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Serials



ONTARIO FISH
RESEARCH

REPORT
ON
FISH-BREEDING
IN THE
DOMINION OF CANADA
1887.

DEPT. OF ZOOLOGY, UNIV. OF TORONTO
PRESENTED BY
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REPORT OF MR. SAMUEL WILMOT,

SUPERINTENDENT OF FISH CULTURE

FOR THE

DOMINION OF CANADA.

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REPORT OF MR. S. WILMOT, SUPERINTENDENT OF FISH CULTURE
FOR THE DOMINION OF CANADA, 1887.

The Honorable GEORGE E. FOSTER,
Minister of Marine and Fisheries, Ottawa.

SIR,—I have the honor to report herewith on the condition of the several fish-breeding establishments in Canada, and to furnish detailed statements of the operations in each hatchery during the year 1887.

CONDITION OF THE HATCHERIES.

The general condition of the twelve hatcheries now in active operation throughout the Dominion is of a very satisfactory nature.

The whole of the available space for the reception of ova in many of the nurseries, is now fully utilized, and with increased quantities of fish eggs which are being collected in certain localities, some of these hatcheries will necessarily require increased room and additional apparatus for breeding purposes.

These improvements will be absolutely necessary, should the Government desire to meet the increasing demands which are being made from year to year from various sections of the Dominion, for larger supplies of young fish to replenish lakes, rivers and other waters; which from over fishing, improper fishing, and other destructive agencies, now require artificial aid to counter-balance the exhaustive drain so perseveringly made upon them.

REPORTS FROM LOCAL OFFICERS.

Subjoined will be found the reports of the several officers in charge of the individual hatcheries in each of the Provinces. In these are given detailed statements of the operations in each nursery, showing the quantities of eggs collected, and the numbers of fry turned out from them respectively; also the number of parent fish captured, together with other matter relating to the condition, wants and improvements of these hatcheries as will best promote their usefulness.

NUMBERS AND DISTRIBUTION OF FRY HATCHED IN 1887.

The gross number of young fish of various kinds hatched and distributed from the several breeding establishments in the Dominion during the year 1887, was in excess of former years, amounting in round numbers to 77,673,000; divided by species they were as follows:—

Atlantic salmon (<i>Salmo salar</i>).....	7,240,000
Pacific salmon (<i>Salmo ginnat</i>)	4,414,000
Lake salmon trout (<i>Salmo namaycush</i>).....	3,129,000
Lake whitefish (<i>Coregonus albus</i>).....	37,820,000
Lake pickerel (doré) (<i>Lucioperca</i>).....	25,000,000
Speckled trout (<i>Salmo fontinalis</i>).....	70,000

Grand Total..... 77,673,000

The planting of this number of young fish in so many of the lakes, rivers and other streams of the country is a work of no inconsiderable magnitude and danger, especially when surrounded, as it is, with manifold difficulties and trials in their transport by railways for long distances; in waggons over rough and intricate roads to waters far inland: through woods and thickets by hand, and up rapid turbulent rivers in canoes, and in scows, towed by horses, in some instances a hundred miles and more beyond habitable parts of the country. Yet, with all these unavoidable difficulties to overcome it is satisfactory to know from the evidence of numerous

reliable eye witnesses of the work, and from the officers and men engaged in it themselves that the loss of young fish in these voyages of transportation is trifling. From lengthened experience, however, it has become demonstrated beyond a doubt that, young fish, if removed at the proper time, can be safely carried long distances by land or by water if properly attended to on the journey by careful and tried messengers.

The distribution of fry hatched in 1887 from the individual hatcheries in each Province and their species is shown in the following table. But the particular waters and the numbers of fry planted in each locality, will be found recorded in the separate reports of the officers in charge of the hatcheries, in the appendices hereto attached.

SCHEDULE of Fry turned out of Hatcheries in 1887.

Hatchery.	Province.	No. of Fry.	Species.
Fraser River.....	British Columbia.....	4,414,000	Salmon.
Sydney.....	Nova Scotia (C.B.)..	1,415,000	do
Bedford.....	do	1,350,000	do
do.....	do	30,000	Salmon trout.
do.....	do	2,850,000	Whitefish.
Dunk River.....	P. E. Island.....	500,000	Salmon.
St. John River.....	New Brunswick.....	45,000	do
do.....	do	334,000	Salmon trout.
do.....	do	2,100,000	Whitefish.
Miramichi.....	do	900,000	Salmon.
Ristigouche.....	Quebec.....	1,500,000	do
Gaspé.....	do	630,000	do
Tadoussac.....	do	900,000	do
Magog.....	do	675,000	Salmon trout.
Newcastle.....	Ontario.....	2,090,000	do
do.....	do	1,370,000	Whitefish.
do.....	do	70,000	Speckled trout.
Sandwich.....	do	31,500,000	Whitefish.
do.....	do	25,000,000	Pickarel.
Total.....		77,673,000	

Over and above the numbers of young fish hatched in the Ontario establishments, it was found expedient with the large stock of eggs on hand that some of the well known commercial fishes of the Great Lake region of the west should be introduced into the waters of the Maritime Provinces. Accordingly a quantity of semi-hatched eggs of the salmon-trout and white-fish were transferred from Ontario to hatcheries in the Provinces of Quebec, New Brunswick and Nova Scotia; where after hatching into fry they would be more readily conveyed to such waters as might be considered most suitable for their acclimatization and after-growth. On this account the following transfers of eyed-ova were made:—

QUANTITY of eyed or semi-hatched fish eggs transferred from Ontario hatcheries to other nurseries in the Maritime Provinces, during 1887.

Hatchery.	Province.	No. of Eggs.	Species.
Magog.....	Quebec.....	800,000	Salmon trout.
Bedford.....	Nova Scotia.....	400,000	do
do.....	do	3,000,000	Whitefish.
St. John River.....	New Brunswick.....	400,000	Salmon trout.
do.....	do	3,000,000	Whitefish.
Total.....		7,600,000	

The total of young fish and semi-hatched ova put out from the Newcastle hatchery, during the year 1887, was as follows:—

Salmon trout fry.....	2,090,000
do eggs, semi-hatched.....	1,600,000
Whitefish fry.....	1,370,000
Speckled trout fry.....	70,000
Total.....	<u>5,130,000</u>

COLLECTION OF FISH EGGS—SEASON OF 1887.

The following is a statement of the numbers of fish eggs collected and placed in the several hatcheries of the Dominion, during the season of 1887. The aggregate quantity is considerably in advance of previous years.

The reports from the officers in charge give the most satisfactory accounts of the healthy state of the ova, together with the strongest assurances for anticipating high percentages of fry from them at the hatching time.

The gross number of ova collected, of all kinds, amounts to 110,580,200. Their disposition in the several hatcheries is as follows:—

TABLE showing the Hatcheries and the quantity of Eggs deposited in them in 1887.

No.	Name of Hatchery.	Province.	No. of Ova.	Species of Fish.
1	Fraser River.....	British Columbia	10,170,000	Salmon (<i>Salmo ginnat</i>).
2	Sydney.....	Nova Scotia, C. B.	1,780,000	do (<i>Salmo salar</i>).
3	Bedford.....	do	900,000	do do
4	Dunk River.....	P. E. Island	1,000,000	do do
5	St. John River.....	New Brunswick.	625,800	do do
6	Miramichi.....	do	1,300,000	do do
7	Restigouche.....	Quebec.....	1,900,000	do do
8	Gaspé.....	do	752,000	do do
9	Tadoussac.....	do	902,400	do do
10	Magog.....	do		
11	Newcastle.....	Ontario.....	9,050,000	Salmon trout (<i>Salmo namaycush</i>).
11	do	do	200,000	Speckled trout (<i>Salmo fontinalis</i>).
12	Sandwich.....	do	50,000,000	Whitefish (<i>Coregonus albus</i>).
12	do	do	32,000,000	Pickereel, doré (<i>Lucioperca</i>).
	Total.....		110,580,200	

NOTE—Eggs were not collected for the Magog Hatchery in the Eastern Townships Lakes, but a supply of semi-hatched ova will be transferred from the Newcastle Establishment to the Magog Nursery during the winter. Whitefish and salmon trout eyed ova will, in like manner, be forwarded to the New Brunswick and Nova Scotia Hatcheries.

TOTAL NUMBER OF FRY DISTRIBUTED SINCE THE HATCHERIES WERE ESTABLISHED.

The grand total of young fish put out from the several fish-breeding establishments in Canada since the commencement of the industry of artificial fish culture, now amounts to five hundred and forty seven millions, one hundred and thirty-five thousand and nine hundred (547,135,900). By far the greater proportion of these, namely, 400,000,000 were of the salmon species, consisting of the Atlantic salmon, Pacific salmon, salmon trout, and whitefish of the Great Lakes, and speckled trout of the streams; the balance were the "*Lucioperca*" or lake pickereel.

These species comprise the principal commercial fishes which are indigenous to the extensive fluvial and lacustrine waters of the country; and thus far the artificial methods of propagation have been applied only to them, but it is confidently expected that the system will soon be applied to the rearing of many other descriptions of fishes which are natives of, or might be acclimated to, the waters of Canada.

STATEMENT showing the Places where, and the Years in which the several Fish Establishment, annually,

YEAR.	ONTARIO.		QUEBEC.			
	Newcastle.	Sandwich.	Magog.	Tadoussac.	Gaspé.	Ristigouche.
	Fry.	Fry.	Fry.	Fry.	Fry.	Fry.
1868 to 1873.	1,070,000					
1874.....	350,000					100,000
1875.....	650,000			60,000	110,000	600,000
1876.....	700,000	8,000,000		150,000	50,000	300,000
1877.....	1,300,000	8,000,000		1,180,000	1,051,000	600,000
1878.....	2,605,000	20,000,000		707,000	650,000	1,015,000
1879.....	2,602,700	12,000,000		1,250,000	1,597,000	1,470,000
1880.....	1,923,000	13,500,000		1,155,000	730,000	1,500,000
1881.....	3,300,000	16,000,000	200,000	334,000	500,000	740,000
1882.....	4,841,000	44,000,000	975,000	600,000	530,000	1,400,000
1883.....	6,053,000	72,000,000	250,000	995,000	520,000	300,000
1884.....	8,800,000	37,000,000	100,000	985,000	859,000	940,000
1885.....	5,700,000	68,000,000	300,000	720,000	290,000	660,000
1886.....	6,451,000	57,000,000	1,400,000	1,627,000	576,000	1,380,000
1887.....	5,130,000	56,500,000	675,000	900,000	630,600	1,500,000
Totals.....	51,475,700	412,000,000	3,900,000	10,663,000	8,093,000	12,505,000

NOTE.—The particular descriptions of Fry above enumerated were as follows:—

Salmonidae—Atlantic and Pacific salmon, salmon trout of the Great Lakes, and
do Whitefish (*Coregonus*) of the Great Lake region.....

Percidae—Pickerel, or Doré (*Lucioperca*)

Grand Total of all kinds

Hatcheries have been erected; also the number of Fry distributed from each since they were built.

NEW BRUNSWICK.		NOVA SCOTIA.		PRINCE EDWARD ISLAND.	BRITISH COLUMBIA.	TOTALS.
Miramichi.	St. John River.	Bedford.	Sydney.	Dunk River.	Fraser River.	
Fry.	Fry.	Fry.	Fry.	Fry.	Fry.	Fry.
						1,070,000
60,000						510,000
150,000						1,570,000
60,000		395,000				9,655,000
320,000		1,000,000				13,451,000
665,000		1,400,000				27,042,000
1,025,000		1,740,000				21,684,700
805,000	170,600	730,000		500,000		21,013,600
770,000	50,000	680,000		375,000		22,949,000
640,000	588,000	850,000	315,000	1,060,000		55,799,000
925,000	72,600	800,000	659,000	1,210,000		83,784,600
795,000	811,000	1,000,000	853,000	1,000,000		53,143,000
900,000	155,000	670,000	772,000	1,100,000	1,800,000	81,067,000
945,000	2,181,000	960,000	1,179,000	400,000	2,825,000	76,724,000
900,000	2,479,000	4,230,000	1,415,000	500,000	4,414,000	77,673,000
3,960,000	6,507,200	14,455,000	5,193,000	6,145,000	8,839,000	547,135,900

speckled trout of the Streams.....	136,000,000
.....	264,000,000
.....	147,135,900
.....	<u>547,135,900</u>

SUMMARY OF TRANSACTIONS AT THE SEVERAL HATCHERIES FROM OFFICERS' REPORTS FOR 1887.

(1.) *Fraser River Hatchery, British Columbia*, distributed 4,414,000 fry in the spring of 1887. Of these, 3,405,000 were of the Suckeye or *Norka* species, and 1,009,000 of the Quinnat or *Chouicha* species. There were laid down in the hatchery in the fall of 18: 7, 10,170,000 ova; 845,000 of these were Quinnat, and 9,325,000 Saw-quai eggs. They are reported to be in a healthy condition. Some 5,000 Saw-quai and 1,270 Quinnat parent salmon were netted; many of these were partially spawned out before being used for artificial purposes.

Great difficulty is felt in getting experienced and careful men to manipulate the fish, and for carrying the eggs from the rivers, where they are collected, to the hatchery. The officer in charge recommends the purchase of a small steam tug for this work, and for the distribution of the fry, and for general service to the coast and river fisheries. The nursery was supplied with a large number of new wire hatching baskets, these with the former supply will utilize all of the available space in the hatchery. Statements of a satisfactory character are given from various sources of the benefits arising from the hatchery, in the great numbers of small salmon seen in the rivers which have been already stocked with fry. From these results, and from the popularity of the institution, the Board of Trade of New Westminster has petitioned the Government to erect another hatchery on the Fraser.

Young shad are asked for to stock the waters of the British Columbia coast, in like manner as the United States Government has already stocked California rivers with marked success.

The principal improvements asked for during the coming year are the cleaning up of the land about the hatchery and fencing in the premises. The establishment, generally speaking, is in good condition.

(2.) *Sydney Hatchery, Cape Breton*, reports 1,415,000 Atlantic salmon fry being distributed from that nursery in the spring of 1887, in the most healthy condition. In the autumn 431 parent salmon were captured, 290 of these were females and gave 1,780,000 eggs, which are now showing life. The parent fish are principally taken in the Margaree and Middle Rivers. The floor of the hatching room is decayed and requires removing. The grounds and building are in a neat and tidy condition. A new scow for transporting the parent fish is required. The outside of the building should get a coat of paint.

(3.) *Bedford Hatchery, Nova Scotia*, from this nursery 1,350,000 salmon fry (*Salmo Salar*) were put into numerous rivers throughout the Province, in the most satisfactory condition. Misfortune befell the salmon trout eggs received from Ontario, only 30,000 were turned out in a healthy state. The loss is difficult to account for. The whitefish eggs transported from Ontario did very well; 2,850,000 fry (or 45 per cent. of the eggs); were planted in the lakes of Halifax County, in first class condition. The plan of building small temporary hatcheries in the more remote parts of the Province, in which semi-hatched ova are placed during the winter months, and early spring, is found to work very well. In this way the fry are nearer to their place of destination, and the danger and expense in carrying fry from Bedford hatchery in the spring months is largely overcome. Grand, Hubley's, Governor's, Neal's, Sandy and William Lakes received the young whitefish; and Lochaber and Wilson's Lakes got the salmon trout fry. The lakes of Antigonish County are reported as being well adapted for whitefish and salmon trout. Mr. Wilmot, the officer in charge, reports the Bedford hatchery as insufficient in hatching capacity, to supply the wants of Nova Scotia, and recommends the location of an additional hatchery in the western counties and another in the eastern part of the Province. It is said that salmon are increasing in satisfactory numbers in some of the rivers, quite equal to those of former years.

In Bedford Basin the catch was double that of the previous year.

From low water, and other causes, during the autumn the catch of parent salmon for the use of the hatchery was small, only 169 fish were taken; 78 of these were females, and gave 900,000 eggs. These are in an exceptionally good condition in the hatching troughs. As there is considerable space in the nursery unoccupied, a request is made to obtain a large supply of whitefish, and salmon trout eggs from Ontario, in order that the project of stocking many of the Nova Scotia lakes with these fish may be continued. The hatchery and its appliances are in good condition, and no unusual expenditure will be required for another year.

(4). *Dunk River Hatchery, in Prince Edward Island*, reports 500,000 salmon fry hatched and distributed from that hatching in the several streams of the Province during the spring of 1887, and that they were all put out in good condition. The number of parent fish was not as large as usual, only 230 were taken; 150 of these were females, and gave 1,000,000 eggs. A large number of these fish were small in size, supposed to be young fish. Great numbers of salmon spawned in the stream below the hatchery.

Reports from all the rivers give a large increase of salmon in them. They are more numerous all around the Island. Guardians are required for Wilmot's river, as poaching was extensively carried on last season. The spearing of eels should be prohibited in the rivers, for, under that pretext, salmon are also speared. The hatchery and dam are in good condition, and the eggs laid down are doing well.

(5). *St. John River Hatchery, New Brunswick*. Difficulties were experienced here in 1886, in procuring parent fish, only 7,000 fry were put out in the spring of 1887. Somewhat better success was had in the fall of 1887, as 167 salmon were taken in the Tobique River; 87 of these were females and gave 625,800 eggs which are doing very well. Many grilse, and also young salmon of four years' growth, were seen in the river. There were 2,100,000 whitefish and 334,000 salmon trout fry hatched from the eggs obtained from Ontario. These young fish were planted in the lakes of the Counties of Victoria, York, Charlotte and Carleton in New Brunswick. Officer McCluskey draws attention to the fact of a large number of salmon being taken by anglers in the Tobique River with the fly, a circumstance formerly unknown but now attributed to the putting out of this hatchery young salmon hatched from eggs obtained from the Restigouche River which is famous for salmon angling. The angling lessees of the Tobique forbid parent salmon to be taken from this river for the hatchery. This action will necessitate the getting of parent salmon another year at the St. John Harbor fisheries. The establishment throughout is in good working condition.

(6). *Miramichi Hatchery, New Brunswick*, reports 900,000 salmon fry distributed safely in the several branches of the Miramichi River. 20,000 fry were also put in the Nipissiguit River. 25,000 fry were obtained from the Restigouche hatchery, and planted in the headwaters of the North-West Miramichi. Certain improvements in painting, repairing building and dams were duly performed. By the introduction of a lot of new troughs increased hatching room has been obtained. The capture of parent fish for the hatchery was commenced in September, by netting them up river, when 320 were taken; of these 190 were females, and gave 1,360,000 eggs, which are progressing most favorably. The parent fish were obtained more readily the past season on account of the closer guardianship of the river, which prevented poachers from setting nets during the close season.

(7). *Restigouche Hatchery, Province of Quebec*. From this institution 1,500,000 fry were put into the waters of the Restigouche. A large number were towed to the upper parts of the Kedgwick, the principal breeding tributary of the Restigouche. They were towed up in open scows or cribs, by horses, and gradually scattered in the best adapted places throughout the whole length of the river. In this way no loss of young fish is experienced. About twenty-five miles of the river can be planted with fry in this way in a day. A shipment of some 30,000 fry was made by railway to the Miramichi River, and reached there safely. It is recommended that the eyed eggs be shipped in future to other hatcheries during the winter, as being more safe, and economical than transporting the fry in large cans of water in the spring.

Parent salmon are procured for this hatchery by the use of a Departmental net, and by purchase from net fishermen, whose stands are adjacent to the retaining pond. About 380 salmon were bought from fishermen, but many died from the effects of rough handling, and wounds caused by the nets. It is found to be almost impossible to get the ordinary fishermen to use the required care in netting the fish, that will prevent them from getting wounded and bruised, in which case it is impossible to prevent many of the salmon from dying. With the Departmental net, which is fished by its employees, very few salmon are injured or die. At the spawning time 410 salmon were found in the reservoir in a sound and healthy state, 193 of these were females, and they gave 1,900,000 eggs. After spawning, the fish were turned out in the tideway in a healthy condition. In the carriage of the eggs some fifteen miles, a few were lost from the severity of the frost and roughness of the road, the remainder are in a fine condition in the hatchery. To ensure full success for getting adequate supplies of parent salmon and preventing injury to them, or loss by death, it is suggested that the Department should locate and fish certain stations, employing their own nets and men. In this way the whole work would be facilitated at probably half the cost of the present system.

A number of young salmon were put in a small pond at the hatchery, with the view of experimenting as to whether they could be grown to the age of smolts, and whether it could be made a profitable undertaking to carry out the experiment on an extended scale. Artificial food was given the fry; some few seemed to feed, but did not thrive well; the result was that little faith can be placed in the attempt to grow salmon fry with artificial food in ponds, with the view of realizing any benefit from the proceeding. The catch of salmon in tidal waters was about equal to the previous year. Angling up river was not quite so good; some very good scores, however, were made; the water was very low and of high temperature. Parent salmon were fairly plentiful on the spawning grounds far up the river. It is feared that the general violation of the "Saturday night till Monday morning close time," in the Bay des Chaleurs, will so exhaust the numbers of salmon, that would otherwise pass up to the spawning grounds, as to most seriously affect the salmon fisheries of the bay and rivers emptying into it.

(8.) *Gaspe Hatchery, in the Province of Quebec*, turned out about 630,000 salmon fry in the Dartmouth, St. John and York Rivers, in a good healthy condition. The Government net was set on the 9th of June, and took 109 parent fish during the season. From 69 females 752,000 eggs were laid down in the nursery, these are looking healthy and well. Repairs were made to the reservoirs, which are now in good condition. It was found that the building, from imperfect construction, was spreading apart, it was at once strengthened with spruce knees, well bolted to the timbers, and is now perfectly secure. The dam of the upper retaining pond was almost re-made for safety against floods. The hatchery will require to be newly painted another season.

(9.) *Tadoussac Hatchery, Province of Quebec*. In the spring of 1887, 900,000 salmon fry were planted in several of the branches of the Saguenay River. These are reported to have been liberated with little loss. Much pains were taken to plant young fish in the St. Margaret River, many difficulties had to be overcome, but the work was satisfactorily accomplished. A considerable number of young salmon (smolts) the growth from fry put into the lake above the hatchery were seen passing down to the salt water last autumn. Salmon parrs were seen in large numbers in the "Mowat" Lakes, where fry were planted for the first time in the spring of 1886. Some were taken measuring five inches in length. The experiment of planting fry in these lakes is thus far very satisfactory. Additional supplies of young fish will be given to these lakes hereafter, as there is an easy passage from them for the young salmon to reach salt water. Salmon angling, from the lowness of the river, was not quite as good as usual last season. It is said that immense numbers of porpoises at the mouth of the Saguenay prevent the salmon from passing up to the branches. The Departmental net captured 151 parent fish for the hatchery.

94 females gave 902,400 eggs, these are in good condition and show vitality in them. Some necessary repairs were made to the banks of the dam. The buildings require a thorough inspection for general improvements that are wanted another year. The dams above the hatchery are in good order.

(10.) *Magog Hatchery, Province of Quebec.*—For the past two seasons fish eggs have not been collected in the Eastern Townships lakes for the Magog nursery. It has been found to be more satisfactory and economical to obtain supplies of semi-hatched eggs from the Newcastle hatchery, Ont. During the past season of 1887 a shipment of salmon-trout eggs was received from Newcastle, from which 675,000, or 84 per cent., of fry were hatched and distributed in good condition in lakes in the Counties of Stanstead and Brome. The salmon trout and whitefish fry, which were planted in the above named and other lakes in the townships, have shown remarkably good results. Whitefish of good size are now seen in many of these waters. These fish were not known in these lakes previous to the time of their being planted there from this hatchery. Salmon-trout, are also reported to be more numerous than formerly, notwithstanding they are illegally destroyed during the "close time."

It is said that whilst salmon trout are increasing, many of the inferior kinds of fish are decreasing, being largely preyed upon by the trout. Black bass, planted here a short time since, are also getting quite plentiful in Lake Memphremagog, and good fishing will soon be had with this game fish. The officer in charge reports that, notwithstanding the efforts of the guardians, the fish in the Eastern Townships waters are being mercilessly slaughtered during the close season, and that over fishing is too extensively carried on. It is proposed to obtain from the Newcastle hatchery a million of eyed ova during the coming season.

(11.) *Newcastle Hatchery, Ontario.*—The various kinds of fry hatched at this establishment were turned out in good condition—2,090,000 salmon-trout were distributed pretty generally throughout the waters of Ontario; 1,370,000 whitefish fry were also put out in like manner as the salmon trout. There were also 70,000 speckled trout distributed from this hatchery. Exclusive of the above, 1,600,000 eyed eggs of the salmon-trout were transferred to the Provinces of Quebec, Nova Scotia and New Brunswick. Total number of all kinds put out 5,130,000.

The ponds at the hatchery were deepened and thoroughly cleaned out, with the view to the introduction of carp and bass, as many demands are made for these fish to stock waters.

The establishment generally with all its hatching apparatus and the dams are in first class condition.

Largely increased numbers of salmon-trout eggs were obtained last autumn over any previous year; 7,550,000 were collected at Wiarton on the Georgian Bay, and 1,500,000 at Pigeon Island, Lake Ontario. These are progressing favorably. There are also a large quantity of speckled trout eggs undergoing incubation in the hatchery. Some millions of the salmon-trout eggs will be transferred to other hatcheries in the Lower Provinces as soon as the embryos are sufficiently advanced for safe carriage.

A statement of the daily operations in collecting salmon-trout eggs is appended, giving the dates of capture of the fish, the quantity of eggs obtained, together with remarks relating to the work at Wiarton, all showing conclusively that the present "close season" of the month of November is the correct spawning time, and judiciously established by the Department. With a strict observance of this "close time" the salmon-trout fisheries may be indefinitely maintained.

An inspection was made around Pigeon Island with the view to establish a Government station for procuring parent fish. The result was not satisfactory, as the rocky bottom was not suitable for a stationary trap net. The stock of eggs in the hatchery are in fine condition, with the exception of some of the speckled trout ova purchased in the United States, which show some injury, evidently from over heating on their way here. The officer in charge is desirous that all applications for fry should be made early, in order that all fish may be put out of the hatchery before the warm season in June sets in.

(12.) *Sandwich Hatchery, Province of Ontario.*—Whitefish and pickerel (doré) are the only fish bred at this hatchery, 31,500,000 fry, and 7,500,000 semi-hatched eggs of the whitefish were turned out in the spring of 1887. There were also 25,000,000 fry of the pickerel hatched out at this institution. Both species were widely spread throughout the lakes of Ontario; and several millions of the whitefish were transferred to hatcheries in Quebec, Nova Scotia and New Brunswick. Reports from all quarters state that the distribution was performed most successfully. In view of establishing a permanent station for collecting pickerel eggs, one was selected on Lake Huron, where a reservoir was located, and a wind-mill and pump erected to supply fresh water continually during the spawning season. The parent fish when taken from the nets were kept in this reservoir until ripe for spawning. The officer reports the whole undertaking a perfect success. Three of the fishing-stations on the Detroit River were worked, namely, Bois Blanc, Fighting and Stony Islands; from these 50,000,000 of whitefish eggs were collected in November last. They were safely laid down in the hatchery and are doing well. Many of these will be transferred to eastern hatcheries at the proper time. The catch of whitefish in the Detroit River fisheries has been greatly in excess of the past year. This increase is attributed to the quantities of fry put in the river from the hatchery. Written testimony of this fact from fishermen will be found appended to the report. Only one-half of the space in the hatchery room is now fitted up with breeding apparatus. It is desirable that the other portion should be supplied with incubators, and other requisites in order to fully utilize the whole of the available space in the building. The engine and pumps are capable of doing double the amount of work now carried on, and with no additional expense, as the engine and pumps must be kept working for a small, as well as a greater supply of eggs.

PARENT FISH FOR THE HATCHERIES.

THE MEANS ADOPTED FOR CAPTURING THEM.

There are several methods in use for securing the supplies of parent fish for stocking the hatcheries with eggs, and it is a matter of much consideration which to adopt. The great object, however, is to obtain the fish by such means as will be the least likely to injure them, for if they become bruised or wounded in their capture, many will die before they become ripe for spawning, others from the same causes will get sickly and diseased in their confinement in the retaining ponds and bring about that deadly fish scourge "*Saprolegnia Ferax*" of fungoid growth upon their bodies, which not only affects the fish outwardly, but also prevents the proper ripening of the ovaries, causing unsoundness of the eggs for healthy impregnation.

It is not only the individual fish thus affected that is ruinous to the work of obtaining ova, but it is the rapid spreading of the fungi, or disease to other fish confined in the same pond. Therefore it is of the first and greatest importance that the parent fish should be captured by such means, and with such careful handling, as to avoid, if possible, any chances of injury to their bodies when taken in the nets, that will cause wounds, bruises or any abrasions of the skin, for it is on such injured parts the fungoid disease first takes its hold, and then spreads rapidly over the whole body till death results,—when so to speak, a three-fold loss is experienced—the parent fish becomes destroyed for present or future benefits for reproduction; the thousands of ova within its body are also lost for the purposes of the hatchery, and the money value given to the fishermen for the fish is thrown away. And I must further add disappointment to the officers, and dissatisfaction to the public, as well as the Department is experienced, from inability to fill the Government hatcheries with eggs.

As previously mentioned numerous methods have been adopted for securing supplies of parent fish, but after a close study, coupled with practical experience of this subject for some years past it has been shown that there is only one safe and reliable plan to be adopted, namely, that the Government secure the best fishing

stations available in the several localities, where the parent fish of the species required are known to frequent on their migrations up river, or in the bays where they resort to spawn; and there, under the control and working of proper officers, set such nets or other appliances as are best adapted to capture the fish in the most careful and economical manner, and convey them to properly constructed reservoirs, or retaining ponds, having sufficient area and depth of pure living water, where they may freely roam about at their pleasure until the time of spawning. In this way experience has demonstrated that parent fish may be taken without injury, and kept in a perfectly healthy state until ripe for manipulation, after which they can be liberated again without experiencing any loss.

The plan adopted of purchasing parent fish from the ordinary net fishermen, whilst from necessity it has been resorted to, is, nevertheless, one that should be discontinued, for it is found that the owners of fishing stands, though they may get the usual market price for each salmon, cannot be made to understand, nor do they wish to comprehend, the absolute necessity there is for having the proper description of nets, and using every possible precaution and care in the handling of the fish, in order that they may not get wounded or bruised. The long accustomed method of taking salmon from the nets in a rough and hurried manner by the fishermen cannot be overcome, especially when no object has been gained, for the fish dealers, from the great competition existing between them, care for nothing beyond the numbers and weight of salmon they may get, let them be wounded, bruised or otherwise injured as the case may be.

The experience already gained in purchasing parent salmon as just described has been that a large percentage of them die, or become so diseased with fungoid growth from injuries received that it will be unwise to continue it. But the correct remedy should be adopted, which is for the Government to appropriate a sufficient number of well-selected fishing stations, and carefully fish them with its own nets, apparatus and men, thus avoiding (as practical trials have shown) the unnecessary loss of parent fish, and preventing an expenditure which does not give commensurate benefits, nor such success in the work of artificial propagation as it is most desirable to attain.

A statement is herewith given of the expenditure connected with collecting parent fish and fish-eggs for the several hatcheries during the season of 1887. In some instances correct accounts have not been kept as to the number of parent fish captured for spawning purposes; this applies more particularly to Fraser River operations, where large hauls of salmon may be taken in the open river, many of which may have been partly spawned out, and others may have shed their whole supply of eggs. In such a case no accurate statement can be given of the actual cost of each fish manipulated, or of the value of ova per thousand. With the Atlantic salmon, however, the process is different, and a correct account will be found in the table as to the cost of each fish, and the eggs per thousand.

TABLE showing the Number and Cost of Parent Fish and Fish Eggs obtained for the Hatcheries in 1887.

No.	Hatchery.	Province.	Number of Parent Fish.	Males.	Females.	Number of Eggs from each Female.	Number of Eggs in each Hatchery.	Average Expenses in Collecting Parent Fish for each Hatchery.	Cost of Eggs per M.	Average cost of each Fish.	Description of Fish.
								\$ cts	\$ cts	\$ cts	
1	Fraser River.....	British Columbia.....	No true account kept.....				10,170,000	1,114 20			Pacific Salmon.
2	Sydney.....	Nova Scotia (C.B.)..	431	141	290	6,138	1,730,000	0 61½	2 56	2 56	Atlantic Salmon
3	Bedford.....	do.....	169	91	78	1,538	900,000	1 24	6 61	6 61	do
4	Dunk River.....	Prince Edward Island	230	80	150	7,000	1,000,000	0 01½	0 19	0 19	do
5	St. John River.....	New Brunswick.....	167	80	87	7,200	625,800	0 81	3 04	3 04	do
6	Miramichi.....	do.....	320	130	190	6,842	1,300,000	4 60 21	0 36	1 43	do
7	Restigouche.....	Quebec.....	403	210	193	3,840	1,900,000	1 63 00	0 86½	4 07	do
8	Gaspé.....	do.....	104	35	69	10,900	752,000	3 36 00	0 46	3 23	do
9	Tadoussac.....	do.....	151	56	95	9,500	502,500	2 57 80	0 29	1 71	do
	Totals with Atlantic Salmon.....		1,976	823	1,152		9,160,000				
10	Magog.....	Quebec.....	Eggs furnished from the Newcastle Hatchery during the winter—				9,050,000	1,501 14	0 16½		Salmon Trout.
			Salmon Trout.....				200,000	415 00	2 10		Speckled Trout.
11	Newcastle.....	Ontario.....	Whitefish.....				48,000,000	514 00	0 01		Whitefish.
			Whitefish.....				32,000,000				Pickarel (Doré).
12	Sandwich.....	do.....	Pickarel (Doré).....								
	Grand Total all kinds of Eggs.....						110,580,200				

PRACTICAL RESULTS FROM ARTIFICIAL BREEDING.

The following extract from the report of the Inspector of Fisheries for Nova Scotia, for 1886, is given as touching upon the artificial culture of salmon:

"A small decrease will be noticed in these fish, but chiefly in those salted in barrels and caught on the Labrador coast. A heavy storm destroyed the nets and largely reduced the home catch, otherwise a large increase would have been had over last year. This is fully stated in the reports of overseers for Pictou and Antigonish counties, where our most productive salmon fisheries exist.

"Salmon are rapidly increasing in the rivers. Wallace River, in the County of Cumberland, which no fish frequented for the past twenty-five years, owing to an impassable mill-dam, shows very gratifying results, as an evidence of artificial culture alone. Fry to the number of 40,000 per annum, have been planted in its head waters since the year 1878. In 1882 a few fish were seen at the dam, and increasing numbers have been seen every year since. During the present fall (1886) no less than from 250 to 350 salmon passed through the new fishways put on the dams, two years ago. * * * * *

"As the plantings will continue, and the river will also now begin to reproduce in the natural way, we may look for a rapid increase during the next few years. provided poachers are kept in check. * * * * *

"I am quite confident that the salmon fisheries of Nova Scotia will never again drop so low as they did in the years of 1880 and 1881. By opening the dams with efficient fish-ways, and by a continual artificial planting, there must surely be about the same result everywhere as in the case of the Wallace River, above referred to, the facts concerning which are indisputable.

"There is not another river in Nova Scotia, nor in Canada, where all the conditions are so favorable for ascertaining the above facts as this one, for the following reasons:

"(1.) It is a small river with clear, bright water, fed from mountain springs, so that all the fish can be seen from the dam.

"(2.) There were no fish in it in 1878 at the first planting, nature has done nothing so far; for the ladders have been built but two years, nor will she do anything for two or three years more. Thus the developing facts here are of intense interest and importance in salmon culture, and I will endeavor to obtain them as accurately in the future.

"(3.) The river previous to the construction of the dam, was one of the most prolific in the production of salmon. Its gravel beds, its clear bright water, its cleanliness from all foreign matter are all most favorable for the production of these fish. Thus I think it will be seen we have something upon which to base our calculations as to the profits of pisciculture, and that, to make it profitable, the same industry, economy, and judgment, are necessary in conducting this as any other industry, if fair returns are expected and disappointments avoided."

The following also speaks very favorably of the operations of fish hatcheries in Cape Breton. Mr. Bertram, Inspector of Fisheries for Cape Breton in his report for 1886, says:

"Anglers had good cause for congratulation on the fine runs of salmon, and sea trout. The better observance of the law against spearing and illegal netting, together with the *successful operations of fish hatcheries* is being attended by marked improvements each succeeding year, in the numbers of salmon and sea trout ascending Cape Breton streams. At the present rate of improvement these streams will attain to the glory of by-gone years in the abundance of these royal fish, for which they were noted in the early history of the island."

 EVIDENCES OF THE BENEFITS FROM THE SANDWICH HATCHERY.

AMHURTSBURG, ONT., 23rd November, 1887.

 Mr. WM. PARKER,
 Sandwich Fish Hatchery.

SIR,—I take great pleasure in noticing the large increase in the catch of whitefish this fall, which is largely in excess of what we have been taking. Thanks to the hatchery. I am thoroughly convinced that if the Government would enlarge the place and give it double its present capacity the trifling expense would be money spent in the most beneficial manner.

I remain yours, &c.,

 ROBT. E. JONES.

SANDWICH WEST, 30th November, 1887.

 Mr. WM. PARKER,
 Officer in charge Sandwich Hatchery.

DEAR SIR,—I notice that a good deal is being said on the American side regarding the increase of whitefish. As a Canadian fisherman I wish to say that I particularly notice a good increase in the catch of whitefish, and cannot help but say that this must be attributed to the numbers of young fish turned out from your hatchery.

I hope the Government will see fit to enlarge and increase the capacity of the hatchery, and I know the general public will benefit by the action.

Yours truly,

 D. BONDY.

GROSSE ISLAND, MICH., 18th November, 1887.

 Mr. WM. PARKER,
 Sandwich Hatchery, Ont.

SIR,—It is with the greatest pleasure I take the liberty of writing you to let you know how your labor is proving to be of the utmost importance to a large number of people on this as well as on your own side of the river.

The catch of whitefish has been much larger this fall than for many years, and especially a large number of small whitefish are to be found in the river. I am confident that were it not for the large number of fry placed there by the Governments that in a few years the whitefish would be unknown here.

Hoping that when the fishery dispute is settled the two countries will both enlarge their hatcheries to double their present capacity,

I remain,

Yours very truly,

 GEO. E. SEDGWICK,
Fisherman.

WINDSOR, ONT., 10th December, 1887.

Mr. WM. PARKER,
Sandwich, Ont.

DEAR SIR,—I take pleasure in informing you that the catch of whitefish in the Detroit River this fall has been twenty-five per cent. increase compared with the fall of 1886, and as the majority of the fish are below the usual average size taken in this river, to my mind this increase is due to your hatchery. In fact, I learn that this season's fishing was good at Toledo and Sandusky, on the south side of the lake, and that the fish were smaller in size at those points than usual, thus showing that they are the growth of the hatcheries.

I remain,
Yours truly,

C. W. GAUTHIER,
Fish Dealer.

SANDWICH, 3rd December, 1887.

MY DEAR MR. PARKER,—From information I have received I am exceedingly glad to be able to offer my congratulations upon what now seems to be the benefits heretofore effected from the hatchery. I am told that the run of whitefish this year was numerically greater than for some years past, and that although a large proportion were of a smaller size than heretofore obtained, yet it is the belief of those engaged in the pursuit of fishing for whitefish, that the beneficial results of the hatchery are being made manifest.

May the hatchery flourish, and may we again be able to have upon our tables (the rich and the poor), at a cheap rate and in abundance, that most delicious of all fresh water fish, "the Detroit River whitefish."

Yours truly,

F. E. MARCON.

SARNIA, 30th December, 1887.

Mr. PARKER,
Sandwich Hatchery.

DEAR SIR,—I write to inform you of the great catch of young pickerel in this section, which, I believe, is owing to the numbers of fry which you planted in these waters. I believe that the artificial hatching of fish is a complete success, and hope that the Department of Fisheries may see their way clear to enlarge your hatchery, so that you may be able to do unbounded good in all quarters where you may be directed to plant the young fish.

Yours very truly,

JOSEPH LEAUZEAU,
Fisherman.

The following letters are given as evidence of the safe carriage and after-growth of salmon-trout fry shipped from the Newcastle hatchery to a number of lakes in the North Riding of Hastings in 1886 and 1887:

RATHBUN STATION, 11th June, 1887.

S. WILMOT, Esq.,
Newcastle, Ont.

SIR,—I am glad to be able to say that the salmon trout fry planted in Humphrey's and Sweet's Lakes last year have been seen by myself and several of our men

this spring. They are now about five and six inches long, and appear to be thriving. We are much obliged for the additional supply received from you this year, which are in apparently good condition.

Yours,

W. HICKS,
Station Master.

BANCROFT, NORTH HASTINGS.

I certify that I am aware that a lot of salmon trout was deposited in a lake in this neighbourhood known as "Sidders Lake," also in a lake known as "Little Island Lake," also in a lake known as "Birk's Creek Lake," and that the fish have been met with in each of these lakes in thriving condition.

(Signed) J. CLARK,
Police Magistrate.

NORTH RIDING OF HASTINGS,
EGAN FARM, 10th June, 1887.

This is to certify that the fry delivered by Messrs. Wilmot and Wilkins, were in lively condition when received. And the fry of 1886 are doing well, and expect by fall to be able to send out a good sample of salmon trout.

ARCHIE RIDDELL.

EXTRACTS FROM LETTERS FROM DAVID GILMOUR, ESQ., IN REFERENCE TO WHITEFISH AND SPECKLED-TROUT FRY PLANTED IN WADSWORTH LAKE.

TRENTON, 15th December, 1887.

S. WILMOT, Esq.

DEAR SIR,—I will at once make my application for speckled-trout fry, and I intend to get as large a quantity as I can of the whitefish. I can assure you that, they are great sport catching with the fly and they take it very eagerly at certain times of the year. * * *

I caught quite a number of the whitefish last summer fly fishing, and they were four and five inches long, and in splendid condition. I was not successful in catching the trout, but want to try them again, they were seen several times the year before in a little stream. * * *

I am positive there were no whitefish planted in the lake before the ones you sent me; these were put in, part in spring 1886, and the remainder in spring of 1887. * * *

Yours truly,

DAVID GILMOUR.

CONCLUSION.

In bringing to a close this report of the operations connected with artificial fish culture in Canada during the past year, I desire to draw the attention of the Department to the necessity that exists for generally enlarging the work, especially in localities where the more direct benefits obtainable from the present institutions cannot be satisfactorily applied. With some additional establishments, a wider scope would be given for the better development of an industry which would afford greater facilities for the Government to foster, and increase the fishing wealth of the country. As a result from such a procedure, the inhabitants generally would obtain increased supplies of fish-food for domestic purposes, and would materially add to the traffic in a great commercial wealth, obtainable from the large water areas of the Dominion.

Respectfully submitted.

SAM. WILMOT,
Superintendent of Fish Culture for the Dominion of Canada.

FISH CULTURE,

1887.

APPENDICES.

REPORTS FROM THE SEVERAL OFFICERS IN CHARGE OF FISH-BREEDING ESTABLISHMENTS IN THE SEVERAL PROVINCES OF THE DOMINION OF CANADA FOR 1887.

1.—FRASER RIVER HATCHERY.

PROVINCE OF BRITISH COLUMBIA.

Report of the Officer in Charge of the Fraser River Hatchery for 1887.

I beg to submit my fourth annual report of this hatchery. From the 7,316,000 salmon eggs laid on the trays during the fall of 1886, the following number of fry and semi-hatched ova of the Pacific salmon (*Chouicha*) and (*Nerka*) were distributed in the several rivers as follows:—

Suckeye Fry.

Nanaimo River, December 9th.....	500,000
Cowitchan do 20th.....	500,000
Coquitlam River, February 26th.....	375,000
Pitt Lake, March 9th	702,000
Harrison Lake, March 24th	858,000
Sumas River, April 12th.....	309,000
Mountain Creek, April 14th.....	161,000
Total	<u>3,405,000</u>

Quinnat Fry.

Pitt Lake, March 9th.....	209,000
Harrison Lake, March 24th.....	150, 00
Sumas River, April 12th... ..	160,000
Stare River, April 12th	450,000
Mountain Creek, April 14th	40,000
Total.	<u>1,009,000</u>

Grand total of fry distributed, 1887.

Sâw-quai species.....	3,405,000
Quinnat do	1,009,000
Grand Total	<u>4,414,000</u>

From the above figures it will be seen that a considerable number of the eggs laid down last fall were lost from various causes, such as, over-crowding in the hatchery, improper impregnation on the spawning grounds, want of sufficient hatching trays, and heavy fall rains, which created a sediment that formed a fungoid growth on the eggs.

Taking all things into consideration, especially the rapid advancement of the ova in this mild climate, the rate of mortality was not greater than expected.

Since this hatchery has been established there has been deposited up to the 14th of April, 1887, in various places on this coast, the following numbers of fry:—

February and March, 1885.....	1,800,000
do do 1886.....	2,625,000
do do 1887.....	4,414,000
Grand Total.....	<u>9,839,000</u>

This table will show that we have increased the number hatched each year over one-third.

From this large output of salmon fry must naturally be expected some beneficial results, and I am led to believe that the prospects for an increase are very favorable.

In order to give some idea of the periodical runs of salmon in the Fraser River for the last eleven years, I present the following table. Their peculiar fluctuations, however, during the past two seasons have somewhat upset the generally adopted theory of the biennial runs, and no data beyond conjecture has been given to base this theory upon:—

Year.	No. of Canneries.	No. of Cases.	Average of each Cannery.	General Remarks.
1877.....	5	64,300	12,860	Good run.
1878.....	8	103,018	12,877	do
1879.....	7	52,573	7,510	Poor run.
1880.....	7	42,155	6,022	do
1881.....	8	142,516	17,814	Good run.
1882.....	11	200,204	18,200	do
1883.....	12	105,700	8,808	Poor run.
1884.....	6	38,407	6,401	do
1885.....	6	89,617	14,936	Good run.
1886.....	11	99,137	9,012	Record was here broken. Should have been very good.
1887.....	12	128,806	10,734	Again broken. Should have been poor run.

The average pack in each cannery shows that for nine years the record was not broken. According to the order of former years, 1886 should have been a very good year. But it turned out a poor one; the average only coming up to 9,012 cases for each cannery, notwithstanding the extraordinary endeavors made to fill the stock of cans on hand. The season of 1887, according to the order of things should have been a poor year, and all in the business expected it to turn out as such; but contrary to their expectations they had a comparatively good run and the canneries averaged 10,734 cases each.

The decrease in 1886, is attributed to the annually increased quantities of salmon packed on the Fraser River for the last ten years, but it is confidently looked for by many that the runs of fish will be more steady in the future from the assistance of re-stocking by artificial means.

Favorable accounts are given in the reports which I have received from time to time in relation to the success of this hatchery. Mr. Charles York, Guardian on the Nanaimo River, states that the Indians there have seen the fry which we turned out in that river. The Indians who live on the Harrison River informed me that they had seen large numbers of fry each season after they were turned out there. They also give it as their opinion that the large quantities of young salmon in the Harrison river this season was to be accounted for by the plantings of fry from this hatchery.

Mr. Lomas, Guardian on the Cowitchan River, makes the following statement in his report: During the spring large shoals of salmon fry were seen in the Cowitchan River, these the Indians believe to be the result of the plantings there from this hatchery."

I herewith quote the following abstract from the New Westminster Board of Trade in a resolution passed and forwarded to the Honorable the Minister of Marine and Fisheries, on the 28th of December, 1887:—

"Whereas owing to the increased quantity of salmon caught in the Fraser River this season, contrary to the expectations of all, the canning proprietors showing an increased value of the salmon industry to be \$405,604 over that of last year; and whereas the recent establishment of the Government hatchery on this river has in our opinion been the cause of producing a large increase of fish, and taking into consideration this great industry and wealth to our Province, all of which is within this district, and having given the matter of fostering this wealth our best consideration, seeing the immense quantities of salmon annually taken from this river, and knowing the inadequate facilities in the hatchery already established; we would respectfully recommend that another hatchery be established upon the Fraser River to assist in keeping up the supply of fish."

From the above statements of the results from the previous seasons' plantings of fry, I feel confident that future years will be even more successful. With a view of further increase; the supply of ova this season, and in order that there might be a surplus to send to eastern hatcheries, should occasion require, I despatched the caretaker to the spawning grounds on the Harrison River on the 14th September, with instructions to build traps, and capture if possible the parent fish without netting them, and to lay in all the "Saw-quai" eggs possible, as they prove to be the most profitable fish for commercial purposes.

It will be seen by the caretaker's statement, which is herewith appended, that 845,000 "Quinnat," and 9,325,000 "Saw-quai," making a total of 10,170,000 eggs were laid down on the hatching trays this season. This large number of ova was double the quantity that this hatchery was originally intended to accommodate, with the limited number of egg trays on hand; and it becomes necessary in some cases to put the trays four tiers deep. This it will be readily understood causes an enormous amount of work, more so owing to the season being so mild, and the water keeping at a high temperature.

The matter of providing a small steamer for the fisheries service which could be utilized for conveying ova to, and distributing fry from this hatchery, has already been brought to the notice of the Department, but as yet no action has been taken in the matter. A suitable steamer could be built here, or purchased at a small cost, to serve both purposes. It would decrease the expenses of transportation, facilitate the handling of ova and distribution of fry, as shown by the caretaker's statement, and would lessen the rate of mortality by having the transportation under our personal supervision. Since this establishment has been in operation no less than \$1,055 has been paid for steamer hire; and the planting of fry next season will again increase it several hundred dollars. The above amount would half pay for such a boat as would be required. And its services in connection with the fisheries on the Fraser River and on the coast would be incalculable.

I ordered suitable wire from San Francisco for the manufacture of additional baskets for the hatching of the ova. When made up they will be ample for all the ova that can be handled in this establishment.

I have requested the Dominion Land Agent here to reserve blocks 13 and 18 in Township 38, through which the stream that supplies the hatchery runs, in order that no deleterious substances may be drained into it from the cultivation of these lands. As the lands in the vicinity of the hatchery are now becoming settled, I would respectfully suggest that a good fence be put up around the hatchery grounds, and the land cleared up and put in order.

The flume which runs water from the dam to the building requires replacing with a larger one. A couple of new boats for next spring's operations and some new nets are required.

These requisites with a few slight repairs to the tanks and troughs inside the building, will put things in efficient working order for another season.

Since the introduction of shad by the United States Fish Commission into the Pacific waters they have increased with rapidity, and have become a great source of wealth to the American people of the Pacific Coast. But as yet the inhabitants of this Province have not been much benefitted by them. Several shad have been caught from time to time in nets off Race Rocks in the Strait of Fuca, and a few have been taken by Indians off Alberni Sound on the West Coast of Vancouver's Island. But none have yet made their appearance in the Fraser River.

I would therefore suggest that a few hundred thousand shad fry be brought from San Francisco and placed in the creeks and overflows of Pitt Lake. This place would make a suitable spawning ground for them, and on their return from the ocean for breeding purposes they would naturally pass up the Fraser River as they have done on the Sacramento.

THOMAS MOWAT,

Officer in charge Fraser River Hatchery.

REPORT OF THE CARETAKER OF THE FRASER RIVER FISH HATCHERY.

On the 14th of September I took three white men, and after procuring supplies we proceeded to Harrison River for the purpose of securing salmon ova for the Fraser River hatchery. On the morning of the 15th inst. we loaded our boat with lumber, and after a day's hard work we got over the rapids of the Harrison and arrived at the spawning beds late at night.

As I deemed it advisable to change the mode of capturing the parent fish I commenced building traps without loss of time, and on the 23rd of the same month I was able to take the first lot of eggs. From this date till the 23rd of October, when the last were taken, I secured 10,170,000 eggs. Of this number 845,000 were "Quinnat" or spring salmon, and 9,325,000 Saw-quai.

Owing to the manner of catching the Saw-quai salmon it was almost impossible to keep an accurate account of the number taken, but I estimated it at fully 5,000. The number of Quinnat fish taken was 1,273. Of this number 664 were females; 115 of these were lost, leaving 519 from which ova was taken.

The last lot of eggs were laid in the hatchery on the 26th of October. It was difficult to get the right kind of men for taking ova. Men were scarce, wages high, and the fishermen employed till very late at the canneries. This year, with one exception, I had to employ men without any experience, and having such a large number of eggs to put in and only one man on whose judgment I could rely, it will be understood that the task of getting the ova to the hatchery was anything but an easy one.

I must call your attention to the very unsatisfactory way there is of getting the eggs to the hatchery. They have to be sent by boat to the mouth of the Harrison River, and it has been repeatedly found that the steamboat which had promised to

call for them failed to stop at all at Harrison; thus compelling a trip by boat of fifty miles, and taking up the time of the men when they should be at the spawning grounds. I would, therefore, suggest that some arrangement be made that will in future ensure the quick and safe transmission of the spawn to the hatchery.

MAX. M. MOWAT,
Caretaker Fraser River Hatchery.

2.—SYDNEY HATCHERY.

PROVINCE OF NOVA SCOTIA.

Report of the Officer in charge of the Sydney Fish Hatchery for 1887.

Herewith I submit my annual report of the work done at this hatchery during the year just passed.

Last year's report shows a deposit in the hatching troughs of 2,000,000 ova. Of this number, 1,415,000 fry were hatched and distributed in a most healthy condition in the following streams:

Sydney River, C. B. County.....	250,000
Balls Creek, do	100,000
Trout Brook, do	175,000
Black Brook, do	75,000
Grand Lake, do	50,000
Twelve Mile Brook, do	50,000
Eskasoni River, do	50,000
Salmon River, do	100,000
Georges River, do	50,000
McLean's Brook, do	50,000
Margaree River, Inverness County.....	150,000
Middle River, Victoria County.....	100,000
Baddeck River, do	100,000
Grand River, Richmond County.....	50,000
For River, do	50,000
Hatchery Brook, C. B. County	15,000
Total.....	1,415,000

The above were successfully distributed and the fry were in splendid condition when liberated.

This fall I succeeded in catching 431 parent salmon, although the waters were never in a less favorable condition: 290 of these were females and 141 males, yielding 1,780,000 eggs, as will be seen from the following table:—

Where caught.	Males.	Females.	No. of ova collected.
Margaree River.....	35	115	720,000
Middle River.....	67	78	460,000
Sydney River.....	19	57	360,000
Salmon River.....	20	40	240,000
Total.....	141	290	1,780,000

The ova are at present healthy and in the best possible condition. The floor in the hatching room is getting very much decayed, this I mentioned in my previous report. On examination it was found that a great deal of patching would be necessary. Next summer the old floor must be taken up and some of the joice, if not all, put in and a new floor laid. I should suggest the putting down of a single floor two inches in thickness. When a floor is double it is more liable to rot when subject to dampness. The salmon tank was thoroughly overhauled and new timbers and covering having been put in.

The grounds about the hatchery are kept as neat and tidy as possible, the storehouse and fence having been painted and considerable work has been done to the grounds generally.

A new scow will be required for conveying the parent fish from the head waters of the Sydney river to the hatchery. The old one was always inconvenient and expensive, being too large and heavy, and not well put together.

The outside of the building is badly in need of painting and should be attended to as early as possible in the spring. The inside of the hatchery room should also get a coat of paint. The walls are now beginning to look shabby and dirty.

C. A. FARQUHARSON,
Officer in charge.

3. BEDFORD HATCHERY.

PROVINCE OF NOVA SCOTIA.

Report of the Officer in charge of the Bedford Hatchery for 1887.

I have the honor herewith to submit my annual report upon the operations connected with the Fish Hatchery under my charge.

As stated in my last report I laid down in the hatching troughs of this establishment 2,000,000 salmon ova, from which 1,350,000 fry were obtained. In addition to the above I received from the Ontario hatcheries about 3,000,000 whitefish eggs and 400,000 salmon trout. I was very successful with the whitefish ova, having hatched over ninety-five per cent. of the number, but I regret to say that with the salmon trout ova I met with a loss similar to that of the preceding spring. When I received these eggs I examined them closely and found them to all appearances healthy, and they appeared to maintain this condition until just about to hatch when nearly all died. The young fish died as they burst from the shell and only a small percentage of them were saved. The result was quite different with one lot of 20,000 of these trout eggs which were taken to Lochaber Lake in Antigonish County, about the first of April. These were placed in the troughs of a temporary house erected there, and notwithstanding they were exposed to severe frost, and at times were thickly covered with filth and sediment, to remove which necessitated very severe and rough handling, nearly all hatched.

Not having had much experience in hatching the salmon trout ova, I am unable to assign any cause for this loss; but am of the opinion that the unclean condition of the water, or its high temperature, was injurious to the embryo when about to burst from the shell. I carried out the instructions of the officer from Newcastle, who delivered them to me, to the letter, and am satisfied that the young fish were alive and apparently strong until the moment of hatching. The whitefish hatched about three weeks earlier than the salmon trout ova, and were distributed among the most suitable lakes in this vicinity.

The distribution of the different kinds of fish hatched was as per the following schedule :—

<i>Salmon Fry.</i>				
Musquodoboit River,	Halifax	County	.....	80,000
Sackville	do	do	.....	40,000
Nine Mile	do	do	.....	80,000
Pennant	do	do	.....	40,000
Indian	do	do	.....	40,000
Little Salmon	do	do	.....	20,000
Big Salmon	do	do	.....	20,000
Ecum Secum	do	do	.....	50,000
Salmon	do	Colchester	do	50,000
North	do	do	do	40,000
Stewiacke	do	do	do	40,000
Wallace	do	Cumberland	do	40,000
Philip	do	do	do	40,000
West	do	Pictou	do	40,000
East	do	do	do	40,000
Middle	do	do	do	40,000
Barney's	do	do	do	40,000
Meander	do	Hants	do	40,000
Herbert	do	do	do	40,000
Shubenacadie	do	do	do	40,000
Cornwallis	do	King's	do	40,000
Gaspereau	do	do	do	40,000
Gold	do	Lunenburg	do	20,000
Middle	do	do	do	20,000
East	do	do	do	40,000
La Have	do	do	do	40,000
Annapolis	do	Annapolis	do	40,000
Liverpool	do	Queen's	do	50,000
Lochaber	do	Antigonish	do	200 000

Total 1,350 000

White Fish Fry.

Grand Lake,	Halifax	County	.....	750,000
Hubley's Lake,	do	do	.....	150,000
Governor's	do	do	.....	150,000
Neal's	do	do	.....	150,000
Sandy	do	do	.....	750,000
Williams	do	do	.....	900,000

Total 2,850,000

Salmon Trout Fry.

Lochaber Lake,	Antigonish	County	.....	20,000
Witson's	do	Halifax	do	10,000

Total 30,000

Total distribution of salmon	.....	1,350,000
do do white fish	.....	2,850,000
do do salmon trout	.....	30,000

Grand total 4,230,000

The work of placing this large number of young fish in the several rivers and lakes was attended with perfect success, no loss being sustained worthy of mention.

The plan which was adopted some years ago of erecting small temporary hatcheries at the most remote points of the Province greatly facilitates the work of distribution, as the eggs can be taken to those places before hatching, and from which the fry can be planted in the adjoining rivers with safety.

In March last I received orders from your Department to place a large number of salmon fry in the rivers of Antigonish County, and knowing that the means of reaching those waters were such that, it would be quite impossible to convey the young fish such long distances with any degree of safety, I erected a small hatchery on the bank of Lake Lochaber, in which I put 250,000 salmon ova, and 20,000 trout ova, all of which were successfully hatched and distributed amongst the lakes and rivers of Antigonish County.

While travelling through this county to reach the several rivers in which these young fish were planted I was forcibly impressed with the advantages this locality possessed for artificial fish culture. The county is interspersed with most beautiful lakes, containing water of a purity quite equal to that of any of the great lakes of the west, and apparently well adapted for the production of white fish, and salmon trout. These rivers, as well as those of the adjoining counties of Guysborough and Pictou, are large and important, and now that the lumbering and milling interests are about exhausted, an opportunity presents itself to your Department to make an effort to restore these rivers to their former importance by re-stocking them with salmon, and other commercial and game fish. At present, and from this Bedford Hatchery, very little can be done, and I would respectfully urge that a hatchery equal at least to the capacity of this one be erected there.

The Lochaber district being on the watershed from which the rivers run south into the Atlantic, and east into the Gulf of St. Lawrence, and as within a radius of twenty miles, the head waters of some twelve or fourteen rivers can be reached,—appears to offer exceptionally favourable advantages for the location of a large hatchery. The St. Mary's River, an important salmon bearing stream, is within four miles of Lochaber Lake, while in another direction the West River of Antigonish is about ten miles. From these streams an abundant supply of parent fish could be secured with which to fill the hatchery with ova.

I would respectfully urge your Department to take into consideration the insufficient hatching capacity of this establishment, having in view the extent of coast line, and the large number of rivers that should annually be stocked from it. The results that may be derived from the planting of such small numbers of fry each year in the different rivers I have stocked, cannot be observed to a satisfactory extent, and it would require a longer time to effect any marked increase; whereas if each river received 200,000 fry annually, instead of 40,000 as at present, the results would become noticeable as soon as the increase took place. With a large and properly located hatchery in the western counties, and a similar one at Lochaber in the east, to supply the extremes of the Province, and confining the work of this hatchery to the central counties, a very large number of fry could be turned out annually at a less proportionate outlay, than by extending the work of this hatchery over the whole of the Province as at present.

Having no means of obtaining statistics of the catch of salmon during the past season on our coast, I cannot speak positively of the numbers, but, from the information I have obtained I am led to believe that salmon are increasing in satisfactory numbers, and in some rivers the numbers entering in the autumn, are said to be quite equal to those of forty years ago. The reports I have obtained from the Musquodoboit river indicate a marked increase of fall or spawning fish, and those engaged in lumbering on that stream inform me that this autumn the pools were full of salmon and sea trout. In Bedford Basin the catch this past season was nearly double that of 1886, and a large number entered the river in the months of September and October.

Capture of Parent Fish.

This branch of the work, upon which depends the whole success of the year, as far as the number of ova obtained are concerned, is necessarily attended with a great deal of uncertainty and anxiety, and it is impossible to at all times guard against failure. Men may be engaged and nets set, but unless the fish reach them they cannot be taken. Having located the spawning sheds and tanks at points considered most suitable for the purpose, the fishing must be done at or near those points; but if through high freshets fishing cannot be continuously carried on, the fish will rush up the rivers, and reach points beyond the scope of the appliances. Again, if a low stage of water prevails, they will not come up to the nets. Unfortunately, the latter condition was met with this autumn, and I have to report a very small catch, as will be seen by the statement below; an unusual preponderance of male fish were caught. The fishing stations were located, as in former years, on the following rivers: Musquodoboit and Chezzetcook in Halifax County, and the West, East and Middle Rivers in Pictou County, from which the following numbers of salmon and ova were obtained:—

Rivers.	Males.	Females.	No. of Ova obtained.
Musquodoboit.....	65	25	300,000.
Chezzetcook.....	8	12	100,000.
West	10	25	300,000.
East.....	5	12	150,000.
Middle.....	3	4	50,000.
Total.....	91	78	900,000.

I am pleased to state that the condition of the ova at the present time is exceptionally good. The loss to date has been very light, and as the embryo is now visible, I can with confidence predict a successful hatching.

As the troughs are now occupied to but one-half their capacity, I have room for a large number of salmon trout, which, together with a full supply of whitefish otva, I hope you will permit me to obtain from our western hatcheries. I would suggest that these eggs be moved at the earliest moment consistent with safety, so that no loss by hatching during their transportation may be met with, and that they may be for as long a period as possible in the water in which they are to be hatched.

In conclusion, I beg to state that the hatchery and its appliances are in good condition, and that no unusual expenditure will be required during the next year.

A. B. WILMOT,
Officer in charge Bedford Hatchery.

4.—DUNK RIVER HATCHERY.

PROVINCE OF PRINCE EDWARD ISLAND.

Report of the Officer in charge of the Prince Edward Island Hatchery for 1887.

I have the honor of submitting my annual report of the work of this hatchery for the past year. As previously reported there were 500,000 young fry hatched in this establishment last spring, which were deposited in the following rivers:—

Dunk River	100,000
Wilmot's River.....	80,000
North Lake	50,000
Johnson's River	50,000
West "	50,000
Trout " (Lot 10)	30,000
Trout " New London	30,000
Tyne Valley River	30,000
De Sable "	30,000
Crapaud "	30,000
Tyron "	10,000
Inspector "	10,000
Total	500,000

These were all put in the several rivers in good condition.

I am sorry to report that we have not got a full supply of eggs this season: we only succeeded in getting 230 fish, 150 females and 80 males. From these were obtained 1,000,000 good healthy eggs. A large percentage of the fall run were young fish, the balance weighed from fifteen to twenty-five pounds. Quite as many fish spawned in the river as came into the reception house. The principal reason for this was the breaking of the dam last year, which caused such a rush of water that it formed a large spawning bed below the hatchery. Besides this there were other beds at the bridge, and the water being so low at the time the salmon came up, that they would not come into the reception house, and the bed of the river being so full of sticks and brush, that we could not drive them in. We will either have to remove the spawning beds, or make a trap at the bridge before next season. This would enable us to get a full supply of parent fish to stock the hatchery with eggs.

From all the rivers I have had reports, there has been quite a large increase of fish, not only in the rivers where we have planted them, but also in several rivers where they have not entered for years. Quite a large run came into the Tyron and Crapaud Rivers, and in several rivers west; which will go to show that the salmon are increasing around the Island. There have been a great many more caught along the coast these last few years than for a long time before.

It was very difficult to guard the river from poachers last fall on account of two of our wardens being discharged and no others appointed. Warden Tucker is about moving away, and some person should be placed in his stead before next fall if the river is to be protected. I am informed that nearly all the salmon entering Wilmot's River last autumn, were speared and killed. A warden is necessary for that river.

I should strongly advise the Department to prohibit eel fishing in these rivers from the 1st of October to the 1st of December. I am of the opinion that a large number of salmon have been speared under pretext of fishing for eels. Besides the boats running up and down the river when spearing eels frighten the salmon, as the water is very clear during that period.

I have had all the troughs and trays varnished and everything put in good repair. I find that several of the hatching troughs are decaying. These as well as some new taps will be required for next year's operations.

The dam appears to be all right. I had quite a lot of clay and stone put on the main part this season where the earth had washed away during rain storms.

The eggs are at the present time looking well and everything is working satisfactorily.

HENRY CLARK,
Officer in charge of Dunk River Hatchery.

5.—ST. JOHN RIVER HATCHERY.

PROVINCE OF NEW BRUNSWICK.

Report of the Officer in charge of the St. John River Hatchery for 1887.

In accordance with the usual custom I beg leave to make my annual report of the operations of this nursery for the past year.

In the latter part of the month of September, 1886, I set about the work of capturing parent salmon and gathering ova for this hatchery. About the 5th of October I reached the first salmon pool on the Tobique River, and on the 10th I arrived with my crew at the pools and spawning grounds on the Serpentine River. Immediately after I got there, to my regret I discovered that there were very few salmon to be found. I was not altogether unprepared for that result, as I found very little encouragement from the settlers along the lower part of the river on my way up, and as a rule they are pretty good judges of the run of fish in the river. I only caught six salmon before I got to the mouth of the Serpentine River.

During the season of 1886, I captured 23 fish, from which I obtained 52,000 eggs, a majority of these fish had partially spawned, others had spawned out.

I was very sorry at my inability to secure a full supply for the house as the expenses are necessarily almost as great and the labor nearly as much as if we had gathered a million eggs. These eggs, however, were of a good quality and hatched a large percentage of fry.

On the 16th of last March I received at this hatchery per Mr. Charles Wilmot, from Newcastle, Ontario, 3,000,000 whitefish and 400,000 salmon trout eggs in very good condition. From these a good percentage of fry were hatched in the spring, and the entire lot together with the salmon fry was safely planted without any serious loss in the several lakes and streams mentioned below, being in accordance with instructions received. I find it a very difficult matter to safely carry young fish such long distances as I was required to take them, especially the salmon trout fry, for they will not bear the same hardships as the salmon or the whitefish. Those long journeys also incur heavy expenses.

Distribution of Whitefish.

Long Lake, Victoria County.....	300,000
Portage Lake "	300,000
Meadow " "	300,000
Skiff " York County	400,000
Magaguadavic Lake, York County.....	400,000
Chamcook Lake, Charlotte County.....	400,000
Total.....	2,100,000

Distribution of Salmon Trout.

Lakeville Lake, Carleton County.....	50,000
Debee " " "	16,000
Boundry " " "	8,000
Oromocto " York "	50,000
Magaguadavic Lake, York County.....	54,000
Foster " Charlotte County.....	48,000
Meadow " Victoria "	48,000
Portage " " "	30,000
Webster Brow " " "	20,000
Fraser's Pond " " "	10,000
Total,.....	331,000

Distribution of Salmon Fry.

Popelogan River, Charlotte County.....	30,000
Tobique " Victoria "	10,000
St. John " " "	5,000
Total.....	45,000

Total Distribution, 1887.

Salmon Fry.....	47,000
Salmon Trout Fry.....	334,000
Whitefish Fry.....	2,100,000
Grand total,.....	2,481,000

After the fry were distributed I obtained some paraffine varnish and had the trays, troughs and other appliances painted. The usual high freshet last spring washed out some portions of the water course at the head of the underground supply pipe. The freshet also carried away a portion of the large dam on the brook, and consequently washed away several rods of the land along the upper bank of the stream. This dam is of no practical use or benefit to the hatchery as no parent fish can be taken in the river to put in the pond. Nevertheless something should be done, either to have the dam repaired or have that part of it taken down between the gate and the shore, so that the water would have a straight run and thus prevent further injury to the bank.

On the 14th of last September I left home for Tobique and Serpentine Rivers, under instructions from the Fisheries Department, to make another trial to capture salmon and collect ova for this establishment. I was more successful this season, having caught 167 salmon, 87 females and 80 males. From this I obtained, as already report, 625,800 eggs.

I have observed unmistakable signs of an increase in the number of young salmon returning to the rivers. Quite a lot of what I would call four-year-old salmon, weighing from six to eight pounds, were caught by my men last autumn, and very many gills. The sand banks and shoal water all along the river were teeming with little salmon. It is scarcely possible to fish for trout without hooking some of them.

I would respectfully invite attention to an important fact coming under my observation. Some ten or twelve years previous to my appointment in charge of this hatchery, I was fishery overseer of this county, and every summer I made an

annual inspection of the several rivers to which salmon resorted, and in all that time I never knew of more than one or two salmon having been taken with a fly. Many years ago I went with the Lieutenant Governor of New Brunswick, Sir Edmund Head, and party in canoes up the Tobique River, from Andover to the head of the Little Tobique Lake; the whole party fished incessantly from the beginning to the end of their journey, and not even so much as the "rise" of a salmon was got; in fact it would have been considered something wonderful in those days to hear of a salmon being caught with a fly on the Tobique waters. Now what is the result? During the past four or five years anglers have begun to have fair sport in fly-fishing for salmon, and last summer two parties landed forty-seven fine salmon in a few days, and only fished about seven miles above the forks. The parties I refer to were Major Howe and H. W. Cram, Esq, manager of the New Brunswick Railroad. From my experience and observations I am quite satisfied that the artificially-bred fry from this hatchery, hatched from the eggs received from the Ristigouche and other nurseries and planted in our rivers has brought about this great improvement in salmon angling on the Tobique River. The benefit arising from fly surface fishing for salmon in the Tobique River goes to the New Brunswick Government, as the river has been leased to certain parties who have notified me of the intention of their company to protect the salmon pools, and of preventing me from capturing parent fish in that river. This action will necessitate the getting our parent fish for breeding purposes in the St. John Harbor, or in some other convenient place, in order to avoid any possible conflict with those lessees, and to do away with that uncertainty hitherto experienced of trying to supply this hatchery with eggs from the Tobique, or the upper parts of the St. John River. I trust, therefore, the Department of Fisheries will devise some means by which this contingency may be avoided in future.

CHARLES McCLUSKEY,
Officer in charge St. John River Hatchery.

6.—MIRAMICHI HATCHERY.

PROVINCE OF NEW BRUNSWICK.

Report of the Officer in charge of the Miramichi Hatchery, for the year 1887.

I beg herewith to submit my annual report of the operations connected with the hatchery under my charge.

In the autumn of 1886 I had laid down in the hatchery 1,020,000 salmon ova. These were successfully hatched and distributed with small loss in the following streams:—

North-West Miramichi River.....	350,000
South-West ".....	200,000
Little South-West ".....	300,000
Stuart's Brook.....	50,000
Nipissiquit River.....	20,000
Total.....	<u>900,000</u>

In addition to this I planted 25,000 in Stoney Brook, a head water of the North-West Miramichi. These fry were procured from the Ristigouche hatchery on the application of the Hon. Michael Adams, who wished to have some of the Ristigouche salmon introduced into Miramichi waters.

The fry have been placed much further up the rivers this year than usual. The loss met with in the whole of the distribution was trifling.

During the summer season some necessary repairs were put upon both the reception and supply dams, also the roof and chimneys of the hatchery were repaired and the building painted, which adds greatly to its appearance. According to instructions from Mr. Wilmet I had a number of new hatching troughs placed in the house, which gives room for about 160,000 more eggs than could heretofore be placed in the hatchery.

I commenced taking parent fish on the 5th September, and by the end of the season I had procured 320. Of that number 190 were females, and the remainder males. From the females I collected 1,300,000 eggs, which shows an average of about 6,840 eggs to each fish. This amount of ova was placed in the hatching troughs and is progressing favourably up to the present date.

I am pleased to state that the labor of procuring parent fish was not as difficult this fall as in past seasons, owing to the number of guardians on the river being increased, and they, by their efforts of enforcing the law caused it useless for the poachers to attempt to set nets after the close season had set in; thereby allowing the salmon to get up to the spawning grounds.

ISAAC SHAESGREEN,
Officer in charge Miramichi Hatchery.

7.—RISTIGOUCHE HATCHERY.

PROVINCE OF QUEBEC.

Report of the Officer in charge of the Ristigouche Hatchery for 1887.

I herewith transmit my annual report on the management and working of this institution under my charge during the past year.

It will be seen by my last annual report that 1,700,000 eggs were deposited in the hatchery in the fall of 1886, from which 1,530,000 fry were successfully hatched; 1,500,000 of these were planted in the Ristigouche and its tributaries in the usual manner; many of the fry being towed up to the head waters of the Kedgwick.

The new cribs constructed for distributing proved very satisfactory. The traps or sides are so arranged as to permit of their being lifted while the cribs are being towed up river, and the little fish are allowed to gradually pass out into the river. Under this system it is possible to tow some twenty or twenty-five miles up river in a day and thus scatter the young fish gradually along the river. This branch of the work is highly approved of by the fishermen, anglers and all others visiting the river, all of whom express the strongest belief in the artificial breeding of fry as the best means of keeping up the supplies of salmon against the immense drain now made upon the salmon fisheries in the tidal waters. Some 30,000 fry were carried to the Miramichi River and deposited in the North-west Branch by the officer there. Should it be the intention of the Department to continue the practice of planting Ristigouche fry in the Miramichi or Bathurst rivers, I would suggest that the semi-hatched ova be transferred to the Miramichi hatchery in the spring months, as when hatched they can be more safely put into the rivers in which they are wanted. In this way there would be no risk of losing the fry in long journeys, and the end would be accomplished with much less expense.

Supply of Parent Salmon.

The departmental net was set on the 20th of May, and captured during the season 160 salmon. Had I received the official instructions sooner in the season to extend the wings of the net, and keep it set during "close season," a greater number of fish would have been captured. But the first and largest run of fish had already passed up river, it being the 20th of June before the instructions were received. Some 380 fish were purchased from the net fishermen, but, unfortunately, a large number of these died of fungoid growth in the gill-, being injured when taken out of the traps and conveyed to the reservoir. The wounded fish which were suitable for food were again returned to the fishermen and credited to the Department. 410 fish were found in the reservoir when spawning season began. From these we collected 1,900,000 eggs. Spawning began on the 20th of October, and ended on the 3rd of November. The parent fish were divided as follows: 193 females and 210 males. 7 female fish would not yield any ova, being injured by the nets. They had not matured, and, owing to severe cold weather setting in, they could not be retained any longer. These were liberated with all the other fish that were spawned.

A great deal of hardship was experienced in manipulating the fish and transporting the eggs to the hatchery. The river became frozen over in many places before the operations were completed. A few eggs were lost in the carriage to the nursery, owing to the severity of the frost, and taking them over rough and frozen ground. With the exception of this slight loss the remaining eggs in the hatchery are at the present time in very fine condition.

Means to increase supplies of parent fish

With regard to the important question of enlarging the supply of parent fish for the use of the hatchery in future, I beg to direct the attention of the Department to the remarks of my last annual report on the subject, and unless the idea therein mentioned is carried out for obtaining a small steam barge for collecting and towing the parent fish from the nets to the reservoir, no great improvement can be looked for. I would also strongly urge upon the Department the importance of at once leasing or otherwise securing some stands of nets on the river, which are now being negotiated for, so that they may be entirely under our own control, and fished in such a manner by our own men, as will prove productive of the best possible results. Under the present system only a small percentage of the fish taken in the nets by the fishermen, who have contracted to supply us with salmon, are found to be alive, owing to their rough usage by the fishermen in taking them out of the nets, and yet they claim they do the best they can to prevent injury to the fish. In giving the high price we did for each fish last season, we were unable to purchase the necessary supply required. The market price runs so high for salmon, and there is so much competition among the dealers, that the fishermen will not go to the extra expense and trouble of catching and keeping the fish alive for us.

Superintendent Wilmot and myself travelled some twenty or thirty miles down the Bay des Chaleurs, below Campbellton, in the month of August last, and closely examined the shores and inlets on both sides of the bay, with a view of finding, if possible, a site to establish a salt water pond in a locality where salmon could be purchased in large quantities, and where pure salt water would always remain in the pond, as in this way the mortality among the fish hitherto experienced would be almost wholly avoided. Only two places were found that could be made suitable. River Leuseau, on the south side, five miles from Charlo Station, on the Intercolonial Railway, and Phaces Brook, on the north side of the bay, fifteen miles below Campbellton. There are streams of fresh water at both the above named places, and salt water ponds could be made by erecting a small dike, or dam, at the outlet of the streams in which the salt water could be retained. But owing to there not being any salmon stations within three or four miles of where the ponds would be located,

it would be almost impossible to convey the fish from the nets to these ponds without some sort of steam barge to tow the cribs. Therefore, these places would not make any decided improvement over the present mode of obtaining fish at tide head.

Retaining Young Fish in Ponds.

Some eight or ten thousand young fry were planted in the same pond which was built at the hatchery a year ago. These little fish were fed during the summer, yet they did not seem to thrive well as but few were to be seen in October when the pond froze over. This pond is supplied with water through a pipe leading from the hatchery, the young fish were fed daily. But I have very little faith in the attempt to grow salmon fry with artificial food in ponds with a view of realizing any benefit from the proceeding.

Experimenting with Sea Trout.

About two hundred speckled trout were obtained in the early spring from fishermen and others, and placed in a pen constructed for them adjoining the salmon pond at "Tide Head." For some time these trout seemed to thrive pretty well, but later on they got covered with fungus and two-thirds of them died. This disease resulted from the fact that the most of the trout were injured in the meshes of the nets, consequently no eggs were obtained.

General Remarks.

The catch of salmon in the tide way on the whole was quite equal to that of 1886. Some few stands did not do as well while others made a larger catch. Many good scores were made by the anglers up river, although the catch, all told, was not as good as last season. This may be accounted for in two ways: (1.) The first run of fish entered the river very early and before the snow freshet was over. These early runs of salmon always pass rapidly up to the heads of the various streams before the anglers get up the river. (2.) The summer season was unusually dry and hot, which made the water in the river very low, and gave it such a high temperature that the fish did not rise to the fly as well as in former years.

I had conversation with several of the guardians who were employed on the river during the spawning time, some of these were on duty fifty miles up the Kedgwick. They report the rivers pretty well stocked with parent fish. There was a slight falling off, however, which will be felt more seriously hereafter if the net fishermen in the tide-way, especially below Dalhousie, are not compelled to comply with the law for observance of the close time from Saturday night to Monday morning. These trap nets with bottoms to them are set at the opening of the fishing season and never lifted again till the season closes. I have to humbly suggest that the Department should cause the Sunday close time to be most strictly kept; otherwise the supplies of breeding fish for natural spawning up river, will be so reduced as to seriously affect the future catch of salmon for commercial purposes throughout the Baie des Chaleurs.

ALEX. MOWAT,
Officer in Charge Ristigouche Hatchery.

(8.)—GASPÉ HATCHERY.**PROVINCE OF QUEBEC.***Report of the Officer in charge of the Gaspé Hatchery for 1887.*

Last year's report showed that 704,000 salmon ova were then in the troughs. These produced a large percentage of fry. The loss during the winter being only about ten per cent.

The fry hatched towards the end of May, and the 1st of June, and after all had emerged from the shell very few died.

I commenced distributing the young fish on the 17th of June, and finished the work on the 12th of July. They were planted in the following rivers:—

Dartmouth River, above the falls.....	200,000
do do below do	130,000
St. John River.....	150,000
York River.....	150,000
Total.....	630,000

The net for taking the usual supply of parent salmon was set on the 9th of June and fished until the 30th of July. There was a good run of fish up the river, but owing to the want of rain and to the clearness of the water, only 105 fish were captured and placed in the pond, of this number one salmon died.

Manipulation of Salmon.

The fish were placed in cribs on the 7th October, one female gave her eggs same day. The operations were continued from the 13th October and finished the 10th November.

40 females averaged 12,000 ova.....	480,000
20 do do 10,000 do	200,000
9 do do 8,000 do	72,000
1 female, no ova.....	.....
Total.....	752,000

These eggs at the present time are looking healthy and well.

Repairs.

Necessary repairs were made to the reservoir; on taking it apart the timber was found to be sound except the posts. These were all made new and the reservoir replaced, putting white lead and cotton wick in the grooves to keep them tight, and it has proved to be so up to the present time. On examination I found the building spreading, owing to improper construction in the first instance. I immediately notified Mr. Wilmot, the Superintendent, and received instructions from him to strengthen the building, which was at once done. Timber and spruce knees, with iron screw bolts and nuts, were secured through the posts and wall plates. This has so strengthened the building as to make it durable for some time. The upper dam at the reception pond was nearly all re-made in September, and is now considered safe against any high run of water. The building needs painting all over next summer to preserve it from the action of the weather.

PHILIP VIBERT,
Officer in Charge Gaspé Hatchery:

(9) TADOUSSAC FISH HATCHERY.

PROVINCE OF QUEBEC.

Report of the Officer in Charge of the Tadoussac Fish Hatchery for the year 1887.

I desire to submit my annual report relating to the operations carried on in the Tadoussac Hatchery for the past year.

In the fall of 1886, 997,920 eggs were deposited in the hatchery, from which 300,000 fry were successfully hatched and planted in the following rivers and lakes:

St. Margaret River, N. W. Branch.....	190,000
do do N. E. do	140,000
St. John do	140,000
Petit Saguenay River	50,000
AMars do	90,000
Jacques Cartier do	20,000
Mowat's Lake	100,000
Hatchery do	170,000
Total.....	900,000

During the month of June the weather remained exceptionally cool and favorable for the transport of fry long distances. I am pleased to state that the young fish were liberated with but little loss, some of the points where they were distributed being a long distance from the hatchery. I am sorry to mention that notwithstanding all the trouble and precautions taken to deliver the fry for the North-West Branch of the St. Margaret River, making in all twenty-four miles from the hatchery, crossing the West Brook running to the river, and by carrying the cans by hand through the woods for a mile to plant a portion of the fry in a beautiful lake connected with the St. Margaret River. Yet the President of the American Club (lessees of the river) does not seem satisfied, but complains of the operations carried on at the Tadoussac Hatchery. It is impossible to take more trouble, I always went myself with the men to look after the cans and have the water changed as often as wanted.

A good many smolts grown from the fry put into the Hatchery Lake passed down to the salt water late in the month of October, when the first freshet had filled up the lake sufficiently to make the water flow over the dams. This is the second year that the same thing has taken place, of the smolts going down so late in the fall from the Little Lake.

I believe it will be unsafe to put a large quantity of fry in the Hatchery Lake next spring, as it is full of smolts and they would destroy the little fry if put in there. The Mowat Lakes are in better condition to receive a large quantity of fry. They are larger sheets of pure water, with a good passage for the young salmon to go to the salt water any time during the summer season. I visited the Mowat Lakes very often, where fry had been planted for the first time by myself, in the spring of 1886, and on the occasion of the distribution in June, 1887. But I made a closer inspection last fall and caught some of the first year's planting of 1886 to examine them well. They measured five inches in length, and there were great numbers of them in the two lakes. Hundreds of people in passing along the lakes going to the Bergeronne River have noticed the young salmon leaping up all over the lakes. As there are no trout in the Mowat Lakes, I consider them, fed as they are by a splendid stream with gravelly bottom, to be good nurseries to put salmon fry in. They are only about seven miles from the hatchery and are emptied by a large brook running down to the salt water by which the smolts have free passage to the sea.

It would be desirable that a large quantity of fry should be planted in these lakes next season.

There were a good many grilse coming around the hatchery cove last year. I caught two to examine them, one measured $13\frac{1}{2}$ inches long and 9 inches around his body, and the other $19\frac{1}{2}$ by 13 inches. They were in perfect condition and fat.

Salmon rod-fishing in the rivers running into the Saguenay has not been good. This I attribute to a great extent to the water in the rivers being so low and clear during the time when the anglers are upon them. And I am also inclined to think that salmon are largely destroyed and driven away by the immense quantities of porpoise seen from the entrance of the Saguenay to Point la Brule. What makes me firmer in this connection that the salmon have been driven away from the Saguenay is that they have been seen in larger numbers than usual from Point aux Bouleaux to Murray Bay. Some of the brush-fisheries from St. Catherine Bay to River aux Bouleaux, which are not adapted for the catching of salmon, have nevertheless caught a good many of these fish during the past season.

I only secured for this hatchery 151 parent salmon, 2 died during the summer, leaving 94 females and 55 males for manipulation. The females gave 902,400 ova, an average of 9,600 eggs from each female. This is a smaller average than last year, owing to 10 of the females bring smaller fish.

The eggs were all laid down on the hatching trays in good condition. The embryos are now quite visible. The work of spawning commenced on the 22nd of October and was completed on the 11th of November and the parent fish were liberated without any loss.

During the summer I had the building cleaned and renovated a little, by painting the tops of the troughs and tanks in each flat, by putting a coat of coal-tar varnish in the inside of the troughs, and on the hatching trays, and by repairing the banks of the dam.

The building requires a thorough inspection and I hope it will be done next summer. At all events, part of the troughs, the tank in the upper flat; and the dalle from the first dam require to be removed, also new fencing around the property. The dams are still in first class order and retain the water well.

L. A. CATELLIER,
Officer in charge Tadoussac Hatchery.

(10.)—MAGOG HATCHERY.**PROVINCE OF QUEBEC.***Report of the Officer in charge of the Magog Fish Hatchery for 1887.*

No attempt was made this year to secure parent fish from Lake Memphremagog, from which to procure eggs to stock this hatchery as it was thought advisable to get them from the upper lakes instead. Accordingly on the 26th of March last a quantity of semi-hatched ova of the salmon trout were received from the Newcastle, Ontario, Hatchery and deposited here in good order. From these about 84 per cent. were hatched, amounting to some 675,000 fry. These were planted successfully in the following named sheets of water:—

Memphremagog Lake,	Counties Stanstead and Brome.
Massawippi	do do do
Orford	do Brome County.

Owing to the coldness of the water the eggs were unusually late in hatching and were not distributed until late in June.

I am happy to inform you that I have received letters and other information from persons who are in a position to know, stating that whitefish are now seen in large numbers in Memphremagog, Massawippi, Megantic, Brompton, and Orford Lakes. Fish guardians, boatmen and fishermen concur in this statement that there never have been known such great numbers of salmon trout in the above named waters as now, notwithstanding that many are illegally slaughtered during the close season in spite of the fish guardians' efforts to protect them. One other good evidence of the increase of salmon trout in these lakes and especially in Memphremagog since the artificial propagation was commenced in the Magog Hatchery is the fact that nearly all the minnows, shad waiters, chubs, and shiners have gradually disappeared, so that the fishermen are compelled to use perch for bait.

In regard to the latter fish (perch) they were put into Memphremagog Lake by persons in Vermont a few years before the Magog Hatchery was built, and at the time the first salmon trout fry were deposited the lake was literally swarming with this undesirable fish. The salmon trout readily take them as bait, and as food, so that the perch too are on the decrease, none being caught now that weigh over a quarter of a pound, as many as seven or eight have been found in the stomach of the salmon trout at one time.

The black bass, too, are constantly and rapidly increasing in size and numbers in Lake Memphremagog, which will soon be one of the best bass fishing grounds in Canada.

In one or two more years the wisdom of the Government will be amply vindicated in their expenditure to increase fish food in these Eastern Townships by means of this hatchery.

I beg to again call the attention of the Department to the fact that, notwithstanding the efforts of the fishery guardians, the fish in the lakes and waters of the Eastern Townships are not adequately protected from evil-disposed persons, who succeed in mercilessly slaughtering them during the close season, and in using seines, nets and night lines at other times in the year so extensively.

A. H. MOORE,
Officer in Charge.

(11.)—NEWCASTLE FISH HATCHERY.

PROVINCE OF ONTARIO.

Report of the Officer in Charge of the Newcastle Fish Hatchery for 1887.

I beg herewith to submit my report of the operations connected with fish breeding at this establishment during the past year.

It is satisfactory to state that the several kinds of fry hatched last spring were turned out in very good condition. No loss of any moment was sustained, notwithstanding the long distances that some of the fry were transported.

The following schedule will show the kinds of fish hatched, the places where they were distributed, and the numbers deposited therein :

Distribution of Salmon Trout.

Cobourg, Lake Ontario.....	100,000
Whitby do	100,000
Toronto do	100,000
Brighton do	100,000
Kingston do	200,000
Kingston do	100,000
Bowmanville do	100,000
Newcastle do	100,000
Ottawa, Fisheries Museum.....	20,000
Cobden Station, Canadian Pacific Railway.....	50,000
Sand Point, Riley's Lake.....	50,000
Barrie, Lake Simcoe.....	100,000
Orillia do	50,000
Orillia, Lake Couchceching.....	50,000
Belleville, Bay of Quinté.....	100,000
Halliburton, Kuskog Lake	25,000
do Crooked Lake.....	25,000
do Drag Lake	25,000
do Redstone Lake.....	50,000
Warton, Georgian Bay.....	200,000
Levant, Trout Lake.....	100,000
Welland, Welland Canal.....	50,000
Mono Road, Alexander Lake.....	50,000
Toronto, Lake Ontario	100,000
North Hastings, Eagle Lake.....	25,000
do Humphrey's Lake	15,000
do Sweet's Lake	10,000
do Livingston's Lake.....	15,000
do Lemable Lake.....	25,000
do Riddle's Lake.....	15,000
do Batoche Lake.....	15,000
do Bartlett's Lake.....	25,000
Grand total.....	<u>2,090,000</u>

Distribution of Speckled Trout.

J. Gilmore, Trenton.....	3,000
Judge Dartnell, Whitby	2,000
Robert Croft, Baltimore.....	2,000
George Neely, Dorchester	2,000
H. J. Shaw, Brantford	2,000
Geo. Monterief, Petrolea	4,000
J. Davey, London.....	2,000
P. McCann do	2,000
P. J. Burk do	2,000
I. S. Leary, Freelon.....	2,000
W. J. Laton, Mapleton.....	2,000
J. Southerland, Woodstock	3,000
Fisheries Museum, Ottawa	4,000
P. White, M.P.P., Cobden Station.....	4,000
Judge Wood, Stratford	4,000
J. Puddicombe, Baden.....	2,000
I. Puddicombe (Parties did not meet fry at station; intended for Guelph Fishing Club).....	3,000
I. Croft Hulme, Belleville.....	3,000
Wm. Robbins, Brewster's Lake	4,000
Archie Riddle, North Hastings.....	5,000
E. G. Burk, Campbellford.....	4,000
Wm. McIntosh, Newcastle.....	4,000
Kept on hand at Newcastle Hatchery.....	5,000
Grand Total	<u>70,000</u>

Distribution of Whitefish.

Port Hope, Lake Ontario.....	200,000
Toronto do	300,000
Newcastle do	50,000
Newcastle do	50,000
Bowmanville do	50,000
Cobourg do	150,000
Belleville, Bay of Quinte.....	500,000
Gilmore Station, Gilmore Lake.....	20,000
Sand Point, Riley's Lake.....	50,000
Grand Total.....	<u>1,370,000</u>

Total distribution from Newcastle, 1887.

Salmon trout fry.....	2,090,000
Speckled trout do	70,000
Whitefish do	1,370,000
Semi-hatched eggs sent to Magog, Quebec.....	800,000
do do do Grand Falls, N.B.....	400,000
do do do Bedford, N.S.....	400,000
Grand Total.....	<u>5,130,000</u>

During the past summer some very important alterations were made in connection with the ponds at the nursery, with the view to their use for carp and bass culture. It was found that they were too shallow. During the winter months ice formed so thickly as to consume most of the water, which caused the fish to die from suffocation. This difficulty, I have to report, has been obviated by digging them several feet deeper, and it is now expected that the ponds are suited for the growth of carp and bass. I would, therefore, strongly recommend the Department to get a supply of these fish as soon as possible. There should be no difficulty in propagating large numbers of these fish for distribution into the waters suitable for them throughout the several Provinces.

This establishment and all its appliances are in a good state of repair. It is very satisfactory indeed to report on the evident strength and durability of the new dam as it stood firm after all the heavy freshets of last spring, and I have every confidence in its withstanding the floods of future years.

The following table will show the number and kinds of eggs placed in the hatchery last fall and where they were obtained:—

Salmon trout eggs collected Pigeon Island.....	1,500,000
do do do Wiarton	7,550,000
Whitefish eggs sent from Sandwich.....	2,000,000
Speckled trout sent from Tadoussac.....	100,000
do obtained from United States.....	200,000
Grand Total	<u>11,350,000</u>

The above large number of salmon trout eggs laid down last fall being more than double the quantity of last season, gives evidence that this work was much more successfully carried on than in the previous year. Much of this success may be attributed to the satisfactory carrying out of Captain J. S. Allan's contract with your Department for capturing the parent fish at Wiarton on the Georgian Bay.

Fully one half of these salmon trout eggs should be transferred at an early date to some of the eastern hatcheries as there will not be sufficient room to warrant safety in hatching such a large quantity at this nursery in the spring.

In accordance with instructions received, I herewith append a statement of the daily operations at Wiarton, which shows the number of parent fish handled, the quantity of eggs collected, and gives full particulars as to the correct spawning time of the salmon trout.

Records of this kind will no doubt be found to be of great importance to your Department as guides for framing the proper close season for these fish, and might be made applicable also for all other species desirable to protect.

A STATEMENT showing the daily operations of Collecting Salmon Trout Eggs at Wiarton, during the Season of 1887.

Date of Lifting Nets	No. of Nets Lifted	Number of Fish from which Spawn was collected and liberated		Number of Fish spawned out before entering nets, and liberated	Number of Fish found injured or dead in nets.		Number of Eggs Collected.	GENERAL REMARKS.
		Males	Females		White-fish	Salmon Trout.		
Nov. 1...								Arrived at Wiarton, 6 p.m.
do 2...								Large number of fish in nets, but too rough to lift.
do 3...	1	32	270	20	9	41	600,000	These injured fish had been speared in nets. Weather rough. Impossible to lift nets.
do 4...								Fish scarcely ripe for spawning. Employed Officer Shackleton to guard nets from poachers
do 5...	2	10	30		1	5	100,000	Sunday. Weather fine all day; blowing hard at night.
do 6...								Shipped 3 boxes eggs to Newcastle. Blowing hard; could not go out to nets.
do 7...								Blowing a gale; too rough to lift nets.
do 8...								Blowing pretty fresh and cold. Capt. Allan has not been able to set No. 3 net yet, owing to rough weather.
do 9...	1	40	300	90	2	11	800,000	Fine weather; snowing. Eggs running freely. No fish ripe in nets. Left for home with eggs.
do 10...	1	72	388	30	3	15	1,100,000	Blowing. Could not lift.
do 11...								Sunday. Fine weather.
do 12...								Weather moderate, but cold.
do 13...								Did not lift. No fish ready for spawning.
do 14...	1	86	298	42		17	750,000	* These fish had been speared and gaffed. Shackleton seized 300 fish at White Cloud Isl'd, said to be taken from our pound nets.
do 15...								Rough weather. Could not lift nets.
do 16...	1	152	329	89	5	*37	800,000	Left for home, with eggs. About 2,000 fish still in nets, but not ripe for spawning.
do 17...								Fish not ripe. Great scarcity of male fish.
do 18...	1	49	387	67	2	21	1,000,000	Sunday. About 3 inches of snow fell. Cold.
do 19...								Fine weather. Large number of fish not yet ripe.
do 20...	1	37	333	83		24	650,000	Blowing hard. Could not go out to nets.
do 21...								do do do
do 22...								do do do
do 23...								do do do
do 24...	1	21	309	117	1	9	950,000	Lifted one net and liberated all fish. Upwards of 700 fish turned out not ripe for spawning.
do 25...								Very cold, and freezing. Rough weather.
do 26...	1	13	183	47		15	500,000	do do do
do 27...								do do do
do 28...								do do do
do 29...	1	19	112	37	1	14	300,000	Liberated all fish from nets. Upwards of 600 fine fish set free, not yet ripe for spawning.
do 30...								Very cold.
...								Left Wiarton for good. Completed operations.
		534	2,940	622	24	209	7,550,000	

There are many salmon trout spawning here after the 1st of December, but the majority of them spawn between the 10th and 25th of November.

A good deal of comment has been made by fishermen and fish dealers directly interested in the traffic of this commercial fish, as regards the present close time, (the whole of November). But all persons interested in maintaining the fisheries

will say that much wisdom has been shown by your Department in fixing this period as the proper close season.

With this close time thoroughly enforced, and with the large numbers of fry now being annually planted in many of the important waters of the country, a very marked improvement in the standard of this favorite marketable fish will undoubtedly be the result.

In September last I was instructed by your Superintendent of Fish Culture to make an inspection of the fishing grounds in the vicinity of Pigeon Island Bar, Lake Ontario, with the view of ascertaining whether one or more pound nets could be safely set in that locality for the purpose of capturing and retaining parent fish till ripe for spawning, in the same manner as has been carried on at Warton for several years past.

In order to properly carry out this work, Captain Allan who is an experienced fisherman in pound net fishing, was engaged to accompany me. We spent several days prospecting in the neighborhood of Pigeon Island, and the bays on the shore of Wolfe Island, between Horse Shoe Island and Bear Point; but could hardly find a square foot of clay or gravelly bottom in the whole district. We made a pole 45 feet in length for sounding, and attached an iron bar to it six feet long and probed the bottom in numerous places, but strange as it may appear, not a rod of clay or gravel could be found. The whole of the lay of that part of the lake for miles around appears to have a formation of solid flat rock. Consequently stakes for pound nets could not be driven, and as the storms in the fall of the year are of a very rough and damaging character, it would be very expensive and I fear unsafe to set pound nets in that locality.

At the present time the eggs are all doing well, with the exception of a few speckled trout eggs of the lot obtained from the United States, a considerable number of these are hatching prematurely, caused, no doubt, by overheating in the car while being transhipped to this establishment.

I would urge upon your Department the necessity of having all orders for fry sent in at an early date, thus saving a great deal of trouble to the officers, and much dissatisfaction and annoyance to applicants, who appear to think they should get supplies of young fish at all seasons of the year, notwithstanding they must all be liberated by the middle of June at the very latest.

CHARLES WILMOT,
Officer in charge Newcastle Establishment.

(12.)—SANDWICH HATCHERY.

PROVINCE OF ONTARIO.

Report of the Officer in charge of the Sandwich Fish Hatchery for the year 1887.

A report is herewith submitted of the operations in breeding whitefish and pickerel in the Sandwich Hatchery under my charge during the past year.

My report of last December stated that I had gathered and placed in the hatchery 46,000,000 whitefish eggs. Out of this number of eggs I put out 31,500,000 young fish, and transferred 7,500,000 eyed eggs to other hatcheries, and under the instructions received the fry were distributed last spring in the following waters:—

Bois Blanc Island.....	2,000,000
Stony Island.....	2,000,000
Gauthier's Ponds, Detroit River.....	1,000,000
Fighting Island do.....	1,000,000
Jolley's Pond do.....	1,000,000
Peléé Island, Lake Erie.....	2,000,000
Leamington do.....	1,500,000
Kingsville do.....	1,000,000
Colchester do.....	1,000,000
Pigeon Bay do.....	2,000,000
Bar Point do.....	3,000,000
Lake Huron.....	2,000,000
Lake St. Clair.....	1,000,000
Port Stanley, Lake Erie.....	1,000,000
Hamilton, Lake Ontario.....	2,000,000
Niagara do.....	2,000,000
Semi-hatched ova sent to other hatcheries.....	7,500,000
Total of Fry.....	39,000,000

The young fish were in a good healthy condition when placed in the above waters, and I expect to hear of a good return from them of marketable fish in a few years.

After having liberated all the whitefish from the hatchery, I prepared the house for receiving the eggs of the pickerel of dories, and succeeded in gathering some 32,000,000 ova from the following fishing stations:—

Weiss Brothers, Lake Huron.....	9,000,000
Loiseau's Station do.....	10,000,000
Hitchcock's and Stread's, Lake Huron....	13,000,000
Total.....	32,000,000

From this number of eggs I was successful in hatching some 25,000,000 young pickerel, which were planted under directions at the following points:—

Lake Huron.....	3,000,000
Lake St. Clair.....	5,000,000
River do.....	3,000,000
Pigeon Bay, Lake Erie.....	5,000,000
Detroit River, near hatchery.....	9,000,000
Total.....	25,000,000

In my report of last year I suggested the propriety of the Department erecting a wind-mill pump and a reservoir near Louiseau's grounds on Lake Huron, which suggestion was carried out, and by its means we were enabled to gather 7,000,000 more eggs.

The wind-mill and pump have been a success in supplying fresh water for the large water reservoir in which we placed the pickeral which are caught before they are ripe for spawning.

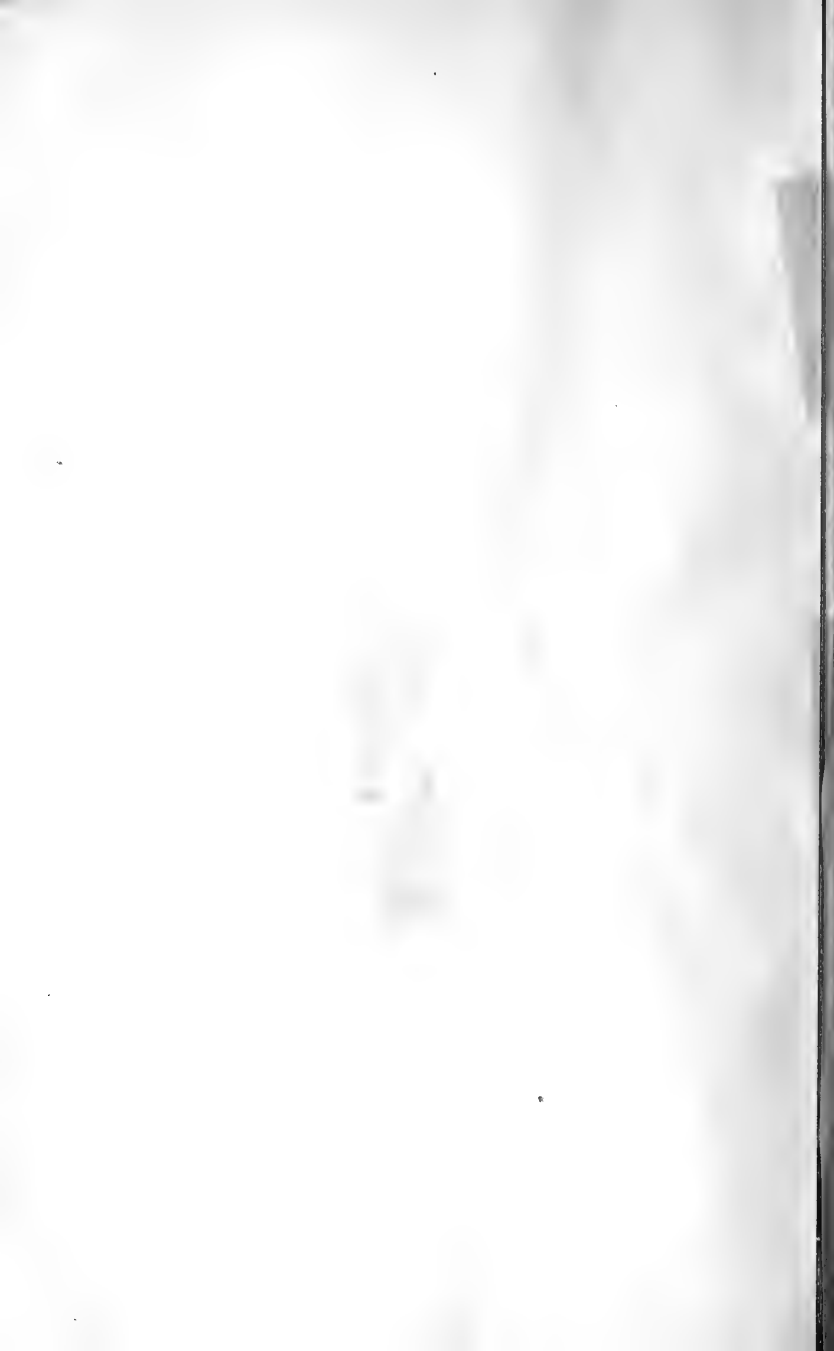
From the reports I have received from fishermen I am happy to state that the increase in the catch of small pickeral has been very marked this last year, and the Sandwich hatchery receives almost unanimous credit for the same.

The hatchery this fall has been filled to its full capacity with the eggs gathered. The following will show the grounds where the fish were caught and the numbers of eggs gathered at each station:—

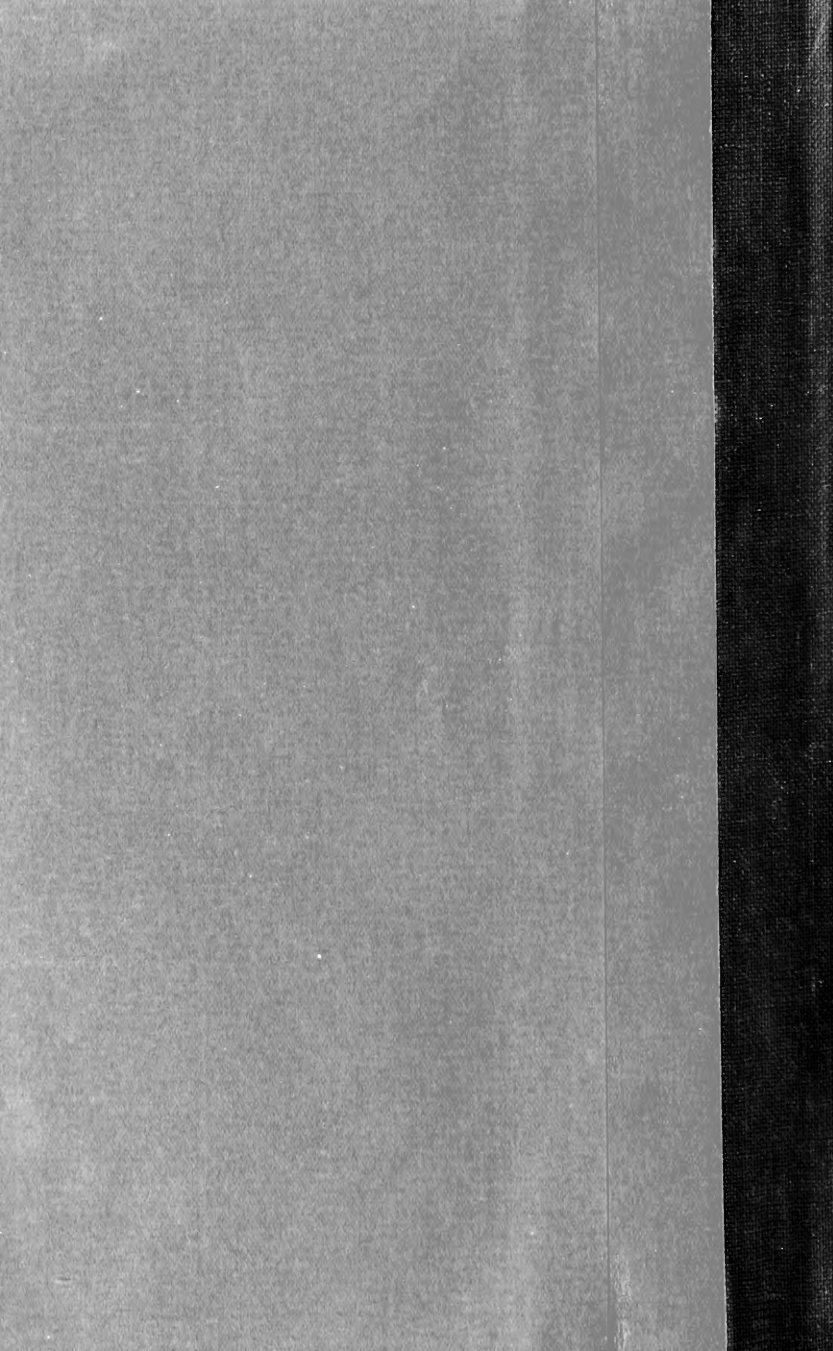
D. Reaume's Station, Stony Island	25,000,000
J. McKee's do Bois Blanc Island.....	15,000,000
C. W. Gauthier's Station, Fighting Island.....	10,000,000
Total.....	<u>50,000,000</u>

I would state here that the catch of whitelish this fall has been greatly in excess of last year, and a noted fact is that a large portion of the catch were young fish, showing that the efforts of the hatchery has not been in vain, which fact is also testified to by several letters which I am in receipt of, several of which I herewith attach to my report. (See page 11.)

WILLIAM PARKER,
Officer in Charge Sandwich Hatchery.







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