco county	324,221	11·8
Iosco county and southward	2,408,407	89·2
	2,732,628	100 0

The centre of the herring fishery of Lake Huron is in Saginaw Bay, and over 70 per cent of the entire United States catch is taken in the six counties contiguous to its waters. On the Canadian side the herring are distributed from the head of the St. Clair River to Cape Hurd. South of Goderich they are caught principally in pounds, but northward they are taken entirely in gill nets, the fishery being followed only a short time during the spawning season.

The movements of the herring in Lake Huron are not very well defined. In the spring and early summer there is a migration of a comparatively small body of fish up the St. Clair River. This run, which is caught late in June and early in July in the vicinity of Port Huron and Sarnia, is composed of large fish, resembling those taken in Lake Erie.

In the spring the general run of the small Lake Huron herring comes ashore about the middle of April and lasts throughout May and June, May being the month when they are most abundant. This shoreward movement takes place along the entire margin of the lake, but is most marked in Saginaw Bay and southward. During the latter part of June the shoal water becomes warm and the fish leave, not returning again until the latter part of September. In October they become more abundant, but the best fishing of the year occurs during November, and there is usually an abundance of herring until the pounds are removed toward the end of that month.

From the middle of October until about November 15th, gill netters carry on a fishery for herring in the vicinity of the Ghegheto or Fishing Islands, the fishermen from Southamptom and other Canadian ports making temporary camps along shore, from which to prosecute their calling. This fishery is close inshore and is carried on from boats only.

Spawning.—The spawning run of herring appears to come inshore around the entire margin of the lake, but the most extensive and constant grounds are located in Saginaw Bay and around the Ghegheto Islands. The spawning season is supposed to be mainly from November 5 to 25.

Decrease.—The general opinion of the fishermen is to the effect that the supply of herring has increased on the Michigan shore south of Alpena, and has decreased on the Canadian side of the lake between Sarnia and Cape Hurd. The views expressed respecting the former region are substantiated by the fact that, exclusive of Chippewa and Mackinac counties where few herring are caught, the average catch per pound net shows a steady increase since 1885, amounting to 90 per cent in 1893.

According to the Canadian statistics catches of herring have been made as follows :

1880.....	183,200 lbs.
1885.....	1,220,600 “
1890.....	1,386,700 “
1894.....	478,200 “

The catch of 1894 is greater than that of 1880, but was taken by a much greater amount of apparatus. The intermediate years appear to have been exceptional for fishing on the Canadian shore, not only for the herring, but for other species as well.

Considering the entire length as a whole, it may safely be affirmed there is no evidence of a decrease in the herring supply.

WALL-EYED PIKE.

Status.—The wall-eyed pike held sixth place in the amount, the fourth place in the value, of the catch in United States waters, in 1893. It was fifth in the size of the catch in Canadian waters, in 1894. On the United States side the catch was distributed by apparatus as follows :

Apparatus.	Amount of Catch.	Percentage of Catch.
	Lbs.	
Pounds.....	686,952	90·6
Haul seines.....	30,445	4 0
Fyke nets.....	24,883	3·3
Spears.....	11,812	1·6
Gill nets.....	3,426	0·5.
	757,518	100·0

Distribution and movements.—The wall-eyed pike is local in its distribution, its centre of abundance being in Saginaw Bay and River, where 82 per cent of the total catch on the Michigan shore was taken in 1893. Relatively small quantities are caught on the north shore and near the St. Clair River, but practically none are

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taken elsewhere. It is said sometimes to run into Saginaw Bay and River, in small bodies during thaws in January, February and March, but this run is composed almost entirely of small fish. About April 5 the adult fish come in and pass to the head of the bay for spawning. In this latter locality fishing is good from the time the nets are set until about May 10th or 15th, and after that a few are caught until the first or middle of June, but further down the bay they remain until July. Very few wall-eyed pike are caught in Saginaw Bay after July, but a limited run of small fish enters the bay in the fall.

Spawning.—This species runs into bays, rivers and small streams for the purpose of depositing its eggs. Some schools enter the streams on the north shore, and others the St. Clair River and some of the creeks at the southern end of the lake, but the bulk of the fish spawns either in Saginaw River or in the bay of the same name. Spawning begins early in April and lasts from 10 to 20 days, usually being concluded before May 1st.

Size.—It is stated that the wall-eyed pike caught in Saginaw River average only 4 to 5 ounces each, and that four-fifths of the fall catch in Saginaw Bay weigh less than one pound.

Decrease.—At most places where the fishermen expressed opinions on the subject it was generally agreed that the wall-eyed pike had decreased. This species, however, appears to be subject to greater fluctuations from year to year than are most others of the lake fishes, and although it may be scarce in any given locality for a number of years, it is liable to return suddenly in comparative abundance.

The catch in United States waters in the three years for which we have statistics, including also a small portion of grass pike, was as follows :

1885.....	940,500 lbs.
1890.....	1,483,072 "
1893.....	827,819 "

Nearly the entire catch in these years was made in pound nets, and we find that the annual average catch per net shows a heavy decrease in 1893 as compared with 1885, although the catch was much larger in the intermediate year, 1890, than in either of the others. The erratic behaviour of this species makes it difficult to estimate its present status as compared with the past, except with the use of more complete data than are now accessible, and it is, therefore, impossible to measure the extent of decrease.

STURGEON.

Status.—The sturgeon is of minor importance on the United States side of Lake Huron, where, in 1893, only about 80,000 lbs., valued at about \$2,000 were obtained. On the Canadian side, however, the catch in 1894 amounted to 370,000 lbs., and was exceeded only by those of the lake trout and herring. Prior to 1875 this species had no value and was generally regarded as a nuisance, but the price per pound now paid for it is but little lower than that of the trout.

Distribution and movements.—In 1893 sturgeon were caught in every county on the Michigan shore, with the exception of Alpena, where, however, 50,000 lbs. were obtained in 1890. In 1893, over two-thirds of the entire United States catch was made south of Saginaw Bay, and on the Canadian shore most of the sturgeon are also taken in the southern part of the lake, especially in the pound nets in the vicinity of Sarnia. The bulk of the catch is made during June and July, but a limited number is secured in September. At other seasons the species does not occur inshore, and it is probable that at such times they are scattered over the deeper portions of the lake, where they are occasionally caught in the trout nets.

Spawning.—The sturgeon spawn principally on the sandy bottoms at the southern end of the lake, during June and July, but well developed spawn suitable for caviar is found in them throughout the year.

Decrease.—There is no question but that the sturgeon has undergone a most remarkable decrease since the beginning of the fishery. The catches for the years embraced in the statistical returns for the United States shore were as follows:—

1885.....	215,500 lbs.
1890.....	365,718 “
1893.....	79,553 “

The increase in 1890 occurred in all parts of the lake south of the four counties near the Strait of Mackinac, having been greatest in Saginaw Bay and in St. Clair county. During the same period there was a marked decrease in the catch on the northern part of the Michigan shore. In 1893 there was a decrease along the entire Michigan shore, but the greatest falling off was in Saginaw Bay, where 179,000 lbs. were taken in 1890, and only 8,183 lbs. in 1893. Owing to the nature of the statistical returns it is not possible to show the catch of sturgeon per unit of apparatus, but the general extent of the decrease may be gathered from the decline in the total catch. Most of the sturgeon are obtained in pounds, but there is one seine credited with a large catch in St. Clair county.

The Canadian catches during four years were as follows:—

1880.....	5,000 lbs.
1885.....	347,800 “
1890.....	223,750 “
1894.....	370,675 “

In 1880 there were few seines and no pound nets in use, and practically no sales of this species, which accounts for the small catch recorded. In 1885 there was a great increase in the number of seines; in 1890 the pounds increased and the seines diminished in numbers, and in 1894 the latter were entirely prohibited, their place being taken by additional pound nets. These figures may be taken to indicate that the catch of sturgeon on the Canadian shore has been fairly maintained since 1885.

Gill Nets.

Introduction.—The gill net fishery of the United States side of Lake Huron, in 1893, yielded 3,534,028 lbs. of fish, valued at \$136,714. This represents about 30 per cent in quantity and about 45 per cent in value of the catch by all methods on the Michigan shore of the lake. The species taken, arranged in the order of the size of catch, are lake trout, whitefish, menominee, whitefish, herring, pike, suckers and perch. The last three species enumerated are not the objects of special pursuit by this method, but are taken incidentally in the fisheries for other species.

Trout fishery.—This ranks as the most important gill net fishery of Lake Huron. In 1893 it yielded 3,171,860 lbs. of trout, being 92 per cent of the entire catch of that species and 90 per cent of the total gill net catch in United States waters. It is prosecuted both by small boats, which confine their operations to the vicinity of the shores, and by tugs, which are able to run longer distances and to set their nets in the deep waters and on the reefs in the centre of the lake. The number of nets fished from boats slightly exceeds that fished from tugs, but they catch only about one-half as many fish. No data are at hand to show the exact amount of trout gill netting fished, the statistics making no distinction between the nets of different sizes of mesh, but practically all are of sufficient size for trout and are used for that species during the greater part of the year.

The following table shows the number of tugs of over five tons burden, the amount of gill netting fished by them and the amount fished by boats, in the different counties on the United States side of the lake.

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County.	Tugs.	Total tonnage.	No. of Nets on tugs.	No. of Nets on boats.	Total No. of Nets.
Chippewa.....	3	42 53	232	236	468
Mackinac.....				213	213
Cheboygan.....				260	260
Presque Isle.....				193	193
Alpena.....	3	71 80	812	579	1391
Alcona.....					
Iosco.....	2	18 70	541	303	844
Arenac.....					
Bay.....					
Tuscola.....					
Huron.....	2	19 32	316	784	1100
Sanilac.....				51	51
St. Clair.....	2	52 83	523		523
	12	205 18	2424	2619	5043

In addition to the 12 tugs enumerated, there are several others which, being under 5 tons measurement and not registered, are considered in the statistical returns in connection with the shore fisheries. Tugs from Detroit fish in Lake Huron, and during 1893 took 100,000 pounds of trout, which were not included in the catch of this lake. Several tugs from Potoskey also fish to a considerable extent in Lake Huron, making their headquarters generally at Cheboygan.

On the Canadian side there were 9 tugs and a number of boats engaged in the fisheries in 1894, using altogether 222,650 fathoms of netting. The tugs have their headquarters at Goderich, Southampton, Tobermory and the Duck Islands.

Fishing begins in the spring as soon as the lake is sufficiently clear of ice and continues without interruption until the ice begins to form again in the fall. During the summer the fishery is less active than in the spring and fall, and after 10th November many fishermen abandon it on account of the closing of navigation and the consequent lack of means of shipping the catch. There is a small winter gill net fishery under the ice in the northern part of the lake.

During the spring and summer, fishing is conducted along the entire United States shore north of Sanilac, with the exception of Saginaw Bay, but on the Canadian side there is no fishery at any time south of the Big Reef. In the summer and fall the best fishing is on the reefs, and later in the season in the deep waters to the north of the Big Reef. The United States fishermen cover the entire region to a distance of from 30 to 50 miles from the Michigan shore; the Canadians operate in a similar zone on the other side of the lake, from the Duck Islands to the Big Reef.

Whitefish Fishery.—The catch of whitefish in gill nets is second only to that of the trout, although much inferior to it. On the Michigan shore, in 1893, only 8 per cent of the total gill net catch consisted of whitefish, 160,518 lbs. being taken by boats and 121,251 lbs. by tugs. In the yield of whitefish the gill nets were much inferior to the pounds, the catches being respectively 24 per cent and 76 per cent of the total.

In the northern part of the lake, on the Michigan side, the whitefish gill netting is of little importance and many of the fish taken are incidental to the fishery for trout, most of them being caught during June, July, August and September. It is noteworthy that in this region over 75 per cent of the pound net whitefish are captured, the pound nets in Chippewa county alone taking over 100,000 lbs. more than all the gill nets in United States waters. Alpena county furnished the most important whitefish gill net fishery on the Michigan shore. In 1893, 127,919 lbs. were landed there, the tugs securing two-thirds and the boats the remainder. No whitefish are obtained in gill nets in Alcona, Sanilac and St. Clair counties, nor in Saginaw Bay, but in both Iosco and Huron counties at the mouth of the bay good

catches are recorded, the boat fishery of Huron county being the largest on the Michigan shore.

The bulk of the whitefish gill netting on the United States side is, therefore, found in that portion of the lake south of the Big Reef, north of Saginaw Bay and west of Sand Beach, and even in this circumscribed region the fishing is confined almost entirely to depths of less than 25 fathoms. In the spring the whitefish are taken by both boats and tugs, the latter usually fishing somewhat further from shore than the former. In the fall the fish come near the shore to spawn and good catches are then made on the inshore grounds. There is no fishery for this species on the Big Reef.

On the Canadian side of the lake whitefish are taken in gill nets off the south side of the Manitoulin Islands and along the eastern shore between Bayfield and Cape Hurd. On the eastern shore, Goderich, Kincardine and Southampton are the principal ports from which the fishery is followed, the nets being set in less than 30 fathoms on sandy and muddy bottom, during the months of May, June, July and August.

In the northern part of Lake Huron, on both sides of the boundary line, there is a small gill net fishery for whitefish through the ice. But a few persons engage in this fishery and each man owns only a small amount of netting.

Menominee fishery.—Under this heading is included the catch of several small species of whitefish in the vicinity of the Strait of Mackinac. Three species appear to be represented, namely, the menominee whitefish, *Coregonus quadrilateralis*; the long-jaw, *Argyrosomus prognathus* and the bluefin, *Argyrosomus nigripinnis*. Small specimens of the common whitefish are also said to be taken with them at times. Collectively the gill net catch of these several species on the Michigan shore in 1893 amounted to 37,425 lbs., only a little over 1 per cent of the total yield of the gill nets. Mackinac and Sanilac counties are the only places from which menominees are recorded in 1893. In Sanilac county the catch was very small and probably consisted largely of small whitefish and large herring; and some of the fish recorded from Mackinac county may have been brought from Lake Michigan.

There are no records of the catch of menominee whitefish by gill nets in Canadian waters.

Herring fishery.—The entire catch of herring by gill nets in United States waters in 1893 amounted to only 26,000 pounds, being less than 1 per cent of the total yield of the gill nets during that year. Mackinac and Sanilac counties are credited with the bulk of this catch, 15,000 pounds, being recorded from the former and 7,500 pounds from the latter.

On the Canadian side herring gill nets are fished from the ports of Goderich and Southampton. The fishermen from both places fish them under the ice during the winter, but men from Southampton use them also during October and November. Most of the fall fishery is carried on near the Fishing Islands and thence up the coast to Cape Hurd, the nets being set in extremely shallow water, often barely deep enough to cover them. The fishermen erect temporary stations along shore and it is said that during November, which is the principal season, as many as 40 or 50 boats are fishing in the region above mentioned. Each boat uses from 6 to 12 nets, varying from 240 to 300 feet each in length.

History and quantity.—Gill net fishing on the Michigan side of Lake Huron appears to have been begun in the vicinity of Alpena. In 1835 a few float and stone nets were fished there, and before 1850 this method of fishing had spread along the coast from the Strait of Mackinac almost to the River St. Clair. At first the gill nets were used almost entirely for whitefish and the fishery was confined to shore waters, but after the decrease of that species more attention was given to the trout. This required longer trips at certain seasons of the year and naturally led to the introduction of tugs for fishing on offshore grounds, though sailboats still continued to operate inshore.

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The first fishing tug was built in 1860, but the first authentic record of a tug actually fishing gill nets was in 1874. In 1882 there were at one time 9 tugs fishing out of Alpena, most of them probably being from other lakes. They appear also to have been used occasionally from Cheboygan. The statistics record 7 tugs on the United States side in 1885, and only 3 in 1890. During the next three years this branch of the fishery increased, and in 1893 there were 12 tugs all told, fishing from Detour, Alpena, Oscoda, Au Sable, Port Austin and Port Huron, but those at Detour did not engage in gill netting with the constancy of those owned at other ports.

The amount of gill netting, according to the statistics, underwent a considerable reduction from 1885 to 1890, but the returns for 1893 show an increase in the number of nets, amounting to 129 per cent as compared with 1890 and to 47 per cent as compared with 1885. This increase involved both the boat and vessel fisheries and manifested itself on all parts of the Michigan shore, although it is most pronounced between Alpena and Port Huron, where the gill netting has always been most important. It should be remembered, however, that the tugs from Petoskey fish from Cheboygan county and there has doubtless been a considerable increase in the number of nets fished in that locality, although it would not appear in the statistics.

The number of nets fished during the years in which statistics were taken was as follows;—

1885.....		3,414
1890.....		2,206
1893.....		5,043

It is not possible, from the information at hand, to tell the size of mesh of this netting, but nearly all of it was of a size suitable for trout and whitefish.

Southampton appears to have been the first port on the Canadian shore from which gill nets were fished. This was probably only a short time prior to 1855, when three boats with three men each were fishing from that place. The fishery steadily increased, until about 1882 there were 24 sail boats engaged in it, and coincident with its growth in that locality there was an increase along the other parts of the shore, especially at Goderich. There appears never to have been much gill netting south of Bayfield. There were 33 boats and no tugs on the Canadian side in 1880, 86 boats and no tugs in 1885, 131 boats and 10 tugs in 1890, and 92 boats and 9 tugs in 1894, not including those fished at the Duck Islands at the northern end of the lake. The number of nets shows a steady increase during the years covered by the statistics, the figures being as follows at four different periods:—

1880.....		54,417 fathoms
1885.....		61,253 “
1890.....		152,200 “
1894.....		222,650 “

Rigs.—The trout nets are about 15 meshes or 6 feet deep, the whitefish nets from 18 to 20 meshes and the herring nets from 40 to 60 meshes deep. The length varies considerably in different places, but, in general, it may be said that the nets are now fished in greater lengths than when they were rigged with floats and stones.

On the United States side the tugs usually have three gangs, or from 15 to 18 miles, in the water at all times. In Canadian waters it is the custom to fish from each tug about 20 miles of trout and whitefish nets in 4 gangs, or about 6 miles of the large trout nets in 3 gangs. The boat rigs are about one-half as long as those of the tugs fishing in the same locality, and the nets are separated into 3 or 4 gangs. At the Fishing Islands the boats use from 6 to 12 herring nets apiece, each net varying in length from 240 to 300 feet.

Size of mesh.—Three classes of nets, as regards the size of mesh and thread are used in Lake Huron, namely, a large mesh for the fall trout, a medium mesh for trout and whitefish, and a small mesh for herring and menominee whitefish.

The large mesh nets, of stouter thread, are used during September and October. On the Michigan shore, the mesh measures from 5 to 5½ inches, and in Canada, from 5½ to 6 inches.

The medium mesh nets are practically the only ones used for trout as well as whitefish, except during the fall. The mesh varies in size from 4¾ to 4¾ inches, most of the fishermen using 4½ inches.

The herring nets used at Port Sanilac and on the eastern shore of the lake, have 2¾-inch mesh, and the menominee nets in the vicinity of the Strait of Mackinac, a 3-inch mesh.

Time out and condition of catch.—In most places, in the spring, the nets are left to fish for five days before being lifted, but during summer, it is the practice to leave them out only three days on the United States side, and four days on the Canadian. The sailboats usually keep their nets in the water one day less than the tugs in the same region. In general, therefore, the fish are permitted to remain in the gill nets for a much longer time in Lake Huron than in Lake Erie. Notwithstanding this fact, however, owing to the colder water and the firmer character of the fish, there is not much complaint of the quality and condition of the gill net catch in this lake. When no untoward circumstance, such as storms, prevents the lifting of the nets at the regular time, there are comparatively few fish unfit for market, although there are usually some too soft to be transported without salting.

Losses by storms.—A smaller proportion of nets is lost through storms than in Lake Erie, the principal damage to the gear resulting from the cutting of the nets on the rocky bottom at the north, or having them filled with dirt, clinkers and drifting snags at the south. Nets fished in shallow water are more liable to these mishaps or to be carried away by the currents than those set in the deeper parts of the lake, to which not even the most violent disturbances can penetrate, and, consequently, the loss of nets is greatest in the southern portion of the lake, along the shore between Goderich and Cape Hurd, and in the shoal water fisheries in the vicinity of the Strait of Mackinac.

In certain parts of the lake considerable damage is done to the gill nets by accumulations of bark derived from the logs rafted from the Canadian shore to the United States. The grinding of the logs against one another during rough weather, dislodges not only the outer bark, but large quantities of the fibrous inner bark as well. The nets collect this material, and when taken ashore to dry, become rolled up and ruined by the curling of the fibre entangled in the thread. It is impossible to remove this material by any process, such as is efficacious in cleaning off the slime, for the chemical composition of the fibre resembles that of the thread, and any treatment which would remove the former would destroy the latter.

POUND NETS.

History and quantity.—Pound nets were used in Lake Huron as early as 1854, but they increased more slowly than in Lake Erie, and even at the present time the fishing stations are much scattered. This is due partly to the sparsely settled shores and partly to the absence of fish and the unsuitable character of the bottom in many places.

Little is known respecting the history of the pound nets on the Michigan shore prior to 1885. Regarding this shore as a whole, we find that there has been a steady increase in the number since 1885, and in 1894 there were 603 in all, an increase of 30 per cent as compared with 1885, and of over 9 per cent as compared with 1890. This increase was most marked on the north shore, in Cheboygan county and at the south near Port Huron. In Saginaw Bay there was but little change, while between Hammond Bay and Saginaw Bay, comprising Presqu Isle, Alpena, Alpena and Iosco counties, there was a marked decrease. These changes are shown in the following table:—

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NUMBER of pound nets in the United States waters of Lake Huron.

Region.	1885.	1890.	1894.
North shore (from St. Ignace to Drummond Island, including north shore of Bois Blanc Island)	41	53	140
Cheboygan County	4	25	41
Presqu Isle, Alpena, Ancona and Iosco counties	83	71*	28
Saginaw Bay	320†	367	352
Saginaw Bay to St. Clair River	14	36	42
	462	552	603

* Decrease in Alpena County and increase in Iosco County.

† Estimated.

About 1882 the first pound nets on the Canadian side of the lake were built south of Goderich and at the Duck Islands. At the extreme southern end of the Canadian shore none were licensed before 1894, but in that year seines were prohibited and the fishermen were permitted to use pound nets instead. In 1894 there were 27, fished in stands of one each, between Sarnia and Lakeview, but no others were used on the eastern shore.

Description.—The pound nets are of the same general construction as in Lake Erie. The length of the leaders varies somewhat with the location and the slope of the bottom; in Saginaw Bay and near Sarnia they are usually between 60 and 85 rods long, while most of those elsewhere are between 35 and 60 rods long. The majority of the cribs are between 26 and 30 feet square, but there are a few as small as 18 by 20 feet and as large as 44 feet square.

The depth of water in which the cribs are set varies with the character of the coastal platform. In Saginaw Bay the great majority are in from 8 to 15 feet of water. South of Saginaw Bay on both sides of the lake most of the nets are in from 20 to 30 feet, and in the northern region in from 25 to 50 feet, the maximum being 90 feet.

On the Canadian side the nets are all set singly, but on the Michigan shore there is a tendency to use as many pounds in a string as possible. The maximum in this respect is reached in Saginaw Bay, where there is one string of twenty-two nets, one of seventeen and two of ten nets each. All others contain less than nine and over half of them between three and five each. In no other part of the lake are there more than five in a string, and in most places the number does not exceed three.

From Detour to St. Ignace and from Mackinaw City to Hammond Bay the mesh in the cribs varies from 2 to 3½ inches, the latter size being the most common. From Hammond Bay to Oak Point most of the nets have the mesh 2½ inches in the front and sides of the crib and 2 inches in the back. From Oak Point to Port Huron the usual size is 3 inches in the front and sides and 2½ inches in the back. The leaders are commonly of 6-inch netting, but a few fishermen use 5, 7 or 8-inch mesh. Most of the hearts and tunnels measure 5 inches, but a few nets have 4 and 4½-inch mesh.

On the Canadian shore the mesh in the cribs is 2½ inches, that used in the other parts of the nets being of the same general dimensions as on the Michigan side.

Seasons and Catch.—In most places on Lake Huron the nets are in use only during the spring and fall, but these seasons are not so sharply defined and uniform as in Lake Erie. There is no legal close time on the Michigan side of the lake, and where a summer close season is observed it is because fish are few and the water is so warm as to injure the twine.

Owing to the difference in dates of the beginning and ending of fish operations in different localities the subject of the seasons and catch can best be described separately for the several regions in which pound nets are employed:—

Detour to St. Ignace and Mackinaw City to Hammond Bay.—Along this stretch of shore, embracing a portion of each peninsula, the nets are set sometime during May. In the vicinity of Detour they are generally removed about July 1, but it apparently scarcely pays to leave them in after June 1. Further west and on the south shore there is usually good fishing until August, when the twine is taken up, tarred and repaired and reset in September, although some of the fishermen do not fish again until the following spring. The nets fished in the fall are left in until some time in November.

In those pounds which are set early there is often a good catch of wall-eyed pike about the beginning of May. The heaviest runs of whitefish occur during May and June and there are sometimes fair catches in July, after which this species gradually diminishes. With the exception of the pounds in Potagannissing Bay, there is a small but continuous run of trout until September, but in that and the following month good runs occur; fewer are obtained in November than at any other time. In August and September there are usually good runs of wall-eyed pike, and a few are taken throughout the entire fishing season. Grass pike and sturgeon are caught principally in the warmer months. In the order of their abundance the several species rank about as follows: whitefish, trout, wall-eyed pike, grass pike, sturgeon, suckers, black bass and perch. The whitefish represent at least three-fifths of the total catch, and many of them are so small as to make their capture a menace to the fishery.

Hammond Bay to Alabaster.—In this region the practice varies; at some places the season is continuous from spring to fall, at others the pounds are fished from about May 15 to July 15, and from September 1 to between November 15 and 25, while at still others only the fall season obtains.

In the spring the pounds catch whitefish, trout, wall-eyed pike, herring, sturgeon, suckers, etc. The best fishing is in the fall, when about the same species are caught. Good lifts of wall-eyed pike are made during September, and from that month to November the best whitefish catches are obtained. The herring are taken principally late in the fall, and in those pounds which are fished throughout the season, most of the trout are caught in the spring.

Saginaw Bay.—Here the pound netting is done during spring and fall only. During July and August the shoal waters become warm and most of the fish leave for deeper and cooler parts of the lake. In the spring the nets nearer the head of the bay are the first to be set, while in the fall those near the lake are the first put in order. In an average season most of the pounds are set about April 15 and removed by July 1. In the fall they are set between September 1 and 25 and are finally removed about November 25.

The spring fishery is principally for wall-eyed pike and herring. Most of the herring are caught during May, and after June 1 they practically disappear until fall. The wall-eyed pike generally run most abundantly from about May 20 to June 20.

The catch in September consists of a few herring and inferior fish, perch, suckers, etc. The herring come in numbers during October and stay until the nets are removed, constituting the bulk of the fall catch, although a few whitefish and lake trout are usually caught in the pounds near the mouth of the bay.

Saginaw Bay to St. Clair River.—In the spring the pound net season begins about April 15 and ends about July 15. In the fall it lasts from September 1 to December 10.

In the vicinity of Port Huron there is an important fishery for the sturgeon. It is by far the most valuable species, but herring and wall-eyed pike are of some importance, and few perch and suckers are also caught. The spring fishery over the northern portions of this shore is not very profitable.

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The herring are caught in great numbers everywhere during the fall, and in the places more remote from the St. Clair River the profits of the fishermen are derived almost entirely from this species. A few whitefish, trout and pickerel are also taken.

St. Clair River to Goderich.—Stake driving commences about May 1 and the twine is usually in place about May 15. The nets are removed for repairs during August, and are usually out of the water from 2 to 6 weeks, during August and the first half of September. Owing to the exposure of this shore many of the nets are not fished after November 1.

In the spring the sturgeon is the most important species, but wall-eyed pike, herring and a few perch are also caught. During May whitefish are taken in the nets farthest from the St. Clair River. The sturgeon are obtained principally during June. During the summer the fishery is not very profitable, and in the fall the herring is the only fish of importance.

Saginaw River.—It is impossible in this connection to distinguish between the pound nets and the fyke nets or "gobb'ers." Pound nets were first introduced into the river about 1870. The first fyke nets were provided with wings instead of leaders, but proving less profitable than the pounds they were but little used. About 1880 the present type of fyke net was introduced, and was found to be equal to the pound net in efficiency. It is similar to the pound net, except that the pot is made of the same pattern as in the Lake Erie fyke net.

In 1885 there were about 120 pound nets and 425 fyke nets, a total of 545 pieces of fixed apparatus. In 1890 the statistics show a great reduction in the number of fykes; the fishermen state that the number was about equal to that in 1894, when it was estimated that there were 300 nets all told, of which 80 were above Saginaw City. There was supposed to be about the same number of each kind. In view of the uncertainty of the returns for this river it is impossible to make comparisons, but there has probably been a reduction since 1885.

The nets are allowed by law to extend from each shore a distance equal to one-third the width of the stream. The leaders are from 5 to 9 rods long, with a 5 or 6-inch mesh, and the heart is 40 to 50 feet long, with a 4-inch mesh. The pots of the pounds vary from 14 to 18 feet square, but many of them are 14 feet by 18 feet. Their depth varies from 12 to 16 feet, in accordance with the depth of the water. The pots of the fyke nets are usually about 20 feet long, and, like the corresponding portion of the pounds, have a mesh ranging from 2½ to 3 inches.

The catch consists of about equal numbers of perch and suckers and a much smaller number of wall-eyed pike taken in this connection are of very small size. The following represents the catch of the principal species:—

Suckers.....	279,691 lbs.
Perch	272,347 "
Wall-eyed pike.....	24,823 "
Catfish and bullheads.....	21,134 "

Interference with navigation.—In most parts of Lake Huron there is little complaint of the interference to vessels by the pound nets, as the latter are remote from the usual courses of navigation, and the water deepens too rapidly to permit of their extension far from shore. In Saginaw Bay and the southern part of the lake, near the St. Clair River, there is some complaint, and in the former region gaps are left for the passage of vessels through the longer strings. At Port Huron and Sarnia the pound net fishermen complain that their nets are injured by boats, sand scows and rafts.

SEINES.

Seines were first used on the United States side of the lake about 1841, and were introduced into other localities soon afterwards. In most places the seine fishery

from various causes proved unprofitable and difficult, and Sagnaw Bay appears to have been the only place in which it became at all considerable. Prior to about 1880 there were a number of seines in operation in the vicinity of Bay Port, Saganin River, Pine River and other localities in the vicinity, but the time mentioned the more profitable method of fishing with pound nets became so general that there was no longer room nor inducement to haul the seines.

Port Huron is the only place where seines are fished at the present time, one having been employed in 1894. The catch was reported as consisting of 23,000 pounds of sturgeon and 30,000 pounds of wall-eyed pike.

From 1860 to 1894 seines were the only form of apparatus employed in the fishery between Sarnia and Point Harris. In the latter year they were prohibited by the Canadian government and licenses for pound nets were issued to the fishermen in their stead. Although the fishermen opposed the innovation, they are now satisfied with the change, a year's experience having demonstrated that more fish can be taken in the pounds than in seines. The seines were 75 to 30 rods long, the mesh measuring $2\frac{1}{2}$ inches in the bunt and 5 inches in the wings. In the spring the season was usually from about May 25 to July 1, the catch consisting principally of sturgeon and wall-eyed pike. The fall season was between September 15 and November 20, the only species taken in considerable quantities being the herring. The objectionable feature of this fishery was the capture of considerable numbers of small wall-eyed pike. It was for this reason that the Canadian authorities prohibited the seines, but it is doubtful if the pounds are much preferable in this respect.

In the early history of the fishery, when seines were used between Southampton and Cape Hurd, considerable numbers of whitefish were caught upon the spawning grounds during the fall, and it is generally considered that the damage thus caused was considerable.

OTHER METHODS.

The use of hooks and lines and of spears is not extensive in Lake Huron. Trout and catfish are the only species taken by the former method and wall-eyed pike, perch and suckers by the latter. There is some sport fishing for lake trout and black bass, but there appears to be no conflict between the sportsmen and the commercial fishermen.

SUMMARY OF CONDITIONS.

From a study of the facts set forth above we have arrived at the following conclusions:—

There has been a vast decrease in the abundance of the whitefish in Lake Huron, and this decrease has continued unchecked to the present time, the same being due to a complication of circumstances. The location of the most extensive fishery for this species has varied from time to time, and it is significant that during any given period of which we have knowledge, the region of the greatest fishery, whether by gill nets or pound nets, has been the region of greatest decrease.

It is impossible to say whether or not the amount of apparatus alone, unaccompanied by other abuses, would have induced the decrease noted. There is no doubt that considerable harm is done by the capture of small whitefish in the pounds, and perhaps to some extent in the gill nets fished ostensibly for menominees. Along the north shore on both sides of the boundary line the catch of small whitefish of inferior value to the fishermen, but of vast consequence to the fishery, is an evil of the pound net fishery which requires correction.

A considerable proportion of all the whitefish taken in the lake are caught during the spawning time, when they are close inshore and readily accessible, and the facility with which they may be taken at such times is probably, to some extent, responsible for their decrease. The discharge of saw-dust into the water of streams

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tributary to the lake and adjacent to whitefish grounds, and the more recent practice of rafting logs from Canada to the United States has, no doubt, had its effect on the whitefish. The bark dislodged by the churning and grinding of the logs in bad weather has caused in places a more or less dense mass of matter upon the bottom, which not only renders the spawning grounds unsuitable for the deposit of eggs, but must also destroy a considerable proportion of the bottom life upon which the whitefish depends for food.

There seems to be no basis for the theory, sometimes advanced, that the decrease in the whitefish has been due to an increase in the lake trout and wall-eyed pike. It is impossible to determine whether there was any increase in either of those predaceous species before 1885, but in both there has probably been a slight decrease since the year mentioned, notwithstanding which the falling off in the whitefish has been unchecked.

Next to the whitefish the sturgeon has shown the most important falling off. This has been very large since the beginning of the fishery and on the Michigan side of the lake it has continued to the present time. On the Canadian shore, in the vicinity of Sarnia, the catch of sturgeon was fairly well maintained from the beginning of the fishery in 1880 until 1894. During that period it was carried entirely on by means of seines, but in the year last mentioned pound nets were substituted and, if the history of the fishery elsewhere is to be repeated here, we should expect a decrease henceforward. There is no doubt that throughout the Great Lakes region the decrease of the sturgeon is due chiefly to the pound net fishery, aided by the practice of catching small individuals which are sold for half price and tersely called "halves" by the fishermen.

During the period for which we were able to acquire information there appears to have been but little decrease in the trout. The large shoal-water variety caught in the fall has apparently fallen off to some extent, but the deep-water form exists in apparently undiminished numbers. The immunity of this species from the effects of the various agencies which have decimated the whitefish is, no doubt, due to its habits and distribution. It is less gregarious than the whitefish, and, instead of being confined to the coastal-platform, it has a lake-wide distribution and an apparently wide individual range of movement. It apparently seeks its food at all depths and finds it in considerable variety and is, therefore, not much affected by the pollution of the bottom. Although the gill net fishery for this species is quite extensive, we have failed to note any serious effect upon its abundance. Young fish are sometimes caught in the gill nets, but as they usually become entangled by the teeth no remedy suggests itself.

Concerning the wall-eyed pike we have been unable to arrive at a satisfactory conclusion. The behaviour of this species is so erratic that the question of an increase or a decrease is difficult to establish with any degree of certainty, but we are inclined to believe that there has been some decrease in its abundance since 1885. It is caught principally in pound nets in Saginaw Bay and the southern end of the lake where very large numbers of the young are obtained at times. The same difficulty occurs in Lake Erie, under which heading the subject is considered at some length.

Taking the entire lake into consideration there is no evidence of any falling off in the herring. There are no abuses connected especially with this fishery.

RECOMMENDATIONS.

Pound nets.—A reduction in the number of pound nets in some places, especially in the northern part of the lake and probably also in Saginaw Bay, is called for.

The recommendations made under pound nets in Lake Erie with respect to the length of leaders, the separation of individual nets in the strings by gaps, and their distance apart are considered to be applicable also to Lake Huron. It is recommended that in Saginaw Bay not more than six pound nets be allowed in a string, and elsewhere in the lake not more than three.

North of a line drawn from North Point, Mich., to Clark Point, Ont., the mesh in the cribs of all pound nets should measure not less than four inches in extension, after shrinkage, and south of said line, not less than $2\frac{1}{2}$ inches. This would provide for the use of only a large mesh in that part of the lake where the whitefish is the most important species and where the young are being captured in undue quantities, and would permit the taking of herring and other small species in those localities where they are now mainly fished for. In the latter case the proposed mesh is also larger than the one now employed, and would, perhaps, serve to liberate a certain proportion of the undersized wall-eyed pike, which are at present a conspicuous feature of the catch.

The use of pound nets during November should be prohibited north of the line above defined, in order to provide a close season for whitefish.

All pound net stakes should be removed from the water within thirty days after the close of the fishing season.

Gill nets.—The mesh in all gill nets should measure at least 5 inches in extension, except that nets of $2\frac{3}{4}$ -inch mesh might be allowed to be fished on the Canadian shore between Sable River and Cape Hurd from October 15 to November 1 for the capture of herring, which at that season do not appear to be associated with young whitefish in that locality.

During November it would be expedient to prohibit fishing by any gill net having a smaller mesh than 6 inches, which would serve in large measure to protect the spawning whitefish.

The use of any gill net within $\frac{1}{2}$ mile of any fixed net should be prohibited.

The mesh in gill nets used for the capture of sturgeon should measure at least 11 inches in extension.

Fyke nets.—The mesh in the bag of fyke nets should measure at least $2\frac{1}{2}$ inches in extension. The number of these nets should be restricted in accordance with the capacity or requirements of each region in which they are employed.

Seines.—The dimensions of seines and the size of mesh therein should conform in each instance to the conditions under which they are employed. The mesh should, in all cases, be sufficiently large to permit the escape of undersized fish, and the number of seines as well as the manner of their use should be properly restricted in all places. It should be prohibited to fish seines on or about the spawning grounds of any of the important fisheries, or in any place where their employment would be unduly harmful.

Naked hooks for sturgeon.—The method of taking sturgeon by means of naked hooks or grapnels should be prohibited.

Spears.—The use of spears for taking fish of any kind should be prohibited.

Sturgeon.—All sturgeon measuring less than 4 feet long, by whatever means taken, should be returned alive to the water.

Pollutions.—The throwing into the water of fish offal, including dead fish taken from the nets, of city garbage and of all other substances deleterious to fish life should be prohibited. Steps should also be taken to prevent injury by the waste from saw-mills and from manufacturing establishments of all kinds both along the shores and in all tributaries containing spawning grounds of important fisheries. It is recommended that in connection with all harbour improvements, and other works of that character, due precaution should be taken in disposing of the material obtained by dredging, etc., to prevent injury to any fishing grounds.

Propagation.—A continuance of the joint efforts to increase the supply of whitefish and lake trout through the agency of artificial propagation is recommended.

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GEORGIAN BAY.

DESCRIPTION OF THE BAY.

Georgian Bay is entirely bounded by Canadian territory, except at the extreme western end of its north channel. From the foot of the bay near Collingwood to the junction of the north channel with the St. Mary's River, it covers a distance of about 225 miles, while its greatest width from the mouth of French River to the junction of the bay with Lake Huron, north of Cove Island, is 54 miles. It is so cut up with islands, especially on its east and north shores and through the north channel, that the extent of its fishing area is difficult to estimate. These islands, numbered by thousands, are of all sizes, from Grand Manitoulin, with a length of 70 miles and a width of 25 miles, to the merest rocks just showing above the surface. The bay proper has an average depth of 25 to 40 fathoms, the greatest depth, about 90 fathoms, being found close offshore in the south-western corner. The water is deepest towards the south shore and shoals gradually towards the north. The deep water mentioned above occupies only a limited area, practically the whole bay being fished. In the north channel the average depth does not exceed 20 fathoms. At certain seasons it is the custom of the fishermen to abandon the mainland stations, and to operate from the islands out in the bay, the principal ones resorted to for this purpose being the Bustards, Squaws and Minks. The extensive fishery carried on from the Duck Islands, situated at the northern end of Lake Huron, is usually associated with those of Manitoulin Island and Georgian Bay. The principal mainland stations for the southern and eastern part of the bay are Wiarton, Owen Sound, Collingwood, Penetanguishene, Waubashene and Byng Inlet; and for the northern part, Killarney, Round Island, Gore Bay and Thessalon.

IMPORTANT FISHES.

Six species of fishes are enumerated in the statistics of Georgian Bay, the variations in the relative annual catch of these at five years intervals having been as follows:—

	1870.	1875.	1880.	1885.	1890.	1894.
1.....	Whitefish.	Trout ...	Whitefish.	Trout ...	Whitefish.	Trout.
2.....	Trout ...	Whitefish.	Trout ...	Whitefish.	Trout ...	Whitefish.
3.....	Wall-eyed pike.	Herring...	Herring...	Sturgeon .	Wall-eyed pike.	Wall-eyed pike.
4.....			Wall-eyed pike.	Wall-eyed pike.	Sturgeon .	Sturgeon.
5.....				Herring...	Herring...	Grass pike
6.....				Grass pike	Grass pike	Herring.

Whitefish.—The records of the Canadian inland fisheries show that a larger catch of whitefish has been made in the Georgian Bay than in all the Canadian waters of the remainder of the great lakes system combined. The yield has been more constant, and, in spite of the extent of the fishery and the appliances used, it is only within the last few years that any decided decrease has been shown. The catch reached its zenith about 1890; it remained about the same up to 1892, though the amount of gear used had more than doubled. Since this last date it has fallen off steadily, though the amount of gear employed has been greatly increased. White-

fish are found all over the Georgian Bay and north channel, and they follow here the same shoreward migrations in the spring and fall that they do in the other inland waters. The fishery begins as soon as the ice is clear of the shores, generally some time in May, earlier or later as the seasons vary. During May and June the gill nets are set not far off shore in shoal water, but as the season advances the fish move into deeper water or farther offshore. The offshore fishing lasts through July and August and part of September, when the shoreward movement of the fish begins, culminating with the close of the season at the end of October. Up to 1892 the catch of whitefish was usually greater than that of trout, but since that date the whitefish have fallen off, and now more trout are being taken. Many spawning grounds are known to the fishermen among the islands and on the offshore reefs, the principal ones being about the Western Islands and Bustards and on the reefs off the Squaws. The spawning season extends through the month of November.

Trout.—The trout have certainly not decreased to anything like the same extent as the whitefish. Fishing for this species begins about the same time as for the whitefish, but during the spring and early summer the proportion of trout taken is not so great, while after September the most of the fish taken in the gill nets are trout. Fishermen claim to recognize two classes of trout, one a smaller fish caught on the offshore reefs and in the deeper water about them, the other a much larger fish always taken inshore. Trout are not as abundant in the north channel as they are south of Grand Manitoulin Islands and around the Ducks. The spawning season is everywhere said to be considerably earlier than that of the whitefish, and the offshore trout are reported to spawn earlier than the larger fish found inshore. The spawning grounds are distributed all round the shores of the bay among the islands, and on the outer reefs and shoals. Trout are mostly caught in the gill nets, comparatively few being taken in the pounds.

Wall-eyed pike.—When seines were used, the best fishing for wall-eyed pike was made early in the spring, near the mouths of the rivers; in many places this seining was done under the ice, the fish being then on their way into the rivers to spawn. An extensive fishery of this kind was carried on at the head of Nottawasaga Bay and at the Waubashene. At the present time wall-eyed pike are mostly taken in the pounds in the north channel. These fish are rarely caught in the gill nets when fished offshore, but during the spring and fall, and particularly in the latter season, when the gill nets are being used inshore, a considerable proportion of wall-eyed pike is obtained by that means. The wall-eyed pike are distributed all along the coast, but are most abundant in the neighbourhood of the large rivers which discharge into the bay and north channel. Large catches are known to have been made in the trap nets which have been fished illegally among the islands on the eastern shore of the bay. The pounds fished in the north channel take a fair amount, but not so many are caught in those set off the south shore of Manitoulin Island and the Ducks. The spawning season of this species is said to be during the latter part of April and the early part of May. As pound nets are not fished in the Georgian Bay proper, and the attention of the fishermen is almost entirely paid to the trout and whitefish, there is really no very extensive fishery made for the wall-eyed pike over the greater part of the bay, and no decrease in the abundance of this fish has been detected.

Lake herring.—This species is abundant all over the Georgian Bay region, but as, until quite recently, there has been no falling off in the fishery for trout and whitefish, no inducement existed to engage in the herring fishery, particularly as the herring taken in the bay are small in size, not averaging over a quarter of a pound each in weight. No fishing is done for them in the spring or summer, at which seasons they are not found inshore, but they are caught to a small extent by means of gill nets in October and November, when they are in shoal water.

Sturgeon.—In the early days sturgeon were very abundant in the Georgian Bay and north channel, particularly in the shoaler bays into which certain of the large rivers discharge. Here as elsewhere they had no commercial value and

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were simply rolled out of the seines and destroyed as a nuisance. At present they are mostly taken at the head of Nottawasaga Bay and at Grande Batture. As far as we have been able to ascertain, the only methods by which they have been taken in this region is by means of seines and pounds, gill nets and set-lines never having been tried, certainly not on any large scale. The returns indicate that a great decrease in their abundance has occurred, as shown by the three annual catches given in the following table:—

1885	478,000 lbs.
1890.....	127,050 "
1894.....	90,265 "

Black bass.—This game fish is not by any means abundant in the Georgian Bay region. A good deal of sport fishing is said to be carried on by summer visitors about Waubashene, and among the islands north of that place, but elsewhere on the northern shores of the bay and along the north channel, bass are seldom or never seen. They have never been taken in the nets fished for whitefish and trout, and form no part whatever of the commercial catch.

CAUSES OF DECREASE.

For many years the Georgian Bay has been one of the principal sources of the market supply of whitefish, as already stated, and the fishery has here been carried on with more vigour and enterprise than anywhere else in Canadian fresh waters. Whitefish and trout are found over the entire area of the bay and north channel, and furnish almost the sole object of the fishery. Prior to 1885 the amount of apparatus employed had not varied much for about 20 years, and the output has been constant. As, however, the whitefish supply from other sources began to fail, increased efforts were put forth by the fishermen of the bay to meet the demand, fishing tugs were more largely employed and the amount of gill netting was greatly increased. As the result of this, we find that between 1885 and 1890 the quantity of whitefish caught was quadrupled. The fishing kept up for a couple of years after 1890, the amount of gear being steadily increased, but here, as elsewhere, the thing had been overdone, and in 1893 and 1894 we find a sudden drop in the catch. The following table shows the amount of apparatus in use at intervals of five years beginning with 1870, together with the catch of whitefish, trout, herring and wall-eyed pike at the same times:—

Year.	No. of fish- ing tugs.	No. of boats.	Gill nets, fathoms.	No. of pounds.	Whitefish.	Trout.	Herring.	Wall-eyed pike.
					Lbs.	Lbs.	Lbs.	Lbs.
1870			298,049		990,000	723,000		41,000
1875	6	264	431,174		2,346,800	2,551,400	53,800	
1880	9	166	405,619		1,042,000	1,001,800	12,600	10,400
1885	15	253	380,163	62	1,421,160	3,369,860	187,600	353,442
1890	23	256	941,600	29	5,498,800	3,496,240	78,400	635,150
1894	32	345	1,086,715	62	2,509,436	3,583,607	263,400	402,610

Reports since received show that the decrease has continued in 1895 and 1896. For several seasons back complaints have been made by all who handle Georgian Bay whitefish at market, that the fish have been undersized. This sudden and alarming decrease in the catch of whitefish has been due mainly to overfishing with gill nets, although the returns show that 1,086,715 fathoms of gill net were licensed in 1894, it is everywhere admitted by the fishermen that much more than that

quantity was being fished. The great bulk of the whitefish is caught in the bay with gill nets, fished by boats which operate from the various stations on the mainland or from the islands, about which the summer fishery is carried on. The nets are supposed to have a $4\frac{1}{2}$ -inch mesh.

That the depletion has been caused by the excessive use of this class of nets is evident from the fact that no other method of fishing for this species has been here employed; and if the whitefish now shipped to market are undersized, as they undoubtedly are, this can only be because the mesh in use is too small. In the north channel pound nets, as well as gill nets, are fished, and the blame for the failure in this particular region must be shared by the two methods. The gill net fishery in the north channel has not been as extensive as in the bay. The decrease there evidently began about 1885 when areas were licensed without regard to the number of pounds fished or the size of their mesh. Fishermen in all parts of the region agree in saying that to the extensive and wasteful fishing by this means then carried on in the north channel, on the south side of Grand Manitoulin and at the Ducks must be attributed the falling off in both whitefish and trout. When this system of licensing areas was abolished the number of pound nets fished was reduced, as is shown by the statistics for 1890 in the above table. The number has, however, been again increased.

As the species taken in these pounds are whitefish, trout, wall-eyed pike and sturgeon, there can be no object in using a small mesh in the pot, such as is required when the catch consists in great proportion of the smaller grades of fishes. We were present at Detour, Michigan, when various parcels of fish from some of these pounds were brought there to be marketed, and can speak of our own knowledge as to the condition of affairs existing. The following table shows the weights of four lots of whitefish:—

Lot No. 1	consisted of	65 fish,	weighing	100 pounds.
" 2	"	74	"	100 "
" 3	"	74	"	100 "
" 4	"	59	"	60 "

The average weight of the fish in the entire shipment was $1\frac{1}{2}$ pounds, but there were a great many weighing only from $\frac{1}{2}$ to $\frac{3}{4}$ pound each. The other species represented were trout and wall-eyed pike.

Most of the Georgian Bay fishermen claim that there has been no decrease in the trout, and the returns do not show that there has been, but a much larger outfit is required to maintain the catch. The trout are taken on the same grounds as the whitefish, and generally with the same nets, though some men use a stronger and larger meshed net. The same complaints are made regarding the trout from the bay as about the whitefish, namely, that they are too small to bear transport and be handled profitably. Large quantities of undersized trout are undoubtedly being sent to market from both the Georgian Bay and north channel, and it is only by the capture of these sizes that the volume of the catch is being kept up. They are obtained to some extent in the pounds, but mainly by the gill nets.

It is well understood that some small trout are always taken in the gill nets, no matter how large the mesh may be, as they get caught by the teeth and become entangled in the net, but the proportion of fish thus taken is always small. In the case of the Georgian Bay, however, the small trout constitute an important part of the supply and are difficult to dispose of, as they invariably reach the market in poor condition. The bulk of these undersized trout are secured in the smaller meshed gill nets, fished for whitefish.

Among the minor causes to which we may attribute the failure in the whitefish and trout is the deposition of bark from the rafts of saw logs which are constantly being towed across the bay and north channel from some of the larger rivers, especially French River and Spanish River, to the milling ports on the Michigan side of Lake Huron. The grinding of the logs against each other in the booms sets free the fine inner bark which settles on the bottom, forming a thick covering. When

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this happens to occur on the spawning or feeding grounds of the fish there can be no doubt that a serious injury is caused.

Some of the in-shore spawning grounds are said to have suffered from the saw-dust and other mill refuse which has been carried down the streams from the mills; but little injury can have been done in this way, as many of the spawning grounds are offshore or remote from the neighbourhood of the mills, and of late years the regulation prohibiting the letting adrift of this refuse has been well observed. The fishermen seem to have been careful about the disposition of refuse fish and fish offal and have generally landed it on the rocks. As the shores of the bay are not extensively settled other pollutions cannot have occurred.

FISHING METHODS.

General Account.—The principal methods of fishing are by means of pound nets and gill nets. Pound nets are not allowed to be fished east of a line running from Cape Hurd to Spanish River; that is to say, they are only permitted in that part of the north channel west of Spanish River, on the south side of Manitoulin Island west of the line before mentioned, and at the Duck Islands. They are prohibited in the bay proper. This arrangement was made at the request of a large majority of the fishermen of the region. In all 62 pound nets were employed in 1894. Gill nets are fished over all parts of the bay, the quantity licensed in 1894 having been 1,086,715 fathoms, operated from 32 tugs and 345 sail boats. Seines were at one time extensively used in some of the bays and channels and near the mouths of some of the rivers, but they are now prohibited. Fyke nets, although permitted, have never been employed except to a very slight extent. Trap nets, small submerged pounds with a covered pot, are not permitted, but they have been extensively fished by poachers, and whenever found they have been confiscated. The manner in which the bay, particularly along its eastern and northern shores, is cut up with channels, inlets and deep creeks, facilitates the use of these engines and makes it difficult to detect them. Trawl line fishing and hook and line fishing are not practiced.

Gill nets.—The gill nets used in Georgian Bay are similar to the trout and whitefish nets of Lake Huron, and the rigs employed are about the same. The most of them have a 4½-inch mesh, but a few of 6-inch mesh are fished at certain times for trout only.

The gill net fishery in Georgian Bay began about 1835 or 1838. It was prosecuted from canoes and small boats of not over 14 feet keel, and the man who possessed a half dozen short home-made nets was counted rich. Nothing under a 5-inch mesh was employed; stones were used on the nets for sinkers, and thin strips of cedar for floats. The nets were put out in the evening and taken up in the morning, the sinkers and floats being removed from the nets each time they came ashore.

Most of the catch was whitefish, and all was salted. The traders came around in schooners supplying the fishermen with salt and barrels, and taking the fish in exchange for general supplies. During the period of the civil war in the United States, from 1861 to 1865, there was a great demand for salted fish, and the prices then received were better than ever since. This demand, no doubt, forced the development of the fishery, as by 1868, when the first official report by the Canadian Department of Marine and Fisheries was issued, it seems to have already attained considerable proportions, the returns of that year showing that 451 men engaged in the fishery, with 144,750 fathoms of gill nets, the catch amounting to 1,884,386 pounds of whitefish, 767,400 pounds of trout and 7,800 pounds of wall-eyed pike. Gill nets continued to be, practically, the only method used until 1881, when pounds were introduced in the north channel, although a few seines were occasionally employed.

The following table shows the length of gill nets fished since 1870 at intervals of five years:—

	Fathoms.
1870.	298,049
1875	431,174
1880	405,619
1885	380,163
1890.	941,600
1894.	1,086,715

Between 1870 and 1875, tugs were introduced into the gill net fishery, and their number increased until 32 were employed in 1894. The fishery is prosecuted mainly from Wiarton, Owen Sound, Collingwood, the vicinity of Waubashene and Midland, Killarney and Thessalon. The tugs and boats located at the Duck Islands fish entirely in Lake Huron.

In the summer, after the shore fishery falls off, the tugs from the southern and south-eastern parts of the bay fish at the western islands and the Minks, and around the islands and banks lying north of Parry Sound; and at the same season the fishermen from Killarney and other mainland ports move out to Squaw Island Bank, Grand Bank and Lonely Island.

The fishery for whitefish and trout is carried on simultaneously. From the time the ice leaves, early in May, until July, the nets are set inshore, but during July and August they are moved into deeper water, and upon the banks and around the outlying islands. In September they are again brought closer to shore, where they are used until the beginning of the close season, 1st November. In the spring and summer the catch consists principally of whitefish, but in the fall more trout are caught.

Pound nets.—The pound nets are similar in construction to those used elsewhere in the great lakes. The leaders are mostly short, with the mesh 6 or 7 inches in extension. The cribs are 40 to 50 feet square, and when the fishery first began a mesh of less than 2½ inches was used, but afterwards a uniform 4-inch mesh throughout was adopted. In 1894, the Dominion government voluntarily reduced the size, but the fishermen had not all taken advantage of this privilege at the time of our visit. There appears to have been no good reason for the change, and we consider that its effect will be disastrous to the whitefish.

Pound nets have never been fished extensively in any part of the bay, except the north channel and on the outer side of Grand Manitoulin Island. The latter region is really in Lake Huron, but as the fish caught there are shipped from Wiarton the statistics usually regard this locality in connection with Georgian Bay.

In 1894, 62 pound nets were fished in this region. They were all in stands of one each and were located in the north channel, both on the main shore and on the numerous islands, and also on the southern shore of Grand Manitoulin Island at its western end, and on the neighbouring Duck Islands. The pound net fishery began at the Duck Islands about 1881, and at Indian Island and near Killarney at about the same time. After several years, however, these nets were forbidden in the region east of a line passing from Cape Hurd to Spanish River. The maximum number was reached about 1889, since which time there has been a gradual reduction. This appears to have taken place mostly on the outer side of Grand Manitoulin Island east of the Duck Islands; it is estimated that there were at one time at least 40 pounds between Massissagua Strait and Providence Bay, where there are now but 9.

The pounds are set as early as possible after the water is free from ice; the time varies with the season, being sometimes in April and sometimes even as late as May 24. The season lasts until November 1. The principal fish taken in this region is the whitefish. It is present during the entire season, but June and July witness the largest catches. Wall-eyed pike also occur throughout the year; if the nets are in early, a good run may be had in the spring, but the best month is

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August. Trout are caught in May, June and July, and again from September to the close of the fishery. Several species of suckers, perch, grass pike and a few sturgeon are also taken.

Seines.—Seines were never employed extensively for whitefish as the bottoms to which this species resort for spawning are generally so stony and rough as to prevent the use of this form of apparatus. The small amount of seining which has been carried on was mainly for sturgeon and wall-eyed pike at Wabashene, Nottawasaga Bay and Killarney. The total length of the seines used has been as follows: 1870, 440 fathoms; 1880, 137 fathoms; 1890, 2,466 fathoms. These nets are now prohibited in the bay.

RECOMMENDATIONS.

The principal fisheries in the Georgian Bay and north channel are those for whitefish and lake trout, and as the decrease in the abundance of those species has apparently been due to two causes, over-fishing and the taking of immature fish, two remedies naturally suggest themselves, namely, a reduction in the amount of fishing and such an increase in the size of the mesh employed as will prevent the capture of an undue amount of the undersized fish.

Although it is understood that the present close season during the month of November does not fully cover the spawning season of the trout, yet it is believed, as this species has not decreased to anything like the same extent of the whitefish, that a reduction in the amount of gill netting fished and an increase in the size of the mesh will afford it all the protection now necessary.

In view of the fact that the fishery with pound nets is carried on mainly for whitefish, trout, wall-eyed pike and sturgeon, it is considered important that only a large-sized mesh be allowed in the cribs. As there can be no objection to the capture of wall-eyed pike and coarse fishes in the bays and among the islands. We deem it advisable to allow a limited amount of fishing with trap nets and fyke nets along the eastern shore of the bay.

We would, therefore, recommend as follows:—

1. That the amount of gill netting now used for whitefish and trout be considerably reduced, and that means be taken to insure that not more than the amount licensed be fished by any tug or boat.

2. That the minimum size of gill net mesh fished for whitefish and trout be fixed at 5 inches, extension measure.

3. That the number of pound nets now fished west of the line from Cape Hurd to Spanish River be not increased; that the regulation which prohibits the use of such nets east of that line be continued; and that the minimum size of mesh in the crib of the pounds be fixed at 4 inches.

4. That a limited number of trap nets and fyke nets be licensed to be fished along the eastern and northern shores of the bay between Waubashene and Killarney.

5. That gill nets having a mesh large enough to prevent the capture of individuals less than 4 feet long, and also set lines with baited hooks, be licensed for the catching of sturgeon.

6. That all sturgeon taken under 4 feet in length be returned alive to the water.

7. That the close season during which whitefish and trout shall not be taken shall be the month of November.

8. That herring may be fished for at all seasons with gill nets having a mesh of not less than $2\frac{1}{2}$ inches.

LAKE SUPERIOR.

DESCRIPTION OF THE LAKE.

Lake Superior, the largest of the great lakes, is characterized by its greater depth, the much greater relative extent of its deep water, and its low temperature.

There is a general absence of shoal areas at a distance from the shores, along which, moreover, the water usually deepens rapidly, the slopes being more abrupt, as a rule, on the northern than on the southern side. The fishing grounds are, therefore, chiefly restricted to a comparatively narrow zone around the borders of the lake, the superficial extent of which is less than one-fourth that of the entire lake, and not much more than one-half the fishing area of either Lake Huron or Lake Erie. The physical conditions of Lake Superior are, furthermore, unfavourable to the production of a great variety of fishes, and only a few of the species represented have been at all prolific. There are however, three more or less prominent bays on the northern side of the lake and three on the southern side, in which the conditions are somewhat tempered.

IMPORTANT FISHES.

The most important fishes of Lake Superior are the whitefish (*Coregonus clupeaformis*) and lake trout (*Cristivomer namaycush*). Other species taken for market are the lake herring (*Argyrosomus artedi*) and one or two related forms, the siscowet (*Cristivomer namaycush siscowet*), wall-eyed pike (*Stizostedion vitreum*) and sturgeon (*Acipenser rubicundus*).

Whitefish.—The whitefish are generally distributed along the borders of the lake, ranging outward into depths of 40 to 50 fathoms, seldom farther, and in some places coming close upon the shore during the spawning season and in the spring.

Throughout the greater part of their range they have given rise to more or less extensive fisheries, although in some regions, as along the Minnesota shore and about Isle Royale, they have always been scarce. This species was the one to which attention was first directed on Lake Superior, and until recently it composed the greater part of the annual catch, but within a few years it had ceded precedence in that respect to the lake trout. The only statistics of the catch for the shores of the United States side of the lake are the following:—

1880	2,257,000 lbs.
1885	4,571,000 "
1890	3,213,000 "
1893	2,010,000 "

Leaving out of consideration the seasonal fluctuations in production, which we have not the means of measuring, the above figures indicate a decreased annual output between 1885 and 1890 of 30 per cent; between 1890 and 1893, of 37 per cent, and between 1885 and 1893, of 56 per cent. This decrease, moreover, was coincident with an increase in the amount of the principal kinds of apparatus employed, and the statistics for 1890 and 1893 were obtained in sufficient detail to show that between those two years the proportionate decrease for pound nets was 57 per cent and for gill nets 64 per cent. The actual decrease has been most marked on the Wisconsin shore, where, between 1885 and 1893, it was enormous, amounting to over 90 per cent. On the Michigan shore, as a whole the production was maintained between 1885 and 1893, but only by the use of a much greater amount of apparatus, equal to 63 per cent in pound nets and 14 per cent in gill nets. On some parts of this shore the figures show an increase, and on other parts a decrease in the output, but the abundance of the fish has apparently everywhere diminished, as is evidenced by the extra efforts required to keep up the catch.

The testimony of all witnesses examined at the principal fishing centres tends positively to corroborate the deductions based upon the statistics, and it also establishes the fact that the fishermen generally are conversant with the changes which have taken place in the status of this product.

The statistics for Canadian waters show a comparatively steady increase in the catch during recent years, coincident with an increase in the amount of apparatus. The evidences of a decrease in the species are not nearly as marked as on the south shore, although the testimony obtained in the Port Arthur region indicated a con-

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siderable falling off. The Canadian catch has always been much smaller than that made in the United States, but in 1893 it amounted to 40 per cent of the latter. The quantity of apparatus employed is much larger on the south shore than on the north shore.

Lake trout.—The lake trout are somewhat more evenly distributed than the whitefish, being abundant on the shores of Minnesota and Isle Royale, as well as along most parts of Wisconsin, Michigan and Canada. Their range in depth is approximately the same as that of the whitefish, although extending down to 60 fathoms or slightly more. They do not, however, come abundantly into the shallower water, and in deep water they are replaced by the siscowet, a well-marked inferior variety, which is generally most plentiful in 80 to 100 or 125 fathoms. The lake trout was not sought for, especially during the early period of the fishery, but in recent years it has been greatly in demand, owing partly to the diminishing supply of whitefish. The statistical returns for the United States side of the lake have been as follows:—

1885.....		2,599,000 lbs.
1890.....		2,485,000 “
1893.....		3,061,000 “

In Canadian waters the following annual catches have been made during the past ten years:—

1885.....		911,000 lbs.
1886.....		842,000 “
1887.....		703,000 “
1888.....		971,000 “
1889.....		1,020,000 “
1890.....		692,000 “
1891.....		1,077,000 “
1892.....		1,055,000 “
1893.....		1,128,000 “
1894.....		1,543,000 “

The falling off in the catch in 1890 was coincident with a temporary decrease in the extent of fishing on both sides of the line, and the subsequent increase of production was accompanied by an increase in the amount of apparatus employed. Over 80 per cent of the annual catch in United States waters has been obtained by means of gill nets, the balance in pound nets and by hooks and lines. The statistical returns are not indicative of a decrease in the abundance of the species in Lake Superior considered as a whole, but they show a falling off in the production in some localities, more especially about the Apostle Islands, since 1885, and at Isle Royale, since 1890. According to the testimony of witnesses, however, there has been a general decrease, the extent of which could not be ascertained, in all parts of the lake except at the eastern end, in the region about Whitefish Point and thence to Otter Head on the Canadian shore. In this latter area, moreover, there has been a large increase in the extent of fishing in very recent years, with a corresponding increase in the amount of the catch.

Lake herring.—Although the herring is a common species in most places about the border of the lake, it has never given rise to more than a very moderate fishery, owing mainly to the distance of markets, but in part also to its generally inferior size in these waters. The supply can be in no danger of diminution while the demands upon it remain as small as at present.

Siscowet.—The siscowet, which inhabits a deeper zone of the lake than the whitefish and lake trout, is poorly esteemed in the market on account of its exceeding fatness, and it, therefore, offers little inducement to the fishermen, except in the event of a scarcity of trout. Considerable quantities are sometimes captured, but the supply is undoubtedly sufficient to withstand any drains that may be made upon it under existing circumstances.

Wall-eyed pike.—This species is scarce on nearly all the open shores of the lake, being mainly confined to a few of the bays on both the northern and southern sides, in none of which, however, is it abundant except on a very limited scale. The total catch in 1893 amounted to only 185,000 pounds, or a little more than 2 per cent of the combined weight of all species taken. The principal places where it has been captured are the western part of the Wisconsin shore, Chequamegon Bay and the head of Whitefish Bay on the United States side, and Black Bay and Bachewanaung Bay on the Canadian side. It is more common in some portions of St. Mary's River. There has evidently been a considerable decrease in the abundance of this species, but it has never been the object of a special fishery, having figured mainly as an incidental feature of the pound net catch.

Sturgeon.—The sturgeon, like the wall-eyed pike, are of very limited distribution in Lake Superior, being restricted mainly to a few of the more or less inclosed areas, in some of which they are reported to have been relatively abundant at one time. In the aggregate, however, they have constituted only a very inconspicuous feature of the fishery, and little profit has been derived from them. The total production for United States waters in 1885 was 182,000 pounds; in 1893, 35,000 pounds; showing a decrease of over 80 per cent, coincident with an increase in the number of pound nets, by which means they have chiefly been captured. The Canadian catch for the past ten years has been as follows:—

	Lbs.
1885.....	41,000
1886.....	41,000
1887.....	120,000
1888.....	54,000
1889.....	71,000
1890.....	97,000
1891.....	43,000
1892.....	49,000
1893.....	35 000
1894.....	39,000

HISTORY AND METHODS OF THE FISHERY.

Beginning of the fishery.—Commercial fishing was first started in the neighbourhood of Whitefish Point soon after 1860, and by the end of that decade it had been extended to the few important settlements along the southern border of the lake as far as Duluth, all of the principal methods now employed having been introduced by 1870. On the Canadian shores commercial fishing dates from about 1871.

Seines.—Seines were in use prior to 1860 for supplying domestic wants, and in conjunction with gill nets constituted the earliest appliances of the market fishermen. They proved very profitable in the beginning, more especially in the capture of whitefish during their periodical movements into shallow water, but they have been gradually falling into disuse, as the schools no longer approach the shores to the same extent as formerly. They have been employed on the shores of all the counties along the southern side of the lake, but probably most extensively and with greatest effect in Wisconsin, between Duluth and the Apostle Islands. The Minnesota coast is not adapted to their use. The greatest number recorded was forty-three in 1885.

The catch by this means in United States waters is relatively very small, having been equal to only about $2\frac{1}{2}$ per cent of the total catch in 1893. Seines have not been utilized on the Canadian shore since 1874.

Gill nets.—Gill netting is carried on along all the shores of the lake except between Pic Island and Otter Head on the Canadian side. It is prosecuted mainly for the capture of lake trout, whitefish and siscowet, but moderate quantities of

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herring are also taken by this means. The rapid slope of the bottom in most places necessarily restricts the fishery to within a comparatively few miles of the land, and on some sections of the coast the nets are mainly set close along the shore. For the most part relatively small rigs are used, but there are a number of large tugs with headquarters at some of the principal fishing centres, such as Duluth, the Apostle Islands, Marquette, Grand Marais, Whitefish Point and Port Arthur. On the Canadian shore at the eastern end of the lake, between Whitefish Bay and Otter Head, the fishery is also conducted on an extensive scale under one management, but chiefly by means of sail boats. The herring nets are mostly employed off Marquette and Duluth.

There has been only a comparatively slight increase in the total quantity of gill nets fished in United States waters since 1885, when that fishery reached nearly its greatest development, but considerable fluctuations in the quantity have occurred in the intervening years. In Canadian waters the maximum was attained in 1884, since which time there has been, as a whole, a general decrease in the amount of gill netting employed along the north shore, but an increase at the eastern end with considerable fluctuations from year to year. The statistical returns for 1893 give the length of gill nets in use that year as follows:—

	State or District.	Length in fathoms.	Total length in fathoms.
United States waters.....	Minnesota.....	90,082	772,696
	Wisconsin.....	139,653	
	Michigan.....	542,961	
Canadian waters.....	North Shore.....	27,000	113,790
	East End.....	86,790	

The Canadian regulations provide that the mesh of gill nets shall measure at least $4\frac{1}{2}$ inches in extension. There are no laws respecting this matter which are applicable to United States waters, but the customary sizes of mesh there employed are between $4\frac{1}{2}$ and $4\frac{3}{4}$ inches, although a 4-inch mesh is sometimes seen. Larger sizes up to $5\frac{1}{2}$ and 6 inches, are also occasionally used on both sides of the line, especially for the trout.

Pound nets.—Although Lake Superior does not present the advantages for pound net fishing possessed by Lakes Erie and Huron, it is carried on at intervals along the entire southern border, but the Minnesota coast is not adapted to this purpose and has never had more than 4 pounds at any one time, all of which have been located near the Canadian boundary. This method of fishing has been most extensively prosecuted on the Wisconsin coast, including the Apostle Islands and Chequamegon Bay, on the east side of Keweenaw Peninsula, and in the vicinity of Whitefish Point. In 1879 the total number of nets on the south shore was about 50. In 1885 it had increased to 230, and in 1893 to 276. The principal increase in recent years has been about Whitefish Point and in Chequamegon Bay.

Pound nets were introduced in Canadian waters, in the vicinity of Port Arthur, in 1878, but during the first decade their number on the north shore never exceeded 8. In 1891 it increased suddenly to 53, but by 1894 it had fallen off to 29. At the eastern end of the lake, between Whitefish Bay and Otter Head, the first of these nets were built in 1883. The maximum number in this region, 21, was reached in 1891, but in 1894 there were only 16 in use.

The mesh in the cribs of the pound nets when new is supposed to measure at least 4 inches on the Canadian side, while on the United States side it ranges from $3\frac{1}{2}$ to 4 inches. Considerable shrinkage takes place after tarring and submersion in the water.

The relative importance of the gill net and pound net fisheries on Lake Superior is indicated approximately by the returns of the catch in United States waters for 1893, which show 61 per cent of the total output to have been obtained by means of the former apparatus and 26 per cent by means of the latter.

Other methods.—Set lines are employed to some extent for taking trout and siscowet, more especially on the coast of Minnesota and about Isle Royale and the Keweenaw Peninsula. Beginning about 1890, this method of fishing has been increasing at the western end of the lake, owing to the fact that the outfit is much less expensive than in the case of pounds and gill nets, and the profits on a small scale are relatively greater. The number of hooks so used in 1893 was about 25,000, the catch amounting to about 8 per cent of the total catch of trout and siscowet in United States waters.

Fyke nets are practically unknown on Lake Superior, and there are probably very few places where they could be employed to advantage. Eleven were enumerated in the statistics for the south shore in 1893, but none have been recorded in any of the returns for Canada. The Indians make use of dip nets for taking whitefish at the base of the rapids in the St. Mary's River at Sault Ste. Marie, but this fishery is of little moment. Sport fishing for brook trout, black bass, etc., is carried on in parts of the same river, but there is very slight inducement for angling anywhere in the waters of Lake Superior.

EXTENT AND CAUSES OF DECREASE.

Of the six species which are the principal objects of the fisheries on Lake Superior, a decrease has evidently taken place in the supply of whitefish, lake trout, wall-eyed pike and sturgeon, while the herring and siscowet appear to be as abundant now as ever. The change has been most serious with respect to the whitefish, formerly composing the greater part of the catch; it has been least noticeable in the case of the lake trout, and of relatively minor importance with the wall-eyed pike and sturgeon.

Our inquiries have failed to demonstrate that agencies foreign to the fisheries have been responsible to an appreciable extent for this decrease. The depth and the low temperature of the water, together with the sparsely settled condition of the shores, preclude the influence of ordinary pollutions as well as of traffic except in a few restricted localities. Logging has sometimes caused injury to the nets, and has frequently interfered with the operation of the seines and pounds, but there is no evidence to show that the fish themselves have been harmed thereby. The refuse from saw-mills appears to have had only a local influence at the most, affecting, possibly, some of the inshore feeding and spawning grounds, but no proof was obtained of its extensive distribution on the bottom of the lake at any time, and for some years past its retention on the shore has been suitably provided for.

It has been impossible to learn to what extent the offal produced in cleaning fish was deposited in the water during the early period of the fishery, but the practice is now widely deprecated and it is seldom followed, except in connection with winter fishing when the offal may be left upon the ice, although much of it is then said to be devoured by the dogs and scavenger birds. It is not considered probable, however, that any marked injury has been caused by this means in recent years, if at any time.

The evidence obtained from all sources tends to substantiate the view that at least the bulk of the decrease observed has resulted from overfishing under some or all of the conditions and practices which have prevailed, but, owing in large part to our imperfect knowledge of the habits of the fishes in this region, it has been impossible to estimate satisfactorily the relative importance of the different factors concerned.

At the inception of the fishery, Lake Superior was especially noteworthy for the quantity of whitefish, mainly of large size, which came into the shoal waters, chiefly in the spring and fall. This circumstance led to the multiplication

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of seines and of shallow water gill nets, by means of which extraordinary catches could be made with little effort. The introduction of pound nets came next, followed by the extension of gill net operations into deeper water, and these two methods are the ones now principally pursued, the shoreward movement of the large fish and the advantages for seining having greatly diminished. Much of the decrease of the whitefish is now commonly laid to the early seining, and while this claim may be justifiable, in some degree, it is a fact that the falling off in the supply has been most apparent during perhaps the past decade. It has also been manifested in the catch obtained by each of the several methods employed, thereby indicating its distribution to all depths of water although not necessarily explaining the means by which it has actually been effected.

The only appliances used for the capture of whitefish have been seines, pounds and gill nets. Seines were formerly employed extensively during the spawning season, and they may have been chiefly instrumental in diminishing the supply of the larger grade of fish, which approached the shores mainly in the spring and fall, but it is probable that the pound nets were also largely, and the gill nets slightly, responsible for that result. Seine fishing in the late fall has been practically abandoned for some time, having become unprofitable, but it has been continued to a greater or less extent at other seasons, especially in a few localities where a small class of fish resorts to the shallow waters in large schools. The catches there made are said to consist principally of inferior sizes, mostly below the standard recognized by the fresh markets, those disposed of being salted by the fishermen and shipped at their risk. The dealers are not inclined to handle this grade of goods and by their attitude in the matter have done much to break up the practice. Notwithstanding the discouragements in that respect, however, this seining has often been persistently continued, and failing to secure a market for the catch, large quantities of the young fish have been left upon the beaches to decay. The destruction by this means seems to have been relatively great, but the evidence fails to show that seining has everywhere been as pernicious in its effects as here described, the greatest amount of damage being indicated for the western part of the lake along the south shore. We have been unable to confirm the reported capture of large amounts of young whitefish by the herring seines, the use of which has been exceedingly limited.

Although the number of pound nets fished in Lake Superior is much smaller than in either Lake Erie or Lake Huron, this method of fishing has been of relatively great importance, considering the comparatively narrow fishing zone along the margins of the lake, fully one-half the total catch of whitefish in recent years having probably been obtained by this means. The fall season, however, is generally cut short by inclement weather, and while all fishing is prohibited in Canadian waters during November, on the southern side of the lake it has been customary to remove the pounds before that month to prevent their destruction by storms. A few may be left in at times on the Wisconsin shore until about the middle of November, but it is evident that in the capture of spawning whitefish the pound nets can have figured only to a very limited extent.

It is generally admitted, however, that many small and undersized whitefish are taken in these nets, the evidence also indicating that this happens most commonly in the western part of the lake as is the case with the seines. The smallest size desirable for the fresh trade is about 1½ pounds. The dealers generally would prefer to handle nothing under that size, and the profits would be relatively greater to the fishermen if only the larger fish were marketed. No practicable method of determining either the average size of the whitefish taken in the pounds or the quantity obtained below any stated size has been presented, nor has it been possible to ascertain by actual observation the sizes of fish that may be able to pass through the several grades of mesh employed, and opinions differ widely in regard to these matters. In Canadian waters the law provides that the mesh of pound net cribs shall measure at least 4 inches; on the United States side it ranges from 3½ to 4 inches; but these sizes are for the new twine which shrinks considerably during use. Moreover, as is well known, many fish that might readily pass through any given mesh,

if they attempted so to do, may be held and captured therein whenever a large mass of fish is taken. The use of a large mesh is, therefore, not an absolute guarantee against the capture of small fish, but there is no doubt that it provides for the escape of so large a proportion of them as to demonstrate the importance of regulating the mesh on the basis of the minimum size of whitefish proper to be marketed. As the pounds are not fished for herring in this lake, only a single standard of mesh is called for, and the case is greatly simplified as compared with Lake Erie and Lake Huron. If the minimum size of marketable whitefish is placed at $1\frac{1}{2}$ pounds, the mesh should be regulated accordingly. It is said that large quantities weighing not over half pound apiece are now captured in the pounds in some places, and of fish from that size up to $1\frac{1}{2}$ pounds, the annual catch seems to be relatively very great. On other parts of the shore they are reported to be taken rarely under 1 to $1\frac{1}{2}$ pounds, but observations are lacking to show to what extent the abundance of these smaller sizes varies with respect to locality. It is probable, however, that the depth of water in which the pound nets are set, as well as the character of their surroundings, greatly influence this result, the young occurring most abundantly in the shoaler water, while the deeper nets and those on bold shores secure a larger average size.

It is the prevailing opinion that, even excluding the large grade of whitefish, the average size of this species has become smaller than was formerly the case, and this decrease in size is shown more markedly in the pound net catch than in that made by the gill nets, as the latter tend to sort out or exclude the smaller fish. That is to say, the size averages larger in the gill net than in the pound net catch, and the latter form of apparatus is to be considered as most detrimental in catching small whitefish.

In Canadian waters the gill net mesh is supposed to measure not less than $4\frac{1}{2}$ inches, but on the United States side of the line it ranges down to 4 inches for both whitefish and lake trout nets. The maximum sizes are from $5\frac{1}{2}$ to 6 inches, but these are used only in a few localities and to a limited extent. The sizes now generally employed in United States waters are from $4\frac{1}{4}$ to $4\frac{3}{4}$ inches, the use of the smallest mentioned being restricted mainly to the extreme eastern part of the lake, on the coast of Michigan.

In the $4\frac{1}{2}$ -inch mesh the smallest sizes of whitefish said to be taken weigh from $1\frac{1}{4}$ to $1\frac{1}{2}$ pounds, and these figures agree with the results of limited observations by the commission. With respect to a $4\frac{1}{2}$ -inch mesh, the estimates place the minimum sizes taken at from about $1\frac{3}{4}$ to 2 pounds, all fish under a fresh marketable size thereby escaping through it. For this reason it would be preferable to employ nothing smaller than $4\frac{1}{2}$ inches. Formerly the average size of the mesh employed was larger than at present, and the reduction has been brought about in consequence of the diminished average size of the fish. This fact alone tends to show that gill netting has had at least some detrimental effect upon the supply of whitefish.

In the herring gill nets, which are used to a limited extent in many parts of the lake, the mesh ranges in size from $1\frac{1}{4}$ to $2\frac{1}{2}$ inches. In some places the herring are found practically alone, but in others the young of both whitefish and trout may be associated and captured with them, but there is no proof that the quantity of those two species so taken is appreciable.

All fishing is supposed to be suspended in Canadian waters during November, but from the principal stations on the south shore, gill netting is carried on to a considerable extent during a part or all of that month. The November catch it said to consist less of whitefish than of trout, but it nevertheless includes a large proportion of the former. Whether the nets are set extensively upon their spawning grounds or interfere greatly with their habits at that period it has been impossible to learn, but quantities of the spawning fish are secured in some places. Gill nets were among the appliances formerly employed for the capture of the large whitefish as they came upon the beaches in the spring and fall, but that fishery has mainly been destroyed. The whitefish are reported to spawn chiefly on reefs and sand banks near the shore, in depths of 4 to 8 fathoms, but such localities are often too much exposed to permit of fishing upon them during the severe weather which

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generally prevails at that season. The spawning period is said to extend principally from about November 1 to 20.

As the catch of lake trout by pound nets and hooks and lines combined is less than one-quarter that obtained by gill nets, it is natural to expect that the cause of any decrease observed will be found mainly in connection with the method of fishing last mentioned. It is possible that the gill net fishery for the trout has been carried on too extensively in some localities, and that too many fish are being thus removed from the water annually in those places.

The spawning season of the trout begins in the latter part of September, and continues through most of October. During this period also the best trout fishing occurs, and large quantities of the spawning fish are secured. They are obtained mostly in the gill nets, but to some extent also in the pounds, although the majority of the latter seem to be removed by the beginning or during the early part of the spawning season. To prohibit fishing at this time or even during any considerable part of it would be equivalent to abolishing the fall fishery.

Smaller trout than whitefish are captured by the gill nets, owing to the fact that they often become caught by the teeth or otherwise entangled by the twine. The amount taken in this manner, however, can scarcely be large enough to cause any appreciable amount of injury, nor is there any way in which the occurrence can be avoided, as it has no relation to the size of the mesh. Aside from this, the minimum sizes of trout taken in the gill nets do not appear to differ materially from those of the whitefish already given; and, as with the latter species, the prevailing opinion seems to be that the average size of the trout has decreased in many places, which fact has also influenced the recent use of smaller-meshed nets than formerly. In some localities, however, more especially on the northern shores of the lake, the trout run relatively large, and larger-meshed nets are more commonly employed. The fresh markets would prefer to receive no trout under 2 pounds in weight, and where the gill net mesh is at least $4\frac{1}{2}$ inches, smaller sizes are said rarely to be obtained. The $4\frac{1}{2}$ -inch mesh will take them down to $1\frac{1}{2}$ pounds, if not to $1\frac{1}{4}$ pounds. Small trout are also captured in the herring gill nets employed along the Minnesota shores, but probably only in limited numbers.

More small trout, relatively, are reported to be taken in the pound nets than in the gill nets, the same as with the whitefish, but the total pound net catch of trout is comparatively light. The hook and line fishery for trout has never been extensive, although it has been increasing somewhat rapidly during the past few years. The fish taken by this means are said to average large, and it was not learned that the method presents any features to which objection can be raised at the present time.

The decrease in the abundance of wall-eyed pike and sturgeon can be charged only to the pound nets, by which means they have been captured almost exclusively.

SUMMARY OF CONDITIONS.

Owing to its small area of shallow water, Lake Superior ranks below each of the other Great Lakes, except Lake Ontario, in the extent and importance of its fishery resources. The number of market fishes which occur in sufficient abundance to provide for extensive operations is practically limited to four, the whitefish, lake trout, siscowet and herring. Of these only the whitefish and trout have been at all conspicuous in the catch, the demand for the siscowet and herring being comparatively small and not likely to increase materially in the immediate future. The only other market species now meriting attention are the wall-eyed pike and sturgeon, neither of which is of more than local interest.

The whitefish has suffered a heavy decrease, which began to be noticed several years back and has been felt on most parts of the coast, but chiefly in United States waters. The catch of lake trout, however, has apparently been maintained as a whole, although the supply seems to have diminished to a greater or less extent in some regions. The character of its distribution and habits insures for this species

a greater degree of natural protection than is possessed by the whitefish, and renders its depletion more difficult although not impossible. Both the wall-eyed pike and sturgeon have decreased greatly in abundance.

The principal fishing methods which have been followed in Lake Superior, enumerated in the order of their importance, are the use of gill nets, pound nets and seines. Set lines have not been extensively employed until within a comparatively few years.

As no evidence has been obtained to show that outside agencies have materially affected the fishing interests, we must look to the practices of the fishermen themselves for an explanation of at least the more important changes in the abundance of fishes which have taken place. The details of this subject have been discussed under the preceding heading. Seines have been partly concerned in the removal of the schools of large and spawning whitefish, and in the destruction of considerable quantities of young whitefish, both of which have been in the habit of coming upon the shores in immense numbers at certain seasons. This class of nets, however, is now used much less extensively than formerly.

The number of pound nets employed has never seemed excessive, considering the wide extent of the lake; the intervals between them have generally been reasonable and they have seldom been placed in strings. The practices in this respect have been influenced by the narrowness of the platform, and the tendency of the whitefish to approach the shores so closely. These circumstances, however, have increased the relative effectiveness of the pounds, and have, apparently, made them an important factor in causing the decrease of whitefish, of which fully one-half the catch in recent years seems to have been secured by this means. These nets are but little use during the spawning season of the whitefish, but their number has probably been greater than was advisable in some especially favoured places, and the small mesh employed has resulted in the destruction of many undersized fish.

There has also been a marked decrease in the proportionate catch of whitefish by the gill nets, although no large quantity of the young can have been removed through the medium of these nets. Excessive fishing by this method has probably affected the supply of whitefish, and as the larger sizes have been caught off an effort has been made to maintain the catch by introducing a successively smaller mesh, until now the latter has reached a limit where whitefish and trout below the fresh market standard are taken to some extent. Gill netting is carried on during the spawning season of the whitefish in United States waters, and during the spawning season of the lake trout on both sides of the line. No positive evidence has been presented to show that any appreciable amount of young whitefish is captured in the herring gill nets.

As the main part of the catch of lake trout is obtained by means of gill nets, it is natural to look to that fishing method for the principal cause of any decrease in this species which may have taken place. The catch of wall-eyed pike and sturgeon, however, has been made chiefly in the pound nets.

RECOMMENDATIONS.

The remedial measures suggested for Lake Superior are as follows:—

1. In all localities where there is evidence of overfishing by the pound nets the number of the latter should be suitably restricted. These nets should be separated by an interval of at least one mile, and they should not be allowed to extend more than one-third the distance across any channel or passageway.

2. Wherever young whitefish abound and may be captured by the pound nets in appreciable quantities, the use of such nets should be prohibited either entirely or during such periods as the young of that species may be so present.

3. The mesh in the cribs of all pound nets should measure at least 4 inches in extension, when in use.

4. It would seem that the extent of gill net fishing for whitefish and trout had reached, if not passed, a safe limitation, and that some restriction should be placed

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upon the quantity of gill nets to be fished hereafter. Further observations, however, are required to establish a satisfactory basis for action in this matter.

5. The mesh in gill nets employed for the capture of the common whitefish and the lake trout should measure not less than $4\frac{1}{2}$ inches, and we consider that a 5-inch mesh would be preferable.

6. The herring gill nets and those used for the smaller varieties of whitefish require a smaller mesh than the above, but the conditions under which such nets may be employed should be explicitly defined.

7. No restrictions appear to be called for at present in respect to the herring gill nets, except that their use should be prohibited wherever young whitefish would be taken in them.

8. The number of seines employed at present is relatively small, and it should not be allowed to increase beyond a safe limitation.

9. The mesh in whitefish seines should measure not less than $3\frac{1}{2}$ inches in the bunt and $4\frac{1}{2}$ inches in the wings.

10. The use of all kinds of seines should be prohibited wherever the capture of young whitefish is involved, either entirely or during the seasons when the young are present.

11. It is considered that it would be beneficial to institute a close season covering the spawning period of the whitefish, during which no fishing for the species should be permitted.

12. All sturgeon measuring less than four feet long, which may be taken by any means, should be returned alive to the water.

13. It may be found advisable to establish local regulations for the protection of the wall-eyed pike in places where they occur, but no information that would be serviceable in that respect has been collected.

14. The throwing into the water of fish offal, and of all other deleterious substances in places where it would be harmful to fish life should be prohibited.

15. Joint efforts for the increase of the supply of both the whitefish and the lake trout by means of artificial propagation are recommended.

LAKE OF THE WOODS, RAINY LAKE AND RAINY RIVER.

DESCRIPTION OF THE WATERS.

The greater part of the boundary line between the state of Minnesota and the Dominion of Canada passes through the series of lakes and rivers beginning at the low divide near Lake Superior and terminating at the west in Lake of the Woods. While the shore lines of this water system have been sufficiently well laid out for general purposes, its hydrography has not been studied and a detailed description of its characteristics in that respect is impossible at the present time. The region is still very sparsely settled, and until within a few years only slight attention had been given to its fishery resources, now forming the basis of one of its most conspicuous industries. Lake of the Woods is, by far, the most important, as it is also much the largest, of these bodies of water. It is connected with Rainy Lake through its principal affluent, Rainy River. Both of these lakes are very irregular in shape with many ramifications, the greater part of each being located in Canadian territory. Rainy River, about 80 miles in length, has a winding course, with some swift water and several rapids, but is navigable for small steamers. Up to the time of our visit in 1894 only a very limited amount of fishing had been attempted on either Rainy Lake or Rainy River, and we, therefore, restricted our inquiries chiefly to Lake of the Woods, where the extensive operations then in progress made it most desirable that the conditions should be understood.

The total length of Lake of the Woods in a direct line north and south, from Rat Portage to the mouth of Rainy River, is about 60 miles. East and west its ramifications are said to extend nearly 100 miles, but its water area is very much

less than those figures signify, owing to the innumerable islands which it contains and its exceedingly irregular outline. In fact, except in its southern part, relatively large expanses of water surface are rare, the land areas greatly preponderating. These differences between the northern and southern parts of the lake are significant of topographical and geological differences also. At the south the shores are low and sandy, with some marshy tracts, while toward the north the shores and islands are mostly rocky and relatively high, giving rise to many picturesque features. The water is correspondingly deep with rough bottom toward the north, and shallow and smooth toward the south, the character of the fisheries in the upper and lower parts of the lake being greatly influenced by this diversity of conditions.

The outlet of Lake of the Woods is Winnipeg River which flows into the lake of the same name, whence the drainage is into Hudson's Bay. Rat Portage, having a population of about 2,000, is situated at the foot of Lake of the Woods of which it is the principal port, being also a divisional station on the Canadian Pacific Railway. All of the exports from the lake now pass this way. Two smaller towns close by Rat Portage complete the list of settlements on the lake, outside of which the only inhabitants are a few squatters, the fishermen connected with the several fishing stations during the summer, and a considerable number of Indians.

The international boundary line in this region is diverted northward from the 49th parallel in such manner as to give to the United States most of the southwestern portion of the lake, including a piece of the mainland which is isolated from the southern border of the lake by a strip of shore belonging to Manitoba. Two small, but important islands, Oak Island and Garden or Cornfield Island, are also situated on the United States side of the boundary.

The principal fisheries are now located in the southern, open part of the lake, commonly known as the Big Traverse, and in the vicinity of Oak Island. A line of soundings made by us across the Big Traverse, from Long Point to Garden Island, developed a maximum depth of 39 feet with depths of 30 to 35 feet within a couple of miles of either shore. The bottom consists of soft mud except near the shores where it becomes sandy. The main part of the Big Traverse has an average width of about 15 to 18 miles, and a length of about 30 miles, but narrower extensions from it toward the east and north retain, in part at least, the same general characteristics. During the summer months, owing to the slight depths, its stagnant condition and high temperature, the water in the Big Traverse and adjacent thereto becomes so highly charged with several varieties of microscopic plants as to give it an intensely green colour which reaches from the surface to a depth of several feet. This feature is indicative of the organic richness of the water in this part of the lake, the basis of its abundant fish supply. These same conditions, however, are the cause of much annoyance to the fishermen through the rapid destruction of their nets by rotting.

FISH AND FISHERIES.

Fishes.—The principal market fishes of Lake of the Woods are the sturgeon (*Acipenser rubicundus*), whitefish (*Coregonus labradoricus* and probably *clupeiformis*), wall-eyed pike (*Stizostedion vitreum*, pike (*Lucius lucius*), and lake trout (*Cristivomer mamaycush*). A few other species, such as the calico bass (*Pomoxis sparoides*), suckers, buffalo, bullheads, and yellow perch (*Perca flavescens*), are also some times sent to market in small quantities. The sturgeon constitutes much the most important feature of the fisheries, which, except for the presence of this species in the lake in great abundance, would probably not this time have attained more than local significance. As a fact, however, there can be a few, if any, sheets of water of its size in the world which give a greater annual yield of fishery products. The caviar is the product chiefly sought, although the sturgeon meat finds ready sale, and the sounds are also preserved.

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The relative importance of the several species is shown by the following statistics of the amounts shipped through Rat Portage during 1894 and 1895. The figures are given separately for the catch on each side of the boundary line :

CATCH FOR 1894.

Species.	United States Waters.	Canadian Waters.	Total.
	Lbs.	Lbs.	Lbs.
Sturgeon.....	1,059,267	162,760	1,222,027
Whitefish.....	411,018	449,280	860,298
Wall-eyed Pike.....	405,104	62,010	467,114
Pike.....	231,474	.....	231,474
Lake Trout.....	.....	12,873	12,873
Miscellaneous.....	96,520	62,310	158,830
Totals.....	2,203,383	749,233	2,952,616

CATCH FOR 1895.

Species.	United States Waters.	Canadian Waters.	Total.
	Lbs.	Lbs.	Lbs.
Sturgeon.....	1,143,072	779,114	1,922,188
Whitefish.....	280,563	713,226	993,789
Wall-eyed pike.....	473,776	254,608	728,384
Pike.....	125,861	83,348	209,209
Lake trout.....	.....	10,287	10,287
Miscellaneous.....	40,915	99,291	140,206
Totals.....	2,064,187	1,939,874	4,004,061

Although the weight of the catch of "scale fish," so-called, exceeds that of the sturgeon, the value of the latter, including the caviar and sounds, is the greater. The exports of caviar amounting to 173,270 pounds in 1894, and 186,699 pounds in 1895; of sturgeon sounds, to 4,063 pounds in 1894, and 5,315 pounds in 1895.

Fishing methods and localities.—The United States catch is derived from a limited area of water, while the Canadian fisheries are carried on in both the southern and northern parts of the lake, the fishing methods being totally unlike in those two sections. We were unable to obtain figures to show what proportion of the Canadian catch was made in each, but the sturgeon fishery is limited to the southern, while the lake trout probably come almost entirely from the northern part.

In the northern parts of the lake market fishing is chiefly restricted to the use of gill nets, which are employed mainly in Big Stone Bay, Clearwater Bay, Yellow Girl Bay and Whitefish Bay, in depths of a few fathoms to over 25 fathoms. In 1894, only about 25 licenses were issued by the Canadian government, each giving

authority for the use of 1,500 fathoms of such netting, but it cannot be said that all of these privileges were utilized. The legal size of the mesh is 5 inches, but larger sizes, up to 6 inches, are also employed. The gill net catch consists of whitefish, wall-eyed pike, pike and lake trout, together with some waste species. One of the large shippers estimates that probably only about one quarter the quantity of whitefish and a smaller proportion of the wall-eyed pike exported from the lake are taken in the gill net fishery. The fisheries in the northern parts of the lake are, therefore, conducted practically on a very limited scale, and as the areas now resorted to by the gill netters are rather far removed from the boundary line they can well be considered to have no immediate relations with the region adjacent to the latter.

The great bulk of the fishing is carried on in the more open, shallow waters composing the southern or upper portion of the lake, where pound nets are the only appliances employed in connection with the market trade. The growth of this industry has been marvellous, prompted by the exceeding richness of the supply of sturgeon, and facilitated by the very favourable natural conditions which here prevail.

Pound nets.—Pound nets were first introduced in Lake of the Woods in 1887, in which year two such nets were located on the southern shore near Winter Road River. The same pounds were in place in 1888, and two additional ones were built at Garden Island, making four in all. In 1889, the number on Garden Island was increased to six; in 1890 there were about twelve pounds on that island, and five on the south shore. The following year the south shore had about fifteen, and Garden Island about twelve. In 1892, the number on the south shore had been increased to 27; the number on Garden Island is not recorded, but fishing was commenced that year at Oak Island, near the mouth of North-west Angle Inlet. In 1893 there were 30 pounds on the south shore, 10 at Oak Island, and about 7 at Garden Island, a total of 47 in those localities, all in United States territory. The first pounds on the Canadian side of the line, two in number, were built in 1893 on the south shore east of the mouth of Rainy River.

In 1894, the year of our visit, the total number of pounds had increased to 160, of which 146 were in United States, and 14 in Canadian waters, as follows: In the former, 96 on the south shore between the mouth of Rainy River and a point just to the west of Long Point, covering a distance of about 19 miles; 7 on Garden Island; 13 on the mainland opposite Garden Island; and 30 on Oak Island and the adjacent mainland. In the latter, 12 on the south shore, within a distance of about 10 miles to the eastward of the mouth of Rainy River; and 2 at Skiff Island at the eastern end of Little Traverse.

During the first part of the season of 1895, 98 additional pounds were fished, making a total of 258, of which 188 were in United States waters and 70 in Canadian waters. The United States nets were located as follows: 126 on the south shore between the mouth of Rainy River and the international boundary line at the west; 7 on Garden Island and 15 on the opposite mainland; and 40 on Oak Island and the adjacent mainland. The Canadian nets had the following distribution: 34 on the south shore, west of Rainy River; 25 on Bigsby Island and adjacent islands; 5 on Big Island; and 6 on Buffalo Point at the western end of the Big Traverse. The addition of several more nets was contemplated during the fall of 1895.

This rate of increase is unprecedented in the history of pound net fishing anywhere in North America.

The construction of the pounds is the same as on the great lakes. Each consists of a crib, tunnel, heart, and leader, all made of cotton netting supported on stakes driven into the bottom. They may be placed separately or in strings of 2 to 5 nets, but seldom more than 3 are joined together in this way. The average length of the leaders is about 50 rods, while the cribs are about 30 feet square. Reckoning on an interval of 10 rods between the inner end of the leader and the shore, which is probably about an average, single pounds would extend a distance of about 1,000 feet, and strings of the same 1,845, 2,700, 3,555, and 4,410 feet respectively, according as they contained 2, 3, 4, or 5 cribs.

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By Canadian regulations $4\frac{1}{2}$ inches is the minimum size of mesh that can be used in the cribs. On the United States side of the line there are no restrictions in this regard, the customary size employed being $3\frac{1}{2}$ inches. These dimensions are for the netting as it comes from the factory, but it shrinks considerably after tarring. The size of mesh is of little importance as concerns the capture of sturgeon, but it has greater significance in respect to the whitefish, wall-eyed pike, etc., as elsewhere explained.

The pound net season on Lake of the Woods is relatively short. They begin to set the nets between the middle and latter part of May or as soon as the ice permits, some time being required to complete this task where many pounds are being operated under one management. It has been the custom on the part of most fishermen to continue this early fishing only until the first part of July, but occasionally until the 10th or 15th of that month, when, on account of the condition of the fish and the rapid rotting of the nets during mid-summer, the latter are removed for a period of four to six or eight weeks or until some time between the middle and last of August. The fall season lasts through September and October. Some take out their nets as early as the 1st of October, and few attempt to fish into November as stormy weather or the formation of ice may suddenly destroy their gear at any time during that month. A few pounds have generally been kept in position during the summer months, with perhaps an interval of a week or two to provide for the cleaning and retarring of the nets, and there seems to be an inclination to increase the amount of fishing at that season.

Sturgeon, basis of fishery.—As before stated the great abundance of sturgeon has been the incentive for the rapid growth of the pound net fishery on Lake of the Woods. Had there been no sturgeon in these waters pound nets would undoubtedly not have been introduced up to the present time, and should the supply of that species ever become depleted it may safely be predicted that these nets will mostly, if not entirely, disappear, as the scale fish do not seem to be sufficiently abundant to support an extensive fishery alone in view of the inconvenient means of marketing the catch. The welfare of the fishing interests of this lake depends, therefore, chiefly on maintaining the stock of sturgeon on essentially its present basis of productiveness. The quantity of sturgeon inhabiting the lake is assuredly very great, indicating unusually favourable conditions for the reproduction and sustenance of the species, but in all cases there is a certain limit beyond which the resources of nature cannot be drawn upon with impunity.

The sturgeon are all dressed before shipment, the head, tail, fins and entrails being removed. The average weight of 675 sturgeon shipped in this condition during the period of our visit was found to be very nearly 25 pounds. On this basis the total exports for the season of 1895 would represent 76,887 sturgeon, an exceedingly large output considering the limited area of the lake.

Distribution and habits of the sturgeon.—It has been impossible to obtain much information respecting the distribution of the sturgeon in this lake, their movements, spawning habits, etc. They are observed to some extent among the islands in the northern part of the lake, but there is nothing to show that the bulk of the fish ever travel that way, unless it be during the winter months, and it is generally conceded that they remain chiefly in the more shallow southern areas during most of the year. The evidence points to Rainy River as furnishing important spawning grounds, but the sturgeon may also resort extensively to other streams, although the number of the latter is very small. Reliable observations regarding the time of spawning are likewise lacking. The uncertainty concerning that question is increased among the fishermen by the fact that according to their view the eggs utilized as caviar are in about the same condition in both the spring (May and June) and fall, while during mid-summer (July and August) they appear less mature, are smaller, and have less commercial value. The majority of the fishermen place the spawning season between the latter part of May and the early part of July, the most reliable testimony rather favouring the last two or three weeks in June, and the first week or two of July, but there may be more or less fluctuation in the time. A smaller proportion

of caviar is said to be obtained from the same number of fish during the early part of the season at Garden and Oak Islands than along the south shore, giving rise to the impression that the ripe fish resort mainly to the latter region at that period. It is significant that we could not learn of the capture of sturgeon with ripe running eggs on any of the fishing shores. In none of the thousand and more sturgeon which we carefully examined between August 6th and 10th, 1894, were the eggs ripe or even sufficiently large and mature to be classed as of first quality.

The spring fishing is said to begin earliest in the vicinity of the mouth of Rainy river, the fish moving westward from that point along the Minnesota shore. At Garden Island they do not commence to take them until a week or two later, and they arrive about Oak Island somewhat later still. These facts are considered by some of the fishermen to indicate that the bulk of the sturgeon make their appearance in the spring from Rainy River, and distribute themselves to different parts of the lake from its mouth, but there are no other data supporting this supposition.

Decrease of the sturgeon.—Up to the summer of 1895, there had been no marked indication of a general decrease in the abundance of the sturgeon, so far as we are able to judge from the figures obtainable. This is as might be expected considering that the fishery had then been carried on extensively for only about three years. Some of the fishermen of longest experience on the lake, however, were firmly convinced that a falling off was already apparent, and with few exceptions all of the fishermen interviewed agreed that the supply cannot long withstand the heavy drains being made upon it. The settlers along Rainy river, as far up as Fort Francis, furthermore complain that while at one time they had no difficulty in obtaining during the spring all the sturgeon required for home consumption, the number has been so much reduced since the introduction of pound nets in the lake that they are now becoming scarce.

The history of all regions in which sturgeon fishing has been actively prosecuted shows that the supply of that species may readily be depleted, a result which has come to be regarded as inevitable wherever the stock is sufficient to warrant operations on a large scale. So universally as this been the case that we cannot doubt the early extermination of this product in Lake of the Woods for all practical purposes unless stringent measures are introduced at once to prevent or at least delay it.

CONCLUSIONS AND RECOMMENDATIONS.

International interests on Lake of the Woods are concerned chiefly with the preservation of the sturgeon. Although the pound-net catch of scale fish is comparatively large and important, especially at certain seasons, should the capture of sturgeon become unprofitable at any time that method of fishing would probably be mostly, if not entirely, abandoned, and little less be done thereafter in waters closely adjacent to the boundary line. As both the scale fish and sturgeon, however, are taken together and under the same conditions, their preservation should and can be arranged for on a common basis.

The most effectual measure of relief and one which we strongly urge to be carried out is a restriction on the extent of fishing, which undoubtedly already far exceeds a safe limitation. It is impossible to determine positively the maximum number of pound nets which could be fished without danger of depleting the supply, as the latter is an uncertain and fluctuating quantity, and the matter will, therefore, have to be settled arbitrarily; but we are convinced that within the small area to which this kind of fishing is confined the total number of pound nets in use should not exceed 150, to be divided between the two countries in proportion to the extent of shore line belonging to each. Even this number we regard as large to insure the ultimate preservation of the sturgeon, but we have been constrained not to reduce it still further in view of the fact that the industry has already been firmly established on so large a basis.

Besides the limitation upon the number of pound nets to be employed, we would recommend that not over two such nets be allowed in any one string; that the

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leaders to the same be not over 50 rods long each; that the inner end of any pound net or pound net string be set in not less than 10 feet of water, and that the outer end of the same extent not over one mile from the shore; and that no pounds be fished within one mile of the mouth of any stream which the sturgeon are known to enter. The object of such provisions is to insure as much freedom of movement for the sturgeon as possible, both during and subsequent to the spawning run.

We also consider it advisable that no gill net or trawl line fishing be permitted in the pound net region, or south of a line extending due east from American Point, at the mouth of North-west Angle Inlet, to the peninsula, except the use of gill nets by the Indians for supplying their own needs.

While a close time covering the spawning season of the sturgeon could not fail to be beneficial, in order to be effective it would require to begin at such a date and to be continued for so long a time as practically to interfere with the entire spring and early summer fishery, the most profitable in the year. A close season is, however, suggested for the wall-eyed pike and whitefish by restricting the pound net season to the period beginning May 15 and terminating October 31, which is essentially in accordance with the present custom.

Protection should be afforded the young sturgeon by requiring the return to the water alive of all individuals taken in the nets which measure less than 4 feet long. At present they are retained when as small as about $3\frac{1}{2}$ feet, the ordinary maximum size being $5\frac{1}{2}$ to 6 feet. No caviar is said to be obtained from sturgeon under 4 feet long, and none of those containing caviar landed during our visit were less than $4\frac{1}{2}$ feet.

The capture of small whitefish, wall-eyed pike, lake trout, etc., should be restricted by regulating the size of mesh, which should measure not less than $4\frac{1}{2}$ inches in pound nets and 5 inches in gill nets.

No fish offal, garbage, saw-mill waste or other polluting agencies should be thrown or allowed to pass into the waters of the lake.

Fishing for sturgeon in Rainy River, except for domestic use, should be prohibited.

Further inquiries require to be made in Rainy Lake and the more eastern waters of the system before deciding upon the measures necessary to protect their fishery resources.

COLUMBIA RIVER.

The Columbia River rises in the south-eastern part of British Columbia, some of its tributary branches being only a few miles distant from the headwaters of streams which discharge into the Fraser River. It crosses the international boundary line near the north-eastern corner of the state of Washington, and for the rest of its course to the sea flows through United States territory. It is joined a short distance north of the boundary line by the Pend d'Oreille, one of its most important tributaries. We had no opportunity of visiting the headwaters of the Columbia, and heard but little of its fishing capabilities.

All of the species of salmon which belong to the Pacific coast occur in the lower waters of the Columbia; but the hump-back and dog salmon enter the river in comparatively small numbers and do not ascend far. Silver salmon ascend as far as the Snake River, although they are not fished for above the Dalles. The quinnat, sockeye and steelhead are found as far up as the headwaters of the Snake River in Idaho. In the Columbia proper the quinnat are not found above Kettle Falls, although these falls do not constitute an impassable barrier to the passage of salmon; they are from 12 to 15 feet high and in certain stages of the water some salmon do get past. Recent investigations have failed to discover that quinnat salmon ever entered the Pend d'Oreille; there is also no positive evidence that the sockeye is found in this part of the Columbia basin. The steelhead is taken occasionally at the mouth of the Pend d'Oreille, and possibly at other places north of the international boundary, but definite information upon the matter is lacking. There never has been any commercial fishing in the Columbia River above Kettle Falls, and it is not at all

likely that any ever will be established. Under these circumstances, it would seem that there is nothing connected with the Columbia River fisheries which calls for joint recommendations.

WATERS CONTIGUOUS TO THE BOUNDARY LINE BETWEEN BRITISH COLUMBIA AND THE STATE OF WASHINGTON.

DESCRIPTION OF THE WATERS.

Physical features.—The western coast, adjacent to the international boundary line between Canada and the United States, is characterized by a nearly land-locked body of salt water, elongate in shape and extending in a general direction north-west and south-east, a distance of over 200 miles. At the southern end, this body of water penetrates for some 50 miles or more into the state of Washington, while its central and northern portions lie between Vancouver Island on the west, and Washington and the mainland of British Columbia on the east. In some parts, it presents many irregularities as to outline, being much constricted in places, and contains numerous islands which occupy the greatest relative area south of the boundary line. It communicates with the sea by means of two passageways, of which, by far, the larger as well as the shorter one is the Strait of Juan de Fuca, opening on the west. At the northern end begins a series of narrow passages or straits, connecting it with the ocean at the upper end of Vancouver Island.

The northern part of this inclosed sea is known as the Gulf or Strait of Georgia, the southern part as Puget Sound—Washington Sound, a name seldom used locally, intervening. It receives many fresh water streams, but only one of large size, the Fraser River, which rises on the western slope of the Rocky Mountains in the neighbourhood of Yellowhead Pass, and lies wholly within the territory of British Columbia. Its total length is about 740 miles.

The international boundary line, coinciding with the 49th parallel of latitude, strikes the Gulf of Georgia only a few miles south of the mouth of the Fraser River, between it and Point Roberts, and passes thence to the westward of the San Juan Islands, and through the centre of the Strait of Fuca.

Fishery resources.—The waters of this region afford a great variety and abundance of important fishes, of both exclusively marine and anadromous species. The ordinary sea fisheries, however, have been developed only to a limited extent, and with respect to only a few species such, as the halibut, herring and dog fish, and further study must be made before passing upon their condition and requirements.

The important anadromous fishes are several species of salmon and the sturgeon. The latter is now fished for extensively only on the Fraser River, but is taken incidentally in the trap nets and by other means on the coast of Washington, more especially at Point Roberts. As a valuable food product, it is deserving of protection, but it is doubtful if joint action regarding it is necessary at the present time, as there is no incentive to its capture in United States waters. The traps at Point Roberts, moreover, are not set during the period when the species is supposed to be making its spawning run, and a close season is thus provided without the aid of legislation.

International interests.—The most important fishery problems for international consideration in this region, and the only ones which appear now to demand urgent attention, are presented by the salmon fishery, which has already attained a remarkable development, and is still rapidly increasing. This industry has been conducted longest on the Fraser River, where it is also carried on upon much the larger scale. The international character of the subject is determined by the fact that certain bodies of the fish on their way from the sea to their spawning grounds pass successively through the waters of both countries and are fished for on both sides of the boundary line during the progress of this movement.

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THE SALMONIDAE.

General account.—Six species of salmon are here recognized by the fishermen namely, the saw-qui or blue-back salmon (*Oncorhynchus nerka*), called locally "sock eye," the quinnat or chinook salmon (*O. tshawytscha*), humpback salmon (*O. gorbusha*), silver salmon (*O. kisutch*), dog salmon (*O. keta*), and the steelhead (*Salmo gairdneri*). The sockeye is most in demand for canning purposes, in connection with which industry the bulk of the salmon caught in this region is now utilized.

All of the species except the sockeye resort to numerous streams tributary to the Gulf of Georgia and Puget Sound for the purpose of spawning, and in the course of their movements they, therefore, become distributed over the greater part of these inland waters, thus affording opportunities for fishing in widely separated localities. The spawning grounds of the sockeye, on the contrary, seem to be chiefly confined to the Fraser River, toward which the greater part of the entire run, after entering through the Strait of Fuca, is immediately directed. It thus traverses a comparatively well-defined course, outside of which extensive fisheries for the species have not been prosecuted.

Sockeye or blue-back salmon.—This species is known exclusively as the "sock-eye" salmon to the fishermen of the Puget Sound and Fraser River region. It is the species most preferred and chiefly used there for canning purposes, on account of the depth and stability of its colour, the firmness of its flesh, etc. Within the area of its distribution it appears to be generally more constant and reliable in its movements than most of the other forms, and beginning to run at a comparatively early date, it affords a considerable fishery so far in advance of the spawning period as to insure an excellent quantity of fish.

The sockeye, as well as the other salmon, which frequent the Gulf of Georgia and Puget Sound, are supposed to enter from the ocean almost entirely through the Strait of Fuca. Some sockeye are said to make use of the inland passage at the northern end of Vancouver Island, but it is claimed that the schools which make their appearance from that direction proceed no farther south than the meeting place of the tides near the southern entrance to Seymour Narrows, their destination being the small rivers which empty along the adjacent shores.

So far as we have been able to ascertain, the sockeye are first observed abundantly in the Strait of Fuca in the vicinity of Becher Bay, a short distance to the westward of Victoria. Between there and Race Rocks they are fished for to a slight extent. Proceeding farther eastward their general tendency is toward the north. A part of the fish turn immediately in that direction, moving up through the Canal de Haro, past San Juan and Stuart Islands, some apparently continuing through the wider channel into the Gulf of Georgia, while others make use of the narrower passes, of which Active or Plumper's Pass has been especially mentioned by those acquainted with the regions. Still other schools pass to the south of San Juan and Lopez Islands, skirting their shores in part, and proceeding up through Rosario Strait. These, to some extent at least, approach Lummi Island and parts of the mainland to the north as far as Boundary Bay which they enter, and thence move around Point Roberts on their way to the Fraser River. A few sockeye are said to enter the bays along the mainland east of the San Juan Islands, and small numbers are reported to be taken in Skagit Bay and in the vicinity of Seattle, but from the evidence obtained it seems likely that large bodies of the species practically avoid the southern part of Puget Sound and the northern part of the Gulf of Georgia. It is, therefore, found abundantly only in the channels and open waters leading from the Strait of Fuca to the mouth of the Fraser River and in places closely adjacent thereto.

The reason for this restricted distribution is explained by the fact that the Fraser seems to be the only river in this region to which the sockeye resorts extensively, and from the evidence at hand we are led to conclude that the species depends mostly on that river for its spawning grounds and hence for perpetuating the main supply on which the market fishery is chiefly based. Small runs enter Lake Wash-

ington at Seattle, and also ascend the Skagit River and possibly other neighbouring streams, but, according to the testimony presented, their total amount is relatively inconsiderable.

The principal fisheries for the sockeye are carried on in the Fraser river and in the Gulf of Georgia, both off the mouth of that river and around Point Roberts. Other important fisheries on a smaller scale are located at the northern end of Lummi Island and at the southern end of San Juan Island. Small quantities are also taken at several other places, more especially by the Indians.

At the commencement of the seasonal movement the fish are reported to appear successively at Becher Bay and the San Juan Islands, before reaching the Fraser river, and the progress of succeeding large schools or bodies has been noticed in the same order, but observations respecting the rate of travel are exceedingly imperfect, although it is said that an interval of anywhere from 5 days to 2 weeks may elapse between their appearance at Becher Bay and at the mouth of the Fraser River. In some of the fishing places they seem to linger for a time, while they pass by others without stopping. Large numbers may remain for a week or 10 days in the discoloured water off the mouth of the river, where a large part of the cannery supplies has been obtained during the past few years.

The sockeye may begin to ascend the Fraser River in the last part of June or the very first part of July, but they are not looked for in sufficient numbers to start fishing before the 10th of the latter month, and it may be still later before operations can profitably be commenced. As a rule, however, the season is expected to open about July 10, and the fish to be running as heavily as they will by July 20. The big runs seldom continue much, if any, beyond August 20, and the entire movement closes in the early part of September at the latest. These dates fluctuate, however, and sometimes very markedly, from year to year, dependent upon seasonal conditions. Two or three distinct periods in the movements of the fish are recognized by the fishermen both on the river and at Point Roberts, but they are separated only by short intervals of poor fishing.

There does not appear to be much difference in the time of arrival of the fish at Point Roberts and at the Fraser River mouth, but there is lack of satisfactory evidence respecting this subject. The time consumed in ascending the tidal part of the river is discussed below in connection with the subject of drift net fishing.

It is claimed by the fishermen that a regular periodicity occurs in respect to the abundance of the sockeye salmon, arranged in cycles of 4 years. Every fourth year, as a rule, this species is said to appear in greatest abundance, followed by 3 years of successively smaller runs, although the grouping is considered to be more properly 2 good years followed by 2 poor ones. While there is a marked fluctuation in this respect in different years, the statistics of the catch fail to show that it takes place with the regularity described.

From such evidence as could be obtained, it seems probable that the sockeye spawns throughout practically the entire length of the Fraser River system, from its lowest to its highest tributaries. The earliest runs are said to work furthest up stream, while some of the later ones at least enter such low down tributaries as the Pitt and Harrison Rivers, both of which have large lake areas. It is probable that this species resorts to the inlets of the lakes for spawning purposes. The spawning season is chiefly the month of October, but it may begin in the latter part of September and continues more or less into November.

No authentic information respecting the extent of mortality of this species after accomplishing its reproductive function could be obtained in regard to the Fraser River, although enormous quantities of dead ones are observed each year in the tributary streams containing its spawning grounds. Investigations made on the Columbia River, however, prove that none of those at least which reach the upper waters return again to the sea, and it is not unlikely that this strange fatality extends to all parts of the river system.

On the Fraser River the general weight of the sockeye is said to be between 7 and 8 pounds, but they sometimes run as small as 6 pounds, and individuals weighing as high as 10 pounds are occasionally taken.

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The catch of sockeye made both in the outside waters and in the Fraser River is used almost exclusively for canning purposes. The local demand is very limited and only relatively small amount are shipped fresh to eastern markets.

We have not been able to obtain any evidence of a decrease in the abundance of the sockeye salmon since fishing operations were commenced in this region.

Quinnat salmon.—The quinnat, chinook, tye or spring salmon are present in this region to a greater or less extent during nearly the entire year, if not at all times, and have spawning grounds in many different streams, although the Fraser River is their principal resort. They may be taken by hook and line in the Gulf of Georgia and Puget Sound during the winter. In February they are said to enter the Fraser River in small numbers, and they continue ascending during the succeeding months, becoming most abundant in May and June. A few are captured in connection with the sockeye, and later another definite run, somewhat smaller than the spring one, takes place; it begins in September and extends into October. The ordinary size of the species as represented in the catch is from 15 to 20 pounds, but individuals weighing 40 to 50 pounds, are not uncommon, and they have been taken weighing as high as 70 pounds.

Although the quinnat ranks first in quality among the salmon of this region, it is not much utilized for canning purposes. In the spring, before the Atlantic salmon appears abundantly, it is in great demand and brings a higher price fresh for the eastern market, and subsequently small shipments continue to be made into the interior of the country. Furthermore, there are many light-coloured and even white-meat fish among them, the proportion of such being some times very large, and causing prejudice against their use by the packers. The pound nets in United States waters are not set until after the close of the spring or main run and the catch in Puget Sound has consequently never been a large one.

Silver salmon.—The silver salmon, or "coho" of the Indians, is an active species, intermediate in size between the sockeye and the quinnat, which distributes itself widely through the region and enters even the narrower channels among the islands. It is said to afford excellent sport fishing in salt water. At Port Angeles, in the Strait of Fuca, it is expected to begin running in the early part of August, but about the San Juan Islands the first catches are made between the 20th and the end of August. In the neighbourhood of Seattle the earliest catch recorded in any year was obtained on August 28th, but the fishery for the species in that locality does not generally commence until about a week later, and it may be carried on until the latter part of October. On the Fraser River the run usually begins between September 10th and 15th, and continues through most or all of October. On this river the silver salmon is only utilized occasionally for canning, more especially in the event of a shortage in the catch of sockeye, but it is extensively salted there, and figures rather conspicuously in the output of the canneries in Washington, where the fishery is mainly by means of purse seines.

Humpback salmon.—The humpback salmon is the smallest and one of the most abundant species in these waters, but it is said to be present only in alternate years. The fish come in large schools and move very slowly, running mainly during August and the early part of September, but sometimes beginning in the latter part of July. They are often associated and taken in connection with the sockeye, but owing to their inferior quality are seldom made use of. In 1895 they were being canned at only one establishment, located in Washington. The Indians smoke them and they are also salted to some extent for export. This species spawns in the lower tributaries of the Fraser River and in many other coast streams.

Dog salmon.—This species comes next in size after the quinnat. It resorts to the fresh waters generally for spawning, entering, it is said, every little creek along the shores. There is considerable difference in the date of its first appearance in different parts of the region, but in Puget Sound the extreme range of the season is from about September 20 to the middle of November. In Hood's Canal it is taken earlier. In the beginning it is considered to be of good quality, but the colour of

the flesh is light, and becomes still paler as the season advances. The dog salmon has no commercial value on the Fraser River, but some of the Washington canneries make use of it, as do also the Indians.

Steelhead.—The steelhead or large sea trout are regarded as of excellent quality in this region, and are in demand for the fresh markets, but they have practically never been utilized by the canneries. Very little information could be obtained regarding their habits. They apparently run up stream mainly in the fall, but between what dates could not be learned. They are said to be in best condition from December to March, inclusive.

THE SALMON FISHERIES.

Fraser River.—Commercial fishing for salmon on the Fraser River has been carried on more or less extensively during about 20 years. It is restricted by law to tidal waters, the upper limit of which is placed at Whonnock Creek, some 40 miles above the mouth of the river. Drift gill nets are the only form of net permitted to be used for that purpose both here and elsewhere throughout British Columbia, with two exceptions, seines being allowed in one of the small northern rivers and trap nets in the Canadian part of Boundary Bay. Above the influence of the tide the Indians may take salmon for their own use by means of spears and dip nets, and hooks and lines may be employed.

The length of the drift nets is restricted to 150 fathoms. Two sizes of mesh are recognized. The larger, intended especially for the quinnat salmon, measures $7\frac{3}{4}$ inches in extension, and may be used from March 1 to September 15. The smaller, designed for the sockeye, silver salmon, etc., measures $5\frac{1}{2}$ inches, and may legally be employed from July 1 to August 25, and again from September 25 to October 31. In 1894, owing to the lateness of the run of sockeye, the open season for the small-meshed nets was extended to September 1. Between September 15 and 25, and between November 1 and March 1, all salmon fishing with nets is prohibited.

Drift net fishing is actually carried on only to a limited extent above the town of New Westminster, which is situated about fourteen miles from the mouth of the river. This is especially the case with respect to the sockeye, for which species only a small proportion of the nets are set above that place, to a distance of three or four miles, nearly all of the fishing being conducted in the lower part of the river and in the adjacent open waters. The outside grounds which have been much resorted to during the past two or three years extend from Point Grey, at the north, to the international boundary line at the south, and offshore a distance of five miles or more.

Until 1891, inclusive, the number of drift nets employed was limited to 500. Since then, however, licenses have been issued to all *bona fide* fishermen, British citizens and residents, who make application. The canneries and other establishments dealing in salmon are allowed several nets apiece, but each independent fisherman is entitled to only a single net. The number of drift net licenses issued and the total length of the nets employed each year since 1891 has been as follows:—

Year.	Number of Nets.	Total Length of Nets.
1892.....	702	123,250 fathoms.
1893.....	1,072	176,000 “
1894.....	1,666	250,000 “
1895.....	1,733	260,000 “

The licenses do not define the ground which each fisherman may occupy, but it is provided that the nets shall be kept at least 250 yards apart, and shall not be

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used so as to obstruct more than one-third the width of the river. Fishing is carried on both day and night, the highly discoloured water which prevails throughout the fishing season serving to obscure the presence of the nets in the day-time.

We could obtain no definite information respecting the rate of movement of the sockeye up the Fraser River. A weekly close season is observed from six o'clock Saturday morning until six o'clock Sunday evening, immediately following which better fishing, as a rule, is obtained in the neighbourhood of New Westminster than at other times of the week. This fact would seem to indicate that fish are able to cover the distance from the mouth of the river in considerable numbers during the 36 hours of uninterrupted passage.

Coast of Washington.—In the Gulf of Georgia, Puget Sound and adjacent waters within the state of Washington, salmon fishing is carried on by means of trap nets, purse seines, drag seines, reef nets and gill nets.

The reef nets belong exclusively to the Indians, and are the original and principal method employed by them for taking salmon. They are fished among the kelp on rocky bottoms, especially about the San Juan Islands, Lummi Island and Point Roberts. The catch by this means, however, composes only a very small proportion of the total catch of the sound. Gill net fishing is followed to some extent in a few of the rivers.

Next to the trap nets, seines are the most productive of the appliances utilized in this region. Two kinds are employed, purse seines and drag seines, the former most extensively. The species chiefly obtained by these methods are the silver, hump-back and dog salmon. Of the total output of the Washington canneries, in 1895, about one-fourth of the fish, by weight, was secured by means of seines. More than one-half of the seine catch was packed at Seattle and no part of it at Point Roberts, but a small catch made in the vicinity of the latter place was disposed of on the Fraser River.

Trap nets have been found to be the most effective form of apparatus for the capture of the sockeye salmon in the clear open waters of the gulf and sound, but they are of recent origin in this region and are still employed in only a few localities, although the tendency is now to increase their number rapidly. Their use has thus far been almost entirely restricted to the zone traversed by the sockeye, and to the season when that species is present therein, but at times one or more of the other species may be taken in large quantities in conjunction with it.

The distribution and number of the trap nets in 1895 was as follows: Point Roberts, including two in the Canadian waters of Boundary Bay, 15; Village Point, Lummi Island, 2; Cattle Point, San Juan Island, 2; Point Demock, Camano Island, 1; Hunot Point, Fidalgo Island, 1; total 21. This is probably the largest number that has been fished in any one year. Additional locations have been occupied, but have been abandoned after trial, and more or less changes in position have everywhere taken place each season. Outside of Point Roberts the use of these nets does not seem to date before 1893, and the majority of those above enumerated were established in 1893 or 1894. We were informed that the building of at least 7 new ones in several different places was contemplated for 1896.

Trap net fishing has been carried on chiefly and for the greatest length of time in the waters immediately surrounding Point Roberts, where the sockeye salmon appear to strike in greater abundance than elsewhere near the shore in United States territory. There are about 32 trap net locations, so-called, in this region, that is to say, places where such nets have been constructed, but less than one-half of them were occupied in 1895. Experience has indicated the most favourable situations for operating traps and these have been taken possession of by those in a position to control the ground, while others have to be satisfied with inferior sites, and some experimenting is still going on in the hope of securing good results in other places.

Of the fifteen nets operated about Point Roberts in 1895, two were off the west shore, two off the south shore, and eleven off the east shore, the last being within the area known as Boundary Bay. The western traps were both situated near the

boundary line, the crib of one being nearly a mile, and of the other, nearly two miles offshore. The leader of the former approached near the shore, but that of the latter began a long distance off, on the edge of the wide bank or shoal. The two southern traps were located not far from the south-western corner or lighthouse reservation, the leaders starting near the beach, and the cribs being distant from the shore about 1,200 and 2,000 feet, respectively.

In Boundary Bay, the water is everywhere so shallow as to permit of a very general distribution of the traps, the most of which have been located without reference to proximity of the shore. In 1895, there was one continuous string of three traps and another of two traps, the remainder being arranged singly. The string of three traps extended off in a south-easterly direction from the south-eastern corner of the point, on which is located the only salmon cannery at this place, lying, therefore, at the entrance to Boundary Bay in rounding Point Roberts from the direction of Fraser River. Its entire length was about one mile; the inner end of the inner leader came close upon the shore, and at the time of our visit, was carried up to high water mark on the beach by an additional piece of netting. The passage of the salmon around this point is thereby prevented for the distance of a mile offshore, and navigation is likewise impeded to the same extent. This line of traps practically parallels the northern margin of a large rectangular reef or patch of rocky bottom, on which the Indians have hitherto done the main part of their reef net fishing for sockeye. The fish are thus mostly turned away from this once productive ground, and this fact has led the Indians to seek redress in the courts, on the plea that treaty rights have been violated.

The remaining 8 traps in Boundary Bay lie to the north and north eastward of the long string, as far as the boundary line, two, in fact, being north of the line, in Canadian waters. The majority of the traps in use, however, as also of the abandoned locations, are situated directly east of the southern part of Point Roberts, their trend, in a general way, being north-west and south-east, but varying considerably within those limits. The cribs of these nets are distant from low water mark on the nearest adjacent shore from about two-fifths of a mile to about two miles, the lengths of the leaders and the positions of the inner ends of the latter with respect to the land differing greatly.

The location and direction of all the traps about Point Roberts have been based upon such knowledge of the movements of the schools of sockeye as the fishermen have acquired through several year's experience. The best position of all is said to be that occupied by the string of three nets extending off from Cannery Point. Next in supposed order of excellence is the neighbourhood of south-west point, followed by the outer waters in the vicinity of the boundary line. The poorest success has been met with in the upper part of Boundary Bay. In some locations, considered to be advantageous as regards the movements of the fish, the bottom or other conditions are unfavourable for introducing this character of apparatus.

The arrangement of the traps is on the understanding that at least those schools of sockeye which pass near the shore enter Boundary Bay toward its eastern side, and then sweep around toward Cannery Point or the adjacent reef. Thence they are supposed to follow the southern and western shores of Point Roberts until near the boundary line, where they are deflected somewhat by the broad bank lying in front of the Fraser River mouths. The leaders are set so as to face the approaching schools and direct them toward the cribs, their course varying, therefore, more or less in accordance with their position. As the fish move only in one direction, passing in a general way from east to west, the cribs have an opening only on one side.

The cribs at Point Roberts are large, but vary considerably in size; they are rectangular in shape, but seldom exactly square. The smallest, in 1895, measured 40 by 38 feet, the largest 80 by 70 feet. Owing to their exposed position and the occasional heavy storms which occur during the fishing season, the trap nets have to be very strongly constructed and present the appearance of being built to stand permanently; but they are sometimes greatly damaged, and at the end of the season are all practically dismantled, although the stakes are seldom removed, being

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generally left in place even when the site is abandoned. The depth of water at the cribs at low tide varies from 3 to 8½ fathoms; at the inner ends of the leaders it ranges mostly from 1 to 3 fathoms, but three of the traps have no shoaler water about them in any part than 5 fathoms.

The first trap net at Point Roberts is said to have been established about 1885; a second one seems to have been added about 1888. The number was increased to 4 or 5 in 1890 or 1891, to 13 in 1893, and to 16 in 1894. The waters about the point have furnished profitable fishing to the Indians as far back as the records go, and during at least 10 years preceding the introduction of the traps, drag seines were used there by the whites, the catch of salmon made by this means being chiefly salted for shipment.

Canneries.—The canning of salmon on the Fraser River began about 1875, since which time the number of establishments engaged in that business has steadily increased, reaching 30 in 1895. These are mostly located at and below Ladner in the extreme lower part of the river, the principal centre for them at present being Steveston, at the mouth of the central or main channel.

In the United States waters of the region six canneries were in operation in 1895, one each at the following places, namely:—Seattle, established about 1878; Semiahmoo, 1890 or 1891; Point Roberts, 1893; Friday Harbour, 1894; Port Angeles, 1895, and Bellingham Bay, a small experimental cannery, built in 1895. The construction of several new canneries was contemplated for 1896.

Statistics.—Complete statistics for the output of salmon are available only for the Fraser River and adjacent Canadian waters. The following figures covering that district during the past four years are taken from the official reports:—

Year.	Canned Lbs.	Fresh. Lbs.	Smoked and Salted. Lbs.	Total. Lbs.
1892.....	4,277,552	2,047,009	916,000	7,240,561
1893.....	22,763,380	2,736,000	884,200	26,383,580
1894.....	17,451,172	1,250,000	380,000	19,081,172
1895.....	24,445,421	.....	.....	24,445,421

The output of the Washington canneries for 1895, based partly on estimates, was about 5,375,000 pounds, of which about 2,600,000 pounds were of sockeye canned at Point Roberts, Semiahmoo and Friday Harbour. No figures could be obtained of the sales of fresh and salted salmon taken in United States waters.

POLLUTIONS.

Fish offal.—In the dressing of salmon for canning purposes a very large quantity of waste is produced, amounting to at least one-third the total weight of the fish handled, and in some cases, by actual observation, to between 40 and 50 per cent. This waste consists of the heads, fins, tails and entrails, all of which are rejected, as no use for them has yet been found except in the manner described below. The proper disposition of this offal, aggregating many tons each season, has given rise to much discussion. The customary practice has been to dump it into the water near each of the canneries where it is produced, but several remedial measures have been attempted although none has met with satisfactory results. The question raised with respect to the presence of so much offal in the water is whether its effect is detrimental or not, either to the welfare of the salmon or to the health of the adjoining region. The bulk of it is produced within a comparatively short period of time, and hence the difficulty of caring for it otherwise than at present. The Canadian regulations of 1890 prohibit the throwing of the offal into the Fraser River, and at one time an attempt was made to have it carried out beyond

the mouth of the river, but this measure was found to be inexpedient and has not continued to be enforced. Factories have been established for converting the waste into oil and fertilizer, but not meeting with financial success they were soon abandoned. This subject has received no attention from the state authorities of Washington.

The cannery people everywhere are confident that no harm results from their method of disposing of the offal, unless it be in certain restricted areas where the eddies cause its retention for a time. During the greater part of the canning season the volume of water in the Fraser River is large, its temperature is low and the current strong. The offal in a fresh condition is said to sink at once and to disappear. The inhabitants, generally, along the river oppose the practice on the ground that it is injurious to health, from which standpoint, however, the question is not of international significance. With respect to the open waters of the sound, we have heard of no complaints regarding this matter, although some of the offal is known to wash ashore in places.

No evidence has been obtained which shows that the throwing in of the offal has had a pernicious effect upon the movements or the abundance of the salmon. If such an effect has actually been produced, as may be the case, it has not, up to the present time, made itself sufficiently manifest to bring it within the scope of observation. We are led, however, to deprecate the continuance of the practice for local reasons at least, and would urge further experiments looking to the utilization of the offal as an incentive to its retention on land.

REGULATIONS IN FORCE.

Following are the more essential provisions of existing salmon regulations on both sides of the boundary line, and also of certain proposed enactments by the Legislature of the State of Washington.

Fraser River.—Commercial fishing is restricted to tidal waters, and to the use of drift gill nets not exceeding 300 yards in length.

The drift nets for quinnat salmon shall have not less than $7\frac{3}{4}$ -inch mesh, and may be used from March 1 to September 15.

The drift nets for other kinds of salmon shall have not less than $5\frac{7}{8}$ -inch mesh, and may be used from July 1 to August 25, and again from September 25 to October 31.

All commercial fishing is prohibited weekly from 6 a. m. Saturday to 6 p. m. Sunday; and annually from September 16 to 25, and from November 1 to March 1.

Drift nets shall be kept at least 250 yards apart, and shall not obstruct more than one-third the width of the river.

Salmon weighing less than 3 pounds shall not be taken.

Resident fishermen are entitled to 1 license each; canners and dealers in fresh and prepared salmon, to from 2 to 20 licenses each.

Washington.—The only regulations relating to the capture of salmon in the open waters of Puget Sound are as follows:

No trap net lead shall exceed 2,500 feet long. There shall be an end passageway of at least 600 feet, and a lateral passageway of at least 2,400 feet between all traps, set nets, etc.

A license is required for each fixed appliance and not more than three licenses shall be issued to one person or corporation. Licenses are issued only to residents and citizens of the state.

Salmon measuring less than 10 inches long can be taken only by hook and line.

By a recent decision of the court, the waters about Point Roberts were declared to be outside of Puget Sound, and, therefore, not subject to the above provisions. There are, consequently, no restrictions applicable to the fisheries in that locality, and this condition was sought to be remedied by a bill submitted to the State Legisla

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ture in February, 1895, which passed the House, but failed of action in the Senate. The following were the principal features of the proposed bill :

The area covered was defined as Puget Sound and the Gulf of Georgia and their tributary waters, within which the same system of licenses should maintain as in the existing law.

Trap net leads were limited to a length of 2,000 feet, with an end passage-way of at least 600 feet and a lateral passageway of at least 3,000 feet between all traps. The mesh of the nets were to measure not less than three inches in extension, and all stakes were to be removed within thirty days after the close of the fishing season.

A close season was provided for the open waters during the entire month of October, and for tributary streams during April, and from October 1 to November 15. In the fresh water tributaries only hook and line fishing was to be permitted between sunset Saturday and sunrise Monday of each week.

The throwing of mill refuse into the water was prohibited.

SUMMARY OF CONDITIONS.

The purely salt water fisheries of the Gulf of Georgia, Puget Sound and adjacent waters have so far been only slightly developed, and comparatively little is known respecting the extent and distribution of their resources. In view of this fact, and until the region shall have been more thoroughly studied and its requirements more definitely ascertained, we consider it inadvisable to attempt their regulation.

The salmon fishery, on the other hand, presents important questions demanding urgent attention. Each of the six species of salmon resorting to these waters has a commercial value and is utilized, although to a variable extent, dependent in part upon the popular estimate of the quality of its flesh and in part upon the readiness with which its capture may be effected. There is no evidence up to the present time of a decrease in the abundance of any of these forms, but the fishery, already conducted on a large scale, is growing rapidly, with the prospect of its resources soon becoming overtaxed in at least one direction.

Five of the species have more or less widely distributed spawning grounds, which circumstance favours their chances of preservation and makes their protection feasible to some extent by local measures. The sockeye salmon, however, having its spawning grounds mainly confined to a single river, toward which the movement of successive schools is chiefly directed on their passage from the sea through the inclosed salt waters of the two countries, constitutes the most prominent object of the fisheries for international consideration at the present time. From a commercial standpoint, moreover, this species is much the most important member of the salmon group in these waters, and were its distribution sufficiently extensive and its season sufficiently prolonged, it would probably be the only species made use of by the canneries.

The perpetuation of the run of sockeye, as of the other salmon, depends unquestionably upon a sufficient number of the fish reaching their spawning grounds annually to provide for the quantity withdrawn by the nets. As regards the sockeye, the material interests of the Fraser River and of the coast of Washington are identical, and whatever might affect the fishery disadvantageously on the one would be equally harmful on the other.

Much remains to be learned respecting the movements of this species. It appears certain that the schools bound for the Fraser River divide or separate when they reach the inner end of the Strait of Fuca, a part passing up to the westward and a part to the eastward of the San Juan Islands, but they are said to entirely avoid the central or San Juan Channel, possibly on account of the very shallow water at its southern entrance. Some of the schools enter Boundary Bay and, thence, turning to the westward, make around Point Roberts, the site of the principal fishery in United States waters. It has not been ascertained by observation, however, what proportion of the fish reach the neighbourhood of Point Roberts, and

there is a diversity of opinion on that subject. The weight of the evidence favours the belief that a large, if not the larger, proportion of the sockeye, after entering the Gulf of Georgia, make directly for the Fraser River or, at least, reach its mouths without approaching closely to the Washington coast. This is supposed to be especially the case with those passing through the Canal de Haro, and this view is supported by the fact that the drift net boats from the river obtain their best fishing well out in the gulf. The fishermen at Point Roberts claim, moreover, that the schools which come their way trim the shore only in part, being distributed to a distance of three or four miles off the land, and that, therefore, only a certain proportion of the fish can be intercepted by the trap nets. The fish are also said to enter Boundary Bay no further than half a mile above the boundary line, and in passing out of it to strike mostly at the south-east and south-west corners of the point, which furnish the best fishing situations. They evidently do not tarry long in Boundary Bay or about the point, as all accounts agree that they are moving rapidly toward their destination. They appear, however, to collect and remain for a short time in the discoloured and brackish water, which, at the season of their passage, covers the broad shoal off the mouths of the Fraser River and makes it such an attractive ground for the drift net fishermen.

To what extent fishing for the sockeye can profitably be carried on south of Point Roberts is still problematical. In the Strait of Fuca the species is first seen abundantly in the vicinity of Becher Bay, where the conditions seem unfavourable for extensive operations. It is next observed at the southern end of San Juan and Lopez Islands, where Indian reef net grounds occur and where two trap nets have been fished during two years past. Small quantities are taken in the traps in Skagit Bay, which they enter through Deception Pass, but of the northward moving schools the third principal fishing ground is on the outer side of Lummi Island near its northern end. Other reef net grounds about the San Juan Islands may be known to the Indians, but the only places where trap nets have been used at all successfully are those just mentioned.

The fishery in United States waters, however, is of very recent origin, and the incentive to its development is so great that we cannot doubt the early discovery of means for intercepting the schools at numerous places along their course. In this view of the case, which we feel entirely justified in taking, it is important that suitable protective measures be established at once, while the supply of salmon is still intact and its maintenance can be assured. In framing our recommendations much difficulty has been encountered in consequence of the great diversity of conditions and practices prevailing on the two sides of the line, but we have sought to provide as uniform regulations as the circumstances render possible. The discoloured waters of the Fraser River are best suited to the use of drift nets. In the open, clear waters of the state of Washington, however, trap nets furnish the only means known to be adapted to the capture of the sockeye on an extensive scale, only a relatively small quantity of this species being taken in the Indian reef nets and the drag seines. The principal interests requiring to be harmonized, therefore, are those of the drift nets and the trap nets, appliances which are totally unlike in their working and in their requirements. Not permitting of a comparison of their respective merits under the different conditions which here accompany their employment, the only safe expedient has been to provide for the passage toward their spawning grounds of a certain proportion of the fish, both by maintaining open passage-ways at all times, and by the removal of all obstructions at stated periods. These measures have been adopted as the main features of the regulations herewith suggested.

RECOMMENDATIONS.

1. The following recommendations are intended to apply only to those waters, adjacent to the boundary line between British Columbia and the state of Washington, which are traversed by the main body of the sockeye salmon and to which our inquiries were chiefly restricted. This area may be roughly defined as comprising

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the Strait of Juan de Fuca and those parts of the Gulf of Georgia and Puget Sound (Washington Sound) lying between the parallels of 48° 10' and 49° 20' north latitude, together with their adjacent bays and tributary streams. We consider, however, that it would be advantageous to extend the scope of any joint regulations which may be agreed upon to all parts of this inclosed sea, and the information necessary to accomplish that purpose satisfactorily could readily be obtained.

2. In the salt waters comprised within the state of Washington we see no reason for prohibiting at present any of the kinds of apparatus now employed there, namely, trap nets, purse seines, drag seines, reef nets and gill nets, the bulk of the sockeye catch being made in the form of net first mentioned.

3. We are in accord with the Canadian regulation which restricts commercial fishing on the Fraser River and off its mouths to the use of drift gill nets, and recommend that the rivers in Washington be subject to the same regulation.

4. Being uncertain as to the capacity of the contiguous waters in question in respect to fishing operations, we are not prepared to suggest a direct limitation upon the quantity of apparatus to be employed, but consider that the present requirements of the case will be met by the restrictive measures which follow.

5. The mesh in trap nets to measure, in extension, not less than three inches in the crib and 6 inches in the leader when actually in use.

Trap net leaders not to exceed 2,000 feet in length.

Not more than two traps to be placed in one continuous line, and when so arranged to be separated by a gap of at least 100 feet between the inner crib and the beginning of the outer leader.

All traps or strings of two traps to be separated by lateral passage-ways of at least 2,500 feet.

The inner end of all trap net leaders to begin in a depth of not less than 1 fathom at low tide, and the space intervening between it and the shore to remain entirely unobstructed.

All trap net stakes to be removed from the water, in the interest of navigation, within 30 days from the close of the fishing season.

6. Drift gill nets not to exceed 150 fathoms each in length.

The drift gill nets employed for taking quinnat salmon to have not less than 7½-inch mesh extension measure, and to be used only from April 1 to September 15.

The drift gill nets employed for taking the sockeye and other smaller species of salmon to have not less than 5½-inch mesh extension measure, and to be used only from July 1 to October 1.

All drift nets when in use to be kept at least 250 yards apart, and to obstruct not more than one-third of the width of the river.

7. We are not prepared to suggest any changes in the dimensions or in the manner of employing drag seines, purse seines and reef nets, nor do we consider any such changes essential while the extent of fishing by these methods remains as small as at present.

8. It is recommended that in all rivers commercial fishing with nets be restricted to the tidal part of the river.

9. We consider it very important that the movement of the salmon toward their spawning grounds be facilitated by weekly close times of 36 hours duration, which we suggest extend from 6 a. m. on Saturday to 6 p. m. on Sunday of each week, during the continuance of the fishing season.

10. We also recommend an annual close season, extending from October 1 to April 1 of each year, during which all net fishing shall be prohibited.

11. We recommend that the Indians be allowed to fish at all times by their customary methods, except the use of drift nets and spears on the rivers during the close seasons, during which periods, moreover, they should be permitted to take salmon only for the purpose of supplying themselves with food, and not for sale or barter.

12. As no evidence of a decrease in the abundance of any of the salmon species has been obtained, we do not feel justified in recommending joint action at present in the matter of their artificial propagation. While we feel confident that the

natural supply can best be maintained by early compliance with suitable protective measures, we found it generally admitted that the efforts made by the Canadian Government to increase the stock of sockeye salmon on the Fraser River by fish-cultural methods has been beneficial, the annual run of the fish being made more constant and the off seasons being improved. In view of the growing demand for the shipment of quinnat salmon in a fresh condition, which may sooner or later come to exceed the supply, we venture to suggest the possibly greater advantages to be gained by the artificial hatching of that species.

13. We are convinced that the remedial measures which have heretofore been adopted, although not enforced, for disposing of the fish offal from the canneries on the Fraser River are inadequate to accomplish the results intended and are also to a large extent impracticable. The practice of throwing this waste material into the river is to be deprecated on general principles, but except in respect to a few localities, no specific evidence has been presented to indicate that it may be detrimental either to the health of the community or to the welfare of the salmon, and there is no proof that the latter have suffered from this cause. It seems to us that as much, if not greater, harm would result from dumping the offal in the open waters off the entrance to the river as from its disposition in the customary manner in the vicinity of the canneries, providing the necessary precautions are taken. So far as we have been able to ascertain, when thrown into the current of the river in a fresh condition it is practically always dissipated, and produces a nuisance only when placed in quiet, shallow water or in eddies which tend to retain it along the shores or to carry it into the adjacent sloughs. Factories established for converting it into oil and fertilizer have failed of success, nor is there any apparent prospect of its extensive utilization in the immediate future. While suggesting renewed inquiries for reaching a more satisfactory solution of this question, we are constrained to recommend that, for the present, the current practice be allowed to continue, under such restrictions as may be called for to prevent the accumulation of the offal in any situations where its effect can be shown to be prejudicial. The fishery officer of the district should be empowered to designate all places where the throwing in of this waste should not be permitted.

No complaints respecting the offal in the vicinity of the canneries in the state of Washington have been received from any source, nor do any regulations regarding the manner of its disposition in that region seem to be called for at present.

14. Waste from saw-mills and other substances deleterious to the salmon should not be allowed to pass into any streams which they frequent.

WM. WAKEHAM,

Representative on behalf of
Great Britain.

RICHARD RATHBUN,

Representative on behalf of the
United States.

City of Washington, December 31, 1896.

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