

With the close of the month a much better feeling is shown; disasters and losses of the past are not thought so irreparable, as long as there is a prospect of some protection being giving the industry by the General Government.

Receipts of fish at Gloucester, Mass., January, 1886.

From--	Fares.	Codfish.	Halibut.	Haddock.	Frozen herring.	Pickled herring.	Oil.
		<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Count.</i>	<i>Barrels.</i>	<i>Barrels</i>
La Have Bank	5	210,000	2,000				
Grand Banks	14		463,700				
Brown's Bank	3	111,000	11,000				
Banquereau	1		25,000				
Western Bank	1	30,000	6,000				
George's Bank	7	112,000	10,100	5,000			
Eastport, Me.	11				2,531,000		
Fortune Bay, Newfoundland ..	4				1,480,000		
Fortune Bay, English	1				350,000		
New England shore, netters ..	11	40,000					
New England shore, trawlers ..	4	7,000		10,000			
Maine	1					220	
Tiverton, R. I.	1						225
Total	64	510,000	517,800	15,000	4,361,000	220	225

15.—THE FISHERIES OF CANADA IN 1884.*

GENERAL REMARKS ON THE PROVINCES.

Nova Scotia.—The returns show that the fisheries of this Province do not only maintain the improvement of the last few years, but they show a large increase over any former year. While this improvement embraces nearly all kinds of fish, it is most marked in cod, mackerel, herring, salmon, and lobsters.

The encouragement offered by the bounty has largely increased the number of vessels and boats engaged in the deep-sea and shore fisheries.

New Brunswick.—From this Province the returns show a large increase in the yield of its fisheries. A most gratifying feature is the general improvement in the salmon fishery, which extends to almost every district in which this fishery is pursued. Smelt, herring, and lobsters show increased catches. Shad and alewives also share in the general improvement, but the sturgeon fishery shows a large falling off from former years. In some districts the herring fishery was not so productive, while in others it shows a largely increased catch. This is no doubt due to the erratic movements of the schools of this fish, which, while never leaving our coast, change their habitat according to temperature, weather, and the location of their favorite food.

Quebec.—The late date at which the ice left in the spring, and the stormy weather which almost constantly prevailed in the Gulf during

* Extracts from the Annual Report of the Department of Fisheries, Dominion of Canada, for the year 1884.

the fishing season, has caused a considerable decrease in the catch of almost all kinds of fish. The decrease in the catch of salmon on the south shore of Gaspé and Bonaventure is, however, counterbalanced by the increased catch on the north shore.

More interest than usual was taken in the mackerel fishery, and considerable outlay was made by local fishermen; but unfavorable weather doubtless affected the movements of the schools, which did not go to the west of Cape Breton, and the catch made was inconsiderable.

The inland fisheries show a large decrease as compared with the catch of 1883. This falling off, which was noticeable in almost every kind of fish, is due more to a prevalence of contrary winds and stormy weather than to any scarcity of fish.

Prince Edward Island.—The stormy and unfavorable weather which prevailed in the Gulf extended also to the straits, and had the same effect on the island fisheries. The returns show a large falling off in all kinds of fish, the decrease being most marked in mackerel. The single exception is the lobster fishery, which, contrary to general expectation, has been good, and the returns show a considerable increase over the very large catch of last year.

The enormous extent to which this fishery has been developed and the constantly increasing number of factories and fishermen have led to much confusion. It will soon be necessary, in the interest of the fishery, as well as of the fishermen and packers, to bring it under the more effective control of the Department.

British Columbia.—The returns from this Province show a large decrease in the salmon catch of the Fraser River, where only six canneries out of thirteen were in operation. This result was not due to any scarcity of fish, but to the large quantity of preserved salmon on the market and the low prices obtained.

A fish hatchery, measuring 100 by 40 feet, was built during last season on the Fraser River. It will easily accommodate 3,000,000 quinnat salmon eggs or 5,500,000 saw-quái [or "suk-kegh," a name for blue-back salmon?] salmon ova. By doubling the trays, double this number of eggs can be laid down. The catching of parent salmon began about the beginning of July, and by the close of the season 3,000,000 eggs were on the trays. The operations were highly successful, and reflect credit upon the officer in charge, Mr. Thomas Mowat.

Ontario.—The total value of the fisheries in the Province of Ontario is reckoned at \$1,133,724.26. On Lake Superior, Lake Huron, and Georgian Bay the individual catches did not much exceed those of last year, but the number of fishermen was larger and the aggregate yield consequently increased. The severe stormy weather which prevailed during the first part of November greatly interfered with the fishermen's operations by damaging or destroying a large amount of twine and driving the runs of fish off the reefs; but, on the whole, the result was satisfactory.

PRODUCE OF THE FISHERIES.

The total value of the fisheries of Canada for the year 1884 is reckoned as follows:

Nova Scotia.....	\$8,763,779 36
New Brunswick.....	3,730,453 99
Quebec.....	1,694,560 85
British Columbia.....	1,358,267 10
Ontario.....	1,133,724 26
Prince Edward Island.....	1,085,618 68

Showing a total value of..... 17,766,404 24

as against \$16,958,192.98 in 1883, an increase of \$808,211.26.

This is exclusive of the quantity consumed by the Indian population of British Columbia, and also of the yield of Manitoba and the North-west Territories, from which, although steps have been taken to supply the information in future, no reliable data are available for the present report.

The following table is valuable for its recapitulation of the yield of the different kinds of fish throughout Canada during 1883 and 1884, with a comparison of the products of these years:

The yield and value of fisheries in the Dominion of Canada for the years 1883 and 1884.

Kinds of fish.	1883.		1884.	
	Quantity.	Value.	Quantity.	Value.
Cod.....cwts..	1,074,014	\$4,507,110 25	1,022,234	\$4,302,454 85
Herring:				
Pickled.....barrels..	443,611	1,825,355 50	493,241	2,029,430 00
Smoked.....boxes..	1,247,000	311,915 00	1,038,194	484,548 50
Frozen.....number..	20,875,000	125,100 00	14,851,500	89,109 00
Preserved or fresh.....pounds..	7,968	950 16	1,049,550	42,550 50
Lobsters:				
Preserved.....do.....	18,364,020	1,889,265 71	15,933,283	2,259,892 80
Preserved.....tons..	1,004	29,310 00	}	3,065
In shell or alive.....per M..	1,195,120	30,078 00		
Salmon:				
Pickled.....barrels..	6,030½	63,901 50	10,049	123,418 50
Fresh.....number..	117,694	44,287 20	173,056	51,910 80
Fresh in ice.....pounds..	1,537,052	262,810 44	2,008,268	340,000 29
Preserved in cans.....do.....	9,400,911	1,087,218 35	6,803,843	781,306 05
Smoked.....do.....	410,363	59,909 02	885,230	55,020 09
Mackerel:				
Preserved in cans.....do.....	702,743	94,853 46	190,457	28,104 03
Pickled.....barrels..	124,093	1,234,632 00	180,170	1,798,487 00
Haddock.....cwts..	178,002	609,066 50	216,544	758,245 70
Hake.....do.....	140,281	511,989 50	40,073	140,255 50
Pollock.....do.....	105,573	309,505 50	78,635	275,222 50
Trout.....pounds..	4,744,529	308,323 12	5,517,487	429,461 00
Trout.....barrels..	4,099	40,072 00	3,540½	35,172 00
Whitefish.....do.....	1,862	18,620 00	2,078	20,780 00
Whitefish.....pounds..	3,120,032	249,602 56	3,139,891	251,191 28
Smelts.....do.....	4,180,943	254,456 58	6,177,410	370,644 60
Sardines.....barrels..	15,294	45,896 00	8,895	26,720 00
Sardines.....hogsheads..	37,717	301,736 00	35,788	357,880 00
Oysters.....barrels..	50,540	151,620 00	41,956	126,458 00
Alewives.....do.....	37,707	150,498 00	47,074	189,854 50
Hako sounds.....pounds..	115,987	110,222 80	83,637	77,726 20
Cod tongues and sounds.....barrels..	1,943	14,433 00	2,006	14,882 00
Shad.....number..	192,800	17,843 75	128,539	12,157 17
Shad, salted.....barrels..	7,076½	56,612 00	7,737	61,901 24
Eels, salted.....do.....	8,482½	31,246 50	4,776	42,768 40
Eels.....number..	514,219	51,421 00	410,464	41,046 40
Muskallonge.....pounds..	771,070	49,257 20	627,750	30,578 30

The yield and value of fisheries in the Dominion of Canada, &c.—Continued.

Kinds of fish.	1883.		1884.	
	Quantity.	Value.	Quantity.	Value.
Bass..... pounds..	1,181,923	\$74,551 04	\$1,186,423	\$75,571 26
Pickereel.....do..	1,671,539	105,011 66	1,771,071	111,452 06
Pike.....do..	930,020	45,361 00	705,948	36,363 40
Sturgeon.....do..	1,041,278	54,006 30	1,601,300	80,790 60
Sturgeon.....barrels..	1,866	9,330 00	1,638	8,190 00
Halibut.....pounds..	1,066,050	62,493 00	1,670,215	98,532 90
Barfish and whitefish.....dozen..	14,050	27,562 50	15,008	18,760 00
Winnonish.....number..	21,500	5,375 00	25,600	6,400 00
Tomcod.....barrels..	4,000	6,000 00	2,080	3,120 00
Perch.....pounds..	10,450	627 00	12,000	720 00
Ling.....cwt.s.	207	823 00	155	620 00
Squid.....barrels..	4,470	17,672 00	3,176	12,704 00
Whiting.....pounds..	25,000	1,530 00	.....	.....
Eulachon, pickled.....barrels..	187	1,517 00	330	2,640 00
Eulachon, fresh.....pounds..	30,000	1,800 00	37,500	2,250 00
Eulachon, smoked.....boxes..	4,050	4,050 00	2,800	2,800 00
Seal skins.....number..	9,195	91,950 00	.....	.....
Hair-seal skins.....do..	22,036	20,586 00	.....	166,788 00
Sea-otter skins.....do..	96	4,800 00	.....	.....
Porpoise skins.....do..	87	298 00	83	332 00
Fish oils, not assorted.....gallons..	632,690	401,726 60	583,883	376,826 10
Whale oil.....do..	5,510	2,505 00	4,640	2,320 00
Seal oil.....do..	127,749	76,649 40	50,070	25,035 00
Cod oil.....do..	121,631	72,978 60	83,391	41,695 50
Dogfish, porpoise, &c., oil.....do..	222,018	80,886 40	16,781	6,766 89
Dogfish oil, refined.....do..	40,000	22,000 00	45,000	24,800 00
Clams, preserved.....pounds..	8,610	1,080 00	14,400	1,800 00
Fish roes.....barrels..	46	108 00	18	72 00
Coarse fish.....do..	15,230	60,920 00	.....	.....
Mixed fish.....do..	24,546	101,068 68	45,227	108,726 26
Fish scrap, dried.....tons..	20	300 00	.....	.....
Fish guano.....do..	2,873	43,095 00	4,422	66,330 00
Fish used for bait and manure.....do..	25,250	225,818 50	250,572	204,875 25
Fish sold in Halifax markets.....do..	.....	31,500 00	.....	52,400 00
Fish sold in Victoria, B. C., markets.....do..	.....	105,000 00	.....	110,000 00
Fish assorted in British Columbia.....do..	.....	2,430 00	58,400	3,504 00
For home consumption, not included in returns.....do..	.....	215,538 30	.....	266,176 00
Total value of the fisheries in Canada.....do..	.....	16,958,192 98	.....	17,766,404 24

FISH BREEDING IN 1884.

The general success of the several institutions during 1884, as given below, will be found satisfactory, as evidencing the onward progress of the work as a whole, although returns from some of the hatcheries do not show as large a crop of ova laid down as in the previous year of 1883. The falling off in the quantity of eggs was occasioned by a less number of parent salmon having been captured at some of the stations than during the season of 1883.

There are now twelve establishments for the propagation of fish by artificial methods, in actual operation in the several provinces of the Dominion. These hatcheries are all at the present time (December 31, 1884) largely filled with fish eggs which have been collected at various points throughout Canada during the spawning season of 1884. The latest hatchery erected on the Fraser River in British Columbia was completed only in time to receive its first crop of ova last autumn.

Particulars relative to the rearing and distribution of fry from eleven of the above-mentioned nurseries during the spring of 1884 are herewith submitted in detail; likewise a descriptive account of the quanti-

ties and species of eggs that were laid down in each of the twelve hatcheries last autumn is given below.

The total number of young fish of various kinds hatched and turned out of these eleven institutions into many of the rivers and other waters of Canada in 1884 amounted to 53,143,000; and the total quantity of eggs laid down in all the hatcheries in the fall of 1884 was 66,033,000.

The particular number and description of young fish bred in each of the nurseries in the several provinces during the hatching season or spring of 1884 was as follows :

Sydney hatchery, Nova Scotia	salmon..	853,000
Bedford hatchery, Nova Scotia.....	do....	1,000,000
Dunk River hatchery, Prince Edward Island	do....	1,000,000
St. John River hatchery, New Brunswick.....	do....	811,000
Miramichi hatchery, New Brunswick.....	do....	795,000
Restigouche hatchery, Quebec	do....	940,000
Gaspé hatchery, Quebec.....	do....	859,000
Tadoussac hatchery, Quebec.....	do....	985,000
Magog hatchery, Quebec	salmon trout..	100,000
Newcastle hatchery, Ontario	do....	5,150,000
Newcastle hatchery, Ontario	speckled trout..	50,000
Newcastle hatchery, Ontario	whitefish..	3,500,000
Newcastle hatchery, Ontario	black bass..	100,000
Sandwich hatchery, Ontario.....	whitefish..	27,000,000
Sandwich hatchery, Ontario.....	pickerel..	10,000,000
Total of fry of all kinds		53,143,000

These were divided by species as follows :

Salmon, <i>Salmo salar</i>	7,243,000	
Salmon trout, <i>Salmo lacustris</i>	5,250,000	
Speckled trout, <i>Salmo fontinalis</i>	50,000	
Whitefish, <i>Coregonus albus</i>	30,500,000	
Pickerel,* <i>Lucioperca</i>	10,000,000	
Black bass, <i>Grystes nigricans</i>	100,000	
Total.....		53,143,000

The particular number and description of fish eggs laid down in each of the nurseries of the several provinces during the spawning season or fall of 1884 was as follows :

Fraser River hatchery, British Columbia	salmon..	3,000,000
Sydney hatchery, Nova Scotia.....	do....	931,000
Bedford hatchery, Nova Scotia.....	do....	800,000
Dunk River hatchery, Prince Edward Island	do....	1,250,000
Miramichi hatchery, New Brunswick	do....	1,000,000
St. John River hatchery, New Brunswick.....	do....	186,000
Restigouche hatchery, Quebec.....	do....	700,000
Gaspé hatchery, Quebec	do....	341,000
Tadoussac hatchery, Quebec	do....	775,000
Magog hatchery, Quebec	No return.	

* This is variously known as lake pickerel, pike perch, wall-eyed pike, doré, dory, *Stizostedium*.

Newcastle hatchery, Ontario	salmon trout..	4,000,000
Newcastle hatchery, Ontario	speckled trout..	50,000
Newcastle hatchery, Ontario	whitefish..	3,000,000
Sandwich hatchery, Ontario	do.....	50,000,000
Total of eggs of all kinds.....		66,033,000

These were divided by species as follows:

Salmon, <i>Salmo quinnat</i>	3,000,000
Salmon, <i>Salmo salar</i>	5,983,000
Salmon trout, <i>Salmo lacustris</i>	4,000,000
Speckled trout, <i>Salmo fontinalis</i>	50,000
Whitefish, <i>Coregonus albus</i>	53,000,000
Total	66,033,000

16.—EXPERIMENTS WITH SALMON IN SCOTLAND.

By FRANCIS DAY, F. L. S.

[Conclusions of paper read before the Linnean Society of London, March 5, 1885.]

The unbiased investigator must admit that, so far as they have gone, the experiments made at Howietoun among the *salmonidæ* are pretty conclusive on the following points:

(1) That male parrs and smolts may afford milt competent to fertilize ova, but when from fish of the second season, or up to 32 months old, it is (? always) of insufficient strength for strong and vigorous fry to be raised.

(2) That female smolts or grilse may give eggs at 32 months of age, but those which are a season older are better capable of producing vigorous fry; while for the purpose of developing ova, a visit to the sea is not a physiological necessity.

(3) That young male *salmonidæ* are more matured for breeding purposes than are young females of the same age.

(4) That although females under 24 months of age may give ova, such are of little use for breeding purposes, the embryos not becoming well developed or vigorous, while the young when hatched are frequently malformed.

(5) That the size of the eggs of *salmonidæ* varies with the age and condition of the parent; but, as a rule, older fish give larger ova than do younger and smaller ones.

(6) That among the produce of every female fish there may be found variations in the size of the eggs.

(7) That from larger ova finer and more rapidly growing fry are produced; consequently that, by selection of breeders, races may be improved; while it is only where segregation is well carried out that such selection is possible.