# UPPPLEMENT No. 1 T0 THE ANNUAL HEPORT 

Or THE

## DEPARTMENT OF FISHERIES

## FISHERIES STATEMENTS

## INS円ECTORS' REPORTS

For the Year

1890. 



OTTAWA:
 MAJESTY.
1891.

## I N DEX

TO THE

# SUPPLEMENT No. 1 TO THE ANNUAL REPORT <br> Or THE <br> DEPARTMEN'I OF FISHERIES <br> 1890. 

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## REPORT

# FISHERIES OF THE DOMINION OF CANADA 

FOR THE YEAR 1890.

## To the Honourable

Charles H. Tupper, Minister of Marine and Fisheries.
Sir,-To be again able to report that the Canadian fisheries, as a whole, are in thriving condition and steadily improving in yield and value is very gratifying. With the exception of the Provinces of Quebec and New Brunswick, where a decrease of $\$ 629,058$ is noticeable, principally due to the partial failure of the codfishery, an examination of the statistics will show an increase in all the other Provinces.

## PRODUCE OF THE FISHERIES.

The following figures represent the total value of the fisheries of the Dominion of Canada for the year 1890 :-

| Nova Scotia. | 6,636,444 64 |
| :---: | :---: |
| British Columbia. | 3,481,432 29 |
| New Brunswick. | 2,699,055 02 |
| Ontario. | 2,009,637 37 |
| Quebec | 1,615,119 76 |
| Prince Edward Island. | 1,041,109 20 |
| Manitoba and the North-West Territories. | 232,104 05 |
| Total. | \$ 17,714,902 33 |

This is exclusive of the quantity consumed by the Indian population of British Columbia, Manitoba and the North-West Territories, of which no accurate data are at hand, but which, it is believed, would increase this total value to fully $\$ 21,000,000$.

In order to give some idea of the extent of capital invested in Canadian fisheries, see statements, pages xxiv, xxvii, showing the number, tonnage and value of fishing vessels and boats, the material employed and the number of fishermen.
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## DETAILS.

The following table shows the value of the principal kinds of commercial fishes exceeding $\$ 100,000$, as well as the increases and decreases in value:-

| Kind of Fish. | Amount. | Increase compared with 1889. | Decrease compared with 1889. |
| :---: | :---: | :---: | :---: |
|  | 8 | 8 | 8 |
| Cod... | 3,433,580 |  | 184,660 |
| Salmon. | 3,036,569 |  | 105,359 |
| Herring. | 1,958,492 |  | 539,865 |
| Lobsters | 1,648,344 | 163,856 |  |
| Mackerel. | 1,524,976 | 594,580 |  |
| Whitefish | 767,657 | 82,561 |  |
| Trout. | 625,286 | 71,917 |  |
| Haddock. | 532,068 |  | 880 |
| Seal skins | 516,956 | 149,673 |  |
| Hake | 377,440 |  | 97,416 |
| Fish Oils. | 315,034 |  | 92,78] |
| Smelts.. | 283,443 | … . . . | 15,508 |
| Pollock | 273,348 |  | 35,236 |
| Alewives | 192,452 | 26,011 |  |
| Pickerel. | 173,420 |  | 8,961 |
| Oysters | 171,778 |  | 18,119 |
| Halibut | 120,672 |  | 39,387 |
| Sturgeon | 116,991 | 14,864 |  |
| Sardines . | 115,752 | 44,340 |  |

## THE FISHERIES OF NOVA SCOTIA.

Instead of the large shortage of nearly one million and a-half dollars mentioned in last year's report, the yield of the fisheries of this Province show an increase of \$289,77.

This increase is principally in the cod, herring, shad and squid fisheries.
Had it not been for the very boisterous weather experienced in the fall and the failure of bait in most places, at the proper time, the catch of cod would have yielded a much larger figure. Neither was the fishery pursued with as much vigour as in former years. In Cape Breton especially, where people found ready employment on the railway, many sought it in preference to fishing.

Herring shows the large increase of noarly 5,000 barrels. On this subject the local Inspector of fisheries makes some very pertinent remarks about the necessity of having better and stricter inspection of fish. The low estimation in which the Cape Breton herring has fallen into public favour, is justly ascribed to the want of such inspection as well as to frauds practised on the public; and the sooner proper remedies are applied, the better it will be for the trade and the fishermen.

Lobsters show a slight increase, especially in fish shipped fresh alive. This increase is ascribed to favourable weather in some localities and a general improvement in the fishery.

The shad fishery exhibits a gratifying increase; but it is evident that additional legislation will be required to check present abuses and to insure the future of this important industry.

Contrary to former apprehensions, mackerel shows an increased catch of nearly $\$ 500,000$. The fish were of excellent quality and the pricos obtained much better than in previous years.

Squid, a fish exclusively used for bait, has become an important factor in the fishing industry of Nova Scotia, owing principally to the enfo"cement of the Newfoundland Bait Act. They are principally caught in trap-nets and seines, and the total value sold to the Bank fishermen exceeds $\$ 25,000$.

## NEW BRUNSWICK.

The returns for this Province show a falling off in the catch of $\$ 367,98 t$, partly due to failure in the large herring and salmon fisheries. The other kinds compare favourably with last year; among them, the cod, mackerel, alewives and lobster fisheries showing very satisfactory results.

The comparative failure in the large herring fishery is ascribed by some persons to the practice of leaving nets all day in the water, by which it is claimed the schools are frightened and debarred from nearing the sho:es. The demand for sardine herring was brisk, and good prices were obtained. It is also claimed that the enormous catch during the past few years of what are called sardine herring, is now seriously depreciating the herring fishery.

The salmon fishery was fair in the estuaries of rivers and in some sheltered places on the coast; but the weather kept so stormy during the whole season, that a large number of nets were destroyed and fishing had to be abandoned in exposed localities. However, the spawning grounds are reported to have been visited by large numbers of breeding salmon.

## PRINCE EDWARD ISLAND.

The returns for this Province exhibit the gratifying increase of $\$ 154,678$ over the year 1889. This is due to an early opening of the season and to other favourable circumstances.

Spring herrings which are used for bait in lobster and mackerel fishing were unusually early and abundant.

A larger number of lobster factories were in operation than during the previous seasm; the fish also being abundant and of fair size.

Mackerel proved comparatively scarce; but, as the fish were of excellent quality and prices ruled high, the results were very satisfactory to the fishermen.

Oysters show a decreased output of 6,054 barrels. This was due to stormy weather in the fall. Some beds are becoming less productive every year, owing to over-fishing in the past; and stringent measures will be required to save them from utter annihilation. In this connection, the local Inspector of Fisheries strongly condemns the practice of winter fishing by which young and unmarketable oysters are left on the ice to perish, or fall back in the water when the ice melts in the spring, to the great injury of the beds. The re-stocking of depleted beds, and the leasing of oyster fishing grounds to private persons, is now engaging the Department's attention, and is fully dealt with in the main report.

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8 a-\mathrm{B} \frac{1}{2}
$$

## QUEBEC.

The returns for this Province show a decrease of $\$ 261,074$, as compared with 1889. This is principally accounted for by a reduced catch of cod, herring and seal, owing to the unprecedented severity of the season and to the damage caused to fishing gear by heavy gales and stormy weather.

The cod fishery began well; but, as the season advanced, bait became scarce, the weather kept rough and the result was a deficit of $32,094 \mathrm{cwt}$. in the catch.

The fall herring fishery was a failure; heavy weather keeping the fish off shore. The practice of using unspawned herring in enormous quantities, during the spring, for manuring purposes, is ascribed by many persons as having something to do with the failure of this fishery; and in this connection, it is proposed that the practice of using herring for manure be prohibited.

Seals were abundant in the gulf; but, owing to pack ice, schooners experienced great difficulty in reaching the fields, and the result was a partial failure.

The salmon fishing proved unremunerative on the south side of the River St. Lawrence, and in the Bay des Cbaleurs. It was better on the north shore and on the coast of Labrador.

The lobster catch was about the same as in 1889.
Mackerel fishing was somewhat better than during the previous year.
The yield of the fisheries in the inland waters of the Province shows a steady improvement.

## ONTARIO.

The yield of the fisheries in this Province is also very satisfactory; the figures being $\$ 2,009,637$ against $\$ 1,963,122$ for 1889 , an increase of $\$ 46,514$. Whitefish and salmon trout gave increased catches, while the other branches of the fishing industry appear to be in a healthy condition. The ciscoe fishery is fast developing into a lucrative business, and some measures of protection will be required to prevent present waste and future injury.

The service inaugurated in 1888, for the protection of the fish in Georgian Bay and Lake Huron by means of a small cruiser, and which has proved of such benefit to the fisheries of these waters, was continued during the present season under the command of Capt. E. Dunn, who by taking advantage of every favourable occasion, was enabled to do efficient work in the matter of enforcing the close seasons and preventing illegal fishing, as is evinced by the large seizures of fish, gill nets and boats made. The ressel employed for the past three seasons having been found unsuitable a new steamer for the service, is now being constructed at Owen Sound, and it is expected will be ready early in the month of August next

## MANITOBA AND THE NORTH-WEST TERRITORIES.

A slight increase is noticeable in the yield of the fisheries of the above Province and Territories, although the close season for whitefish was lengthened by twenty days. This speaks well for the abundance of the fish, and goes far to show
that there need be no undue apprehension about the alleged depletion of these waters if reasonable protection is extended thereto.

One of the greatest drawbacks in the permanent improvement of the fisheries of Manitoba and the North-West Territories is the reckless destruction of whitefish by Indians during the breeding season; but it is to be hoped that Indian agents will be able, in the future, to prevail upon the several bands under their charge to desist from such wisteful practices and to kill only the number of fish necessarily required for their winter provision.

The service of protecting Fisheries is being extended to remote districts in the North-West Territories, and with an increasing population and the gradual settlement of the country, the fishing industry must necessarily develop. The great lakes to the west and north of Manitoba are teeming with whitefish, salmon, trout, sturgeon, and other valuable kinds of fish, for which a ready market can always be found in the neighbouring Republic. Salmon are abundant in the large rivers which empty into Hudson's Bay, and with the completion of the Hudson's Bay Railway, it is confidently expected that the trade in pickled and fresh fish could give employment to 10,000 persons in the great North-West alone.

## BRITISH COLUMBIA.

The increase in the yield of the fisheries of this Province, although not quite so large as that of 1889 , is still very satisfactory, amounting as it loes to $\$ 133,365$.

The salmon fishery shows a slight falling off, solely attributable to the low prices which ruled in the market. The run of fish on the Fraser, although it began a month later than usual, was good, and in August the rush of salmon was so great that in some instances fish had to be thrown away. On the Skeena and Naas Rivers the run was exceedingly large: the canneries being kept well supplied. There were 34 canneries operated during the season of 1890 , and the output amounted to nearly $20,000,000$ one pound cans.

The yield of fur seals shows an increase of $\$ 157,661$ over that of 1889.
The other branches of the fishing industry are in a healthy condition.
A great diversity of opinion prevails between the resident officer of the Fisheries Department and the canners regarding the enforcement of necessary restrictions for the preservation of the salmon industry. The former contend, and with a good show of reason, that one of the principal causes of the rapid decline of the salmon fishery in the Atlantic Provinces, as well as in the United States, is duc to overfishing and the neglect of statutory enactments to check it; while the canners claim that the supply of fish being inexhaustible, no protection is necessary. It has been clearly demonstrated in previous reports how utterly untenable such a pretention was. It was shown how the catch on the Columbia River, which amounted to 629,000 cases in 1883 , fell down to 328,000 in 1889 , or more than one half, and in this connection it may not be amiss to quote the following extract from a recent report on the salmon and salmon rivers of Alaska, by Dr. Bean, of the United States' Commission of Fish and Fisheries:
"There seems to be a disposition on the part of buyers to underrate Alaskan products; its fishery resources have not been laid under contribution for market
supply until within a few years, during which we have seen, as the result of recklose and improvident fishing, the practical destruction of the salmon fisheries of the Sacramento and the reduction of the take on the Columbia to nearly one-third of what it was in the early history of the salmon canning industry on that river."

*     *         * "Whether these fisheries shall continue to furnish an opportunity for profitable enterprise and investment depends upon the policy to be inaugurated and maintained by the Government. Under judicious regulation and restraint, these fisheries may be made a continuing source of wealth to the inhabitants of the territory, and an important food resource to the nation; without such regulation and restraint, we shall have repeated in Alaskan rivers the story of the Sacramento and the Columbia. And the destruction in Alaska will be more rapid because of the small size of the rivers and the ease with which salmon can be prevented from ascending them. For a few years, there will be wanton waste of that marvelous abundance, which the fishermen-concerned only for immediate profit and utterly improvident for the future-declare to be inexhaustible. This season of prosperity will be followed by a rapid decline in the value and production of these fisheries, and a point will be eventually reached where the salmon canning industry will be no longer profitable."

These remarks from ono of the highest authorities on fishing matters in the States are well worth the careful attention of persons engaged in the business.

With the view of affording additional protection to the salmon industry of British Columbia, an Order in Council was passed on the 14th March, 1890, limiting the size of nets to 5 㚅 inches extension measure; making a weekly close time from Saturday night until Monday morning, which was subsequently changed to 6 a.m. Saturday to $6 \mathrm{p} . \mathrm{m}$. Sunday; limiting the number of boats licensed to fish with drift nets on the Fraser River to 500 , of which number 350 are to be allowed to canneries and 150 to outside fishermen, and regulating the fees to be paid on each license.

## GENERAL RECAPITULATION

Of the Yield and Value of the Fisheries in the Dominion of Canada, for the Years 1889 and 1890.

| Kinds of Fish. | 1889. |  | 1890. |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Quantity. | Value. | Quantity. | Value. |
|  |  | 8 cts. |  | 8 cts. |
| Cod... ............... .... . ........ Cwt. | 904,560 | 3,618,240 00 | 857,734 | 3,433,580 00 |
| Herring, pickled. .... .......... .... Brls. | 286,678 | 1,165,724 00 | 274,274 | 1,097,096 00 |
| do smoked............. . ...... Boxes. | 2,685,170 | 1666,342 25 | 1,354,161 | 340,29025 |
| do frozen, fresh.. ... ..... . Lbs. | 32,895,881 | 666,291 41 | 15,621,786 | 521,106 10 |
| Lobsters, preserved, in cans............. " | 10,637, 233 | 1,276,468 20 | 11,559,984 | 1,387,198 60 |
| do in shell, alive, \&c. ... ......... Tons. | 5,247 | 208,020 00 | 6,748 | 261,146 00 |
| Salmon, pickled., ........... ... .... . Brls. | 6,704 | 84,740 00 | 5, 1401 ${ }^{\frac{1}{2}}$ | 70,652 00 |
| do fresh . . . . . ........... . . Lbs. | 4,267,173 | 634,734 20 | 3,686,998 | 563,533 10 |
| do preserved, in cans......... .... " | 20,141,152 | 2,417,508 16 | 19,910,304 | 2,389,666 44 |
| do smoked. | 24,714 | 4,943 00 | 63,592 | 12,718 00 |
| Mackerel, preserved, in cans. . . . . . . . . | 196,212 | 23,544 88 | 283,474 | 35,032 92 |
| do fresh .......... . . ...... ... " | 542,500 | 32,550 00 | 770,090 | 46,254 00 |
| do pickled.... .... ...... ....... Brls. | 62,237 | 874,302 00 | 96,246 | 1,443,690 00 |
| Haddock ...... .... ........ ....... . . Cwt. | 125,662 | 532,948 00 | 133,017 | 532,068 00 |
| Hake . . ...... .......... .... ... " | 118,714 | 474,856 00 | 94,335 | 377,440 00 |
| Pollock. | 77,196 | 308,784 00 | 188,387 | 273,548 00 |
| Trout . . . . ...... .. ....... ... Lbs. | 5,125,493 | 512,549 30 | 5,829,466 | 584,166 60 |
| do pickled...... ... . .... ......... Brls. | 4,082 | 40,820 00 | 4,112 | 41,12000 |
| Whitefish............ . ............. Lbs. | 9,806,422 | 685,096 30 | 11,176,582 | 767,657 90 |
| Smelts ..... .......... .... ......... . " | 5,011,058 | 298,95i 78 | 4,735,517 | 283,443 57 |
| Sardines......... . ... .. . .....Hogsheads. | 23,804 | 71,412 00 |  | 115,75200 |
| Oysters.. . . . . . . . . . . . . . . . . . . . . . . . . . . . . Brls. | 63,049 | 189,897 00 | 56,676 | 171,77800 |
| Hake Sounds .... .... ... ........ Lbs. | 79,4891 | 79,489 50 | 67,554 | 62,624 00 |
| Cod Tongues and Sounds. | 307,247 | 19,253 50 | 321,200 | 16,060 00 |
| Alewives . ... .. ...... . .......... Brls. | 37,470 | 166,441 00) | 42,766 | 192,452 00 |
| Shad, fresh.................. . . . . . . . . Lbs. | 170,330 | 10,219 80 | 108,103 | 6,486 18 |
| do pickled .......................... . . Brls. | 4,868 | 48,14500 | 6,728 | 66,524 00 |
| Eels do .... .. .... .. . .. .... " | 7,100 | 71,000 00 | 7,389 | 73,890 00 |
| do fresh.... . .... . . . ........ Lbs. | 1,378,473 | 82,708 38 | 1,425,051 | 85,503 06 |
| Halibut., | 1,903,115 | 160,059 00 | 1,525,130 | 120,672 80 |
| Sturgeon ...... . ....... ...... ..... " | 1,773,685 | 102,127 72 | 2,047,170 | 116,991 90 |
| Maskinongé. | 755,203 | 45,312 18 | 769,846 | 46,190 76 |
| Bass . . | 1,153,487 | $55,7251.6$ | 977,470 | 58.64870 |
| Pickerel. | 3,264,501 | 182,391 92 | 3,142,189 | 173,420 13 |
| Pike | 1,743,444 | 69,287 79 | 1,691,702 | 62,262 64 |
| Wimninish | 100,000 | 6,000 00 | 100,000 | 6,000 00 |
| Tom Cod or Frost Fish. |  | 26,580 00 |  | 34,244 88 |
| Flounders. | 84,300 | 8,430 00 | 79,000 | 7,900 00 |
| Squid . . . . . . . . . . . . . . . . . . . . . . . . . . . . Brls. | 11,649 | 46,596 00 | 13,138 | 52,45200 |
| Oolâchans.. . . . ....... ... ............ Lbs. | 165,200 | 13,390 00 | 114,600 | 7,780 00 |
| Clams |  | 19,950 00 |  | 16,180 00 |
| Fur Seal Skins in B.C. . . . . .......... No. | 33,570 | 335,700 00 | 44,751 | 492,261 00 |
| Hair do . ....... ................ " | 33,333 | 31,583 00 | 27,245 | 24,695 00 |
| Sea Otter Skins.. | 115 | 11,500 00 | 102 | 10,200 00 |
| Porpoise skins | 777 | 3,151 00 | 549 | 2,271 00 |
|  | 984,183 | 417,815 00 | 727,020 | 315,034 00 |
| Coarse and Mixed Fish. ..... .......... Brls. | 27,275 | 147,852 48 | 40,278 | 187,942 05 |
| Mixed Fish, B.C. |  | 63,236 25 |  | 46,911 25 |
| Fsh used as Bait. . . . . . . . . . . . . . . . . Brls. | 217,609 | 261,347 00 | 165,590 | 248,986 00 |
| Fish used as Manure......... . . . . . . . " | 60,563 | 30,281 00 | 122,484 | 61,24200 |
| Guano....... ...... ........ .. . ... TTons. | 984 | 24,600 00 | 602 | 17,080 00 |
| Crabs .............. . . . . . . |  |  | 504,800 | 25,240 00 |
| Home Consumption not included in Returns |  | 336,370 87 |  | 327,809 50 |
| Total. | ... | 17,655,256 03 |  | 17,714,902 33 |


| Provinces. | Value. | Decrease. | Increase. |
| :---: | :---: | :---: | :---: |
|  | 1890. |  |  |
|  | \$ ct.t. | \$ ets. | * cts. |
| Nova Scotia. | 6,636,444 61 |  | 289,722 64 |
| New Bruxswiek... | 2,699,055 02 | 367,984 02 |  |
| Qcebrc. | 1,615,119 76 | 261,074 43 |  |
| Prince Heward Islanis | 1,041,109 20 |  | 154,678 36 |
| British Colcmbra...... | 3,481,432 29 |  | 133,364 68 |
| Ontario | 2,009,637 37 |  | 46,514 57 |
| Manitoba anid North-West Territorirs. | 232,104 05 |  | 64,424 50 |
| Total. | 17,714,902 33 | 629,058 45 | 688,704 75 |
| Increase over 1889 |  |  | 69,646 30 |

## COMPARATIVE STATEMENT

Of Production in each Branch of the Fisheries in the respective Provinces of the Dominion of Canada, in 1889 and 1890.

PROVINCE OF NOVA SCOTIA,

| Kinds of Fish. | 1889. |  | 1890. |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Quantity. | Value. | Quantity. | Value. |
|  | no :3 | $x^{2}, 8.20$ | $9060^{82}$ | ala <br> $\$$ cts |
| Salmon . . . . . . . . . . . . . . . . . . . . . Brls. | 2,37\% | 38,032 00 | 2,042 | 32,672 00 |
| do fresh...... ............... . . . . Ibbs. | 407,454 | 81,49040 | 287,722 | 57,544 49 |
| do smoked. . . . . . . . . . . . . . . . . Lbas. | 7,516 | 1,503 00 | 2,892 | 57800 |
| do preserved . ............... Cans. | 9,284 | 1,466 80 | 8,032 | 1,205-40 |
| Mackerel. . . . . . . . . . . . . . . . . . . . . . . . . Brls. | 43,038 | 586,31700 | 70,509 | 1,057,635 00 |
| do preserved. . . . . . . . . . . . . . . . . Cans. | 62,258 | 7,470 40 | 91,408 | 11,985 00 |
| do fresh . . . . . . . . . . . . . . . . No. | 542,500 | 32,550 00 | 770,090 | 46,25400 |
| Herring . . . . . . . . . . . . . . . . . . . . Bris. | 127,605 | 529,43200 | 126,054 | 504,216 00 |
| de smoked ........... .. ...... Boxes, | 35,835 | 8.95850 | 17,160 | 4,290 00 |
| do fresh or cans. . . . . . . . . . . . . . . . Jdos. | 5,760 | 69120 | Cans 6.336 | 63360 |
| Alewives. . . . . . . . . . . . . . . . . . . . . . Brls. | 22,858 | 102,862 00 | 21,448 | 96,51600 |
| do smoked..... ...... .......... No. | 150,000 | 1,200 00 | 130,000 | 1,040 00 |
| Cod, dried. . . . . . . . . . . . . . . . . . . . Cwt. | 587,558 | 2,350,232 00 | 607,904 | 2,431,616 00 |
| Cod Tongues and Sounds . . . . . . . . . Brls. | 11,328 | 13,28000 | 1,355 | 13,55000 |
| Haddock .................... . . ..... Cwt. | 115,956 | 492,324 00 | 110.174 | 440,696 00 |
| do fresh.......... .................. . . Lbs. |  |  | 400,000 | 16,000 00 |
| Finnan Haddies. . . . . . . . . . . . . . . . . . . . Lbs. | 280,000 | 11,200 00 | 158,000 | 12,640 06 |
| Pollock....... . . . . . . . . . . . . . . Cwt. | 56,326 | 225,304 00 | 49,428 | 197,712 00 |
| Hake. | 79,690 | 318,760 00 | 59,335 | 237,440 00 |
| do Sounds........................... . Lbs. | 42,328 | 42,328 00 | 30, 103 | 30,103 00 |
| Halibut . . . . . . . . . .............. " | 1,155,924 | 115,592 40 | 687,657 | 68,765 50 |
| Shad . . . . . . . . . . . . . . . . . . . . . . Brls. | 1,012 | 9,585 00 | 1,607 | 15,31400 |
| Bass . . . . . . . . . . . . . . . . . . . . . . . Lbs. | 26,800 | 1,608 40 | 11,575 | 69500 |
| Trout. . . . . . . . . . . . . . . . . . . . . . . ${ }^{\text {" }}$ | 148,448 | 14,844 80 | 147,941 | 14,794 10 |
| Squid . . . . . . . . . . . . . . . . . . . . . . . . . . Brls. | 11,360 | 45,44000 | 13,039 | 62,056 00 |
| Smelts . . . . . . . . . . . . . . . . . . . . . . . Lbos. | 480,760 | 2S,845 50 | 421,740 | 25,304 40 |
| Eels. . . . . . . . . . . . . . . . . . . . . . . . . Brls. | 3,468 | 34,680 00 | 3,212 | 32,420 00 |
| Oysters...... . ... ... ........ ... " | 2,532 | 7,596 00 | 3,013 | 9,039 00 |
| Lobsters, preserved. . . . . . . . . . . . . Cans. | 6,181,763 | 741,811 80 | 6,161,716 | 739,406 44 |
| do shipped fresh, alive, \&c.... Tons. | 4,212 | 176,97000 | 5,632 | 211,016 00 |
| Fish Oils. . . . . . . . . . . . . . . . . . . . . Galls. | 368,290 | 147,315 80 | 269,418 | 107,766 80 |
| Guano. ........... . . . . . . . . . . . . Tons. | 661 | 16,525 00 | -267 | 8,71500 |
| Fish used as Bait . . . ................. . . Bris. | 59,102 | 88,653 50 | 57,554 | 86,332 00 |
| do <br> Manure | 18,256 | 9,127 50 | 19,228 | 9,614 00 |
| Amount sold in Halifax market... . Home consumption of various counties, as |  | 40,500 00 |  | 59,600 00 |
| per return Clams. |  | $\begin{array}{r} 20,400 \\ 1,825 \\ 1,80 \end{array}$ |  | 59,60000 1,28000 |
| Total |  | 6,346,722 00 |  | 6,636,444 64 |
| Increase in 1890.. |  |  | -• • | 289,722 64 |

## COMPARATIVE STATEMENT

Of Productions in each Branch of Fisheries, \&c.-Continued.
PROVINCE OF NEW BRUNSWICK.



## COMPARATIVE STATEMENT

Of Production in each Branch of Fisherier, \&e.-Continued. PROVINCE OF PRINCE EDWARD ISLAND.


## COMPARATIVE STATEMENT

Of Production in each Branch of Fisheries, \&c.-Continued.
PROVINCE OF QUEBEC.


## COMPARATIVE STATEMENT

## Of the Production in each Branch of Fisheries, de.-Continued.

PROVINCE OF BRITISH COLUMBIA.


## COMPARATIVE STATEMENT

## Of Production in each Branch of Fisheries, \&c.-Continued.

PROVINCE OF ONTARIO.


Approximative Yield and Value of the Fisheries for the Years 1889 and 1890. MANITOBA AND NORTH-WEST TERRITORIES.

| Kinds of Fish. | 1889. |  | 1890. |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Quantity | Value. | Quantity. | Value. |
|  |  | \$ cts. |  | \$ cts. |
| Whitefish.. .... .... ......... .... Lbbs. | 2,517,282 | 125,884 10 | 3,402,222 | 170,111 10 |
| do ..................... Brls. |  | 4,680 00 |  |  |
| Pikerel (Dore). . . . . . . . . . . . . . . . . . . . ${ }^{\text {L }}$ Lbs. Pike (Jacktish) . . . . . . . . . . . . | 449,638 596,147 | 13,490 11,922 94 | 505,707 744,082 | 1,171 <br> 14,881 <br> 184 |
| Sturgeon......................... . | 110,738 | 5,536 90 | 187,830 | +1,391 50 |
| Catfish ......................... | 24,025 | -48050 |  |  |
| Tullibee.. ... ....... . ....... . " | 172,704 | 1,72204 | 178,700 | 3,54 (0) |
| Mixed fish. .... ....... ............ " | 395,793 | 3,951 93 | 948,730 | 18,94 60 |
| Total | ........... | 167,679 55 | .. ......... | 232,104 05 |
| Increase in 1890.. |  |  |  | 64,424 50 |

## RECAPITULATION

Table showing the Total Value of the Fisheries in the respective Provinces of Canada, from 1870 to 1890, inclusive, as compile d from the Annual Reports of the Department of Fisheries.

|  | Years. | Nova Scotia. | New <br> Brunswick. | Prince Edward Island. | Quebec. | Ontario. | British Columbia. | Manitoba and North-West Territories. | Total for Canada. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | $\$$ | \$ | \$ | \$ | \$ | \$ | 8 | \$ |
| 1870 |  | 4,019,425 | 1,131,433 | No data | 1,161,551 | 264,982 | No data | No data | 6,577,391 |
| 1871 |  | 5,101,030 | 1,185,033 | do | 1,093,612 | 193,524 | do | do | 7,573,199 |
| 1872 |  | 6,016,835 | 1,965,459 | do | 1,320,189 | 267,633 | do | do | 9,570,116 |
| 1873 |  | 6,577,087 | 2,285,662 | 207,595 | 1,391,564 | 293,091 | do | do | 10,754,997 |
| 1874 |  | 6,652,302 | 2,685,794 | 288,863 | 1,608,660 | 446,267 | do | do | 11,681,886 |
| 1875 |  | 5,573,851 | 2,427,654 | 298,927 | 1,596,759 | 453,194 | do | do | 10,350,385 |
| 1876 |  | 6,029,050 | 1,953,389 | 494,967 | 2,097,668 | 437,229 | 104,697 | do | 11,117,000 |
| 1877 |  | 5,527,858 | 2,133,237 | 763,036 | 2,560,147 | 438,223 | 583,433 | do | 12,005,934 |
| 1878 |  | 6,131,600 | 2,305,790 | 840,344 | 2,664,055 | 348,122 | 925,767 | do | 13,295,678 |
| 1879 |  | 5,752,937 | 2,554,722 | 1,402,301 | 2,820,395 | 367,133 | 631,766 | do | 13,529,254 |
| 1880. |  | 6,291,061 | 2,744,447 | 1,675,089 | 2,631,556 | 444,491 | 713,335 | do | 14,499,979 |
| 1881 |  | 6,214,782 | 2,930,904 | 1,955,290 | 2,751,962 | 509,903 | 1,454,321 | do | $15,817,162$ |
| 1882 |  | 7,131,418 | 3,192,339 | 1,855,687 | 1,976,516 | 825,457 | 1,842,675 | do | 16,824,092 |
| 1883 |  | 7,689,374 | 3,185,674 | 1,272,468 | 2,138,997 | 1,027,033 | 1,644,646 | do | 16,958,192 |
| 1884 |  | 8,763,779 | 3,730,454 | 1,085,619 | 1,694,561 | 1,133,724 | 1,358,267 | do | 17,766,404 |
| 1885 |  | $8,283,922$ | 4,005,431 | 1,293,430 | 1,719,460 | 1,342,692 | 1,078,038 | do | 17,722,973 |
| 1886 |  | 8,415,362 | 4,180,227 | 1,141,991 | 1,741,382 | 1,435,998 | 1,577,348 | 186,980 | 18,679,288 |
| 1887 |  | 8,379,782 | 3,559,507 | 1,037,426 | 1,773,567 | 1,531,850 | 1,974,887 | 129,084 | 18,386,163 |
| 1888 |  | 7,817,030 | 2,941,863 | 876,862 | 1,860,012 | 1,839, 869 | 1,902,195 | 180,677 | 17,418,510 |
| 1889 |  | 6,346,722 | 3,067,03! | 886,430 | 1,876,194 | 1,963,193 | 3,348,06 | 167,679 | 17,655,256 |
| 1890 |  | 6,636,444 | 2,699,055 | 1,041,109 | 1,615,119 | 2,004,637 | 3,481,432 | 232,104 | 17,714,902 |
|  | ls. | 139,351,651 | 56,805,113 | 18,417,434 | 40,093,926 | 17,573,175 | 22,620, 874 | 896,524 | 295,818,701 |

## RECAPITULATION

Showing the Number，Tonnage and Value of Vessels and Boats；Value of all Fishing Material，\＆c．；Number of Fishermen in the Dominion of Canada for the Year 1890.

| Provinces． | Fisha <br> $\dot{8}$ <br> $\stackrel{8}{8}$ <br> $\stackrel{8}{8}$ | EN． |  | Vessels | $\underset{\sim}{3}$ | Bол童 | C． | Gild Ne <br> SEin <br> Fathoms． | TS AND ES． $\qquad$ $\cdot \neg \cdots \eta^{B} \Lambda$ |  |  |  | Total Value．＊ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | \＄ |  | \＄ |  | \＄ | \＄ | \＄ | $\$$ | \＄ |
| Nova Seotia | 6，396 | 21，288 | 597 | 31，077 | 1，412，645 | 13，693 | 320，426； | 3，130，394 | 763，160 | 102，065 | 415，308 | 189，707 | 3，243，310 |
| New Brunswick． | 614 | 10，525 | 151 | 2，804 | 76，490 | 5，391 | 167，451 | 376，868 | 251，245 | 1168，580 | 205，560 | 315，419 | 1，184，745 |
| Prince Edward Island | 181 | 2，086 | 78 | 2，477 | 47，080 | 1，537 | 54，025 | 114，919 | 57，229 | 27，！51 | 135，835 | 26，200 | 348，320 |
| Quebec． | 364 | 11，003 | 67 | 2，097 | 61，100 | 6，182 | 180，625） | 247，867 | 157，743 | 55，876 | （66，200 | ．．．$\cdot$ ．．．． | 521，544 |
| Ontario | 263 | 2，782 | 61 | 1，614 | 115，000 | 1，277 | 102，131 | 1，397，292 | 259，974 | 86，338 |  |  | 563,443 |
| British Columbia | 908 | 7，315 | 115 | 3，015 | 440，475 | 1，723 | 99，688 | 273，945 | 206，007 | 7，115 |  | 757，994 | 1，511，279 |
|  | 8，726 | 54,999 |  |  |  |  |  |  |  |  |  |  |  |
| Totals |  | 63，725 | ，069 | 43，084 | 2，152，790 | 29，803 | 924，3．4 | 5，541，285 | 1，695，358 | 537，925 | 822，903 | 1，239，319 | 7，372，641 |

[^0]
## RECAPITULATION

$\infty_{\infty}$ Showing the Number of Vessels, Boats and Value of other Fishing Material, \&c., also the Number of Men engaged Fishing during $\infty$ the Year 1889.*

*Note-This table was not published in the Annual Report of 1889.

Table showing the Number of Vessels and Boats, their Value and that of other Fishing Material, also the Number of Fishermen engaged in Fishing during the Year 1883 .

|  | Fishermen. |  | Vessels. |  |  | Boats. |  | Gill Nets and Seines. |  | Value of Trap and Pound Nets, \&c. and other Fishing Material. | Total Value. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Vessels. | Boats. | Number. | Tonnage. | Value. | Number. | Value. | Fathoms. | Value. |  |  |
|  |  |  |  |  | \$ |  | 8 |  | \$ | \$ | \$ |
| Nova Scotia | 7,140 | 22,413 | 751 | 33,421 | 1,437,135 | 12,116 | 342,965 | 1,081,965 | 512,385 | 198,480 | 2,490,965 |
| New Brunswick. | 1,005 | 7,346 | 923 | 3,918 | 109,510 | 4,2a1 | 163,563 | 367,065 | 242,978 | 214,292 | 730,343 |
| Prince Edward Island. | 294 | 3,262 | 42 | 1,578 | $44,6: 50$ | 1,108 | 43,781 | 80,373 | 34,933 | 2,930 | 126,314 |
| Quebec.. .. ... .. | 760 | 11,174 | 137 | 7,969 | 319,750 | (6,500 | 162,074 | 203,510 | 168,174 | 84,570 | 733,571 |
| Ontario ...... | 97 | 2,594 | 22 | 406 | 45,950 | 910 | 21,598 | 1,031,937 | 147,903 | 55,638 | 271,089 |
| British Columbia. | 70 | 5,170 | 23 | 814 | 67,050 | 940 | 4!, 205 | 158,750 | 136,990 | 515,000 | 768,245 |
|  | 9,966 | 52,259 |  |  |  |  |  |  |  |  |  |
| Totals. |  | 62,225 | 1,198 | $4 \times 106$ | 2,023,045 | 25,825 | 783,186 | 2,723,600 | 1,243,366 | 1,070,930 | 5,120,52- |

[^1]Comparative Table showing Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries of Canada, together with the Value of Fishing Materials employed, from 1879 to 1890.

| Years. | Vessels. |  |  | Boats. |  | Value fets and Seines. | Value of other <br> Fishing Material. | Total of Capital Jnvested. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | No. | Tonnage. | Value. | No. | Value. |  |  |  |
|  |  |  | \$ |  | \$ | \$ | \$ | \$ |
| 1879. | 1,183 | 43,873 | 1,714,917 | 25,616 | 854,289 | 988,698 | 456,617 | 4,014,521 |
| 1880. | 1,181 | 45,323 | 1,814,688 | 25,266 | 716,352 | 985,978 | 419,564 | 3,936,582 |
| 1881. | 1,120 | 48,389 | 1,765,870 | 26,108 | 696,710 | 970,617 | 679,852 | 4,113,049 |
| 1882. | 1,140 | 42,845 | 1,749,717 | 26,477 | 833,137 | 1,351,193 | 823,938 | 4,759,985 |
| 1883. | 1,198 | 48,106 | 2,023,045 | 25,825 | 783,186 | 1,243,366 | 1,070,930 | 5,120,527 |
| 1884. | 1,182 | 42,747 | 1,866,711 | 24,287 | 741,727 | 1,191,579 | 1,224,646 | 5,014,663 |
| 1885. | 1,177 | 48,728 | 2,021,633 | 28,472 | 852,257 | 1,219,284 | 2,604,285 | 6,697,459 |
| 1886. | 1,113 | 44,605 | 1,980,411 | 28,137 | 850,545 | 1,263,152 | 2,720,187 | 6,814,295 |
| 1887. | 1,168 | 44,485 | 1,989,840 | 28,092 | 875,316 | 1,499,328 | 2,384,356 | 6,748,840 |
| 1888. | 1,137 | 43,247 | 2,017,558 | 27.384 | 859,953 | 1,594,992 | 2,390,502 | 6,863,005 |
| 1889. | 1,100 | 44,936 | 2,064,918 | 29,555 | 965,010 | 1,591,085 | 2,149,138 | 6,770,151 |
| 1890. | 1,069 | 43,084 | 2,152,790 | 29,403 | 924,346 | 1,695,358 | 2,600,147 | 7,372,641 |

Comparative Table showing the Number of Men Employed in the Fishing Industry in Vessels and Boats since the Year 1879 to 1890.

|  | Years. | Number of Men in V essels. | Number of Men in Boats. | $\begin{gathered} \text { Total } \\ \text { Number } \\ \text { of } \\ \text { Fishernen. } \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: |
| 1879. |  | 8,818 | 52,574 | 61,395 |
| 1880 |  | 8,757 | 51,900 | 60,657 |
| 1881. |  | 8,359 | 50,679 | 59,056 |
| 1882 |  | 8,498 | 52,785 | 61,283 |
| 1883 |  | 9,966 | 52,259 | 62,225 |
| 1884. |  | 9,968 | 51,854 | 61,822 |
| 1885. |  | 9,539 | 53,282 | 62,821 |
| 1886. |  | 8,927 | 53,073 | 62,000 |
| 1887 |  | 8,911 | 55,247 | 64,158 |
| 1888. | $\ldots$ | 9,574 | 53,109 | 62,683 |
| 1889. |  | 9,621 | 55,382 | 65,003 |
| 1890. |  | 8,726 | 55,000 | 63,726 |

## THE FISHERY LAWS OF THE DOMINION.

Table of Close Seasons in force on 31st December, 1890.
First and last days of which are inclusive, except in dates for Salmon and Lobsters.


Note.-In the Province of British Columbia, the following Regulations are in force: :-

1. Net fishing allowed only under licenses.
2. Salmon nets to have meshes of at least $5 \frac{3}{\text { a }}$ inches extension measure.
3. Drift nets confined to tidal waters. No nets to bar more than one-third of any river. Fishing to be discontinued from $6 \mathrm{a} . \mathrm{m}$. Saturday to $6 \mathrm{p} . \mathrm{m}$. Sunday.
4. The Minister of Marine and Fisheries to determine number of boats, seines, or nets to be used on each stream.
5. The close season for trout is from the 15 th October to 15 th March.

## SYNOPSIS OF FISHERY LAWS.

Net fishing of any kind is prohibited in public waters, except under lease or license.
The size of nets is regulated so as to prevent the killing of young fish. Nets cannot be set or seines used so as to bar channels or bays.

A general weekly close-time is provided in addition to special close season.
The use of explosive or poisonous substances for catching or killing fish is illegal.
Mill dams must be provided with efficient fish passes. Models or drawings will be furnished by the Department on application.

The above enactments and close-seasons are supplemented in special cases, under authority of the Fisheries Act, by a total prohibition of fishing for stated periods.

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$$

## FISH BREEDING.

A full report on the result of fish-breeding operations during the season of 1890, is published at Part II of this Supplement. This also contains illustrations of the several kinds of nets used in salmon fishing in the Baie des Chaleurs and elsewhere, as well as a report of Mr. S. Wilmot's visit to Newfoundland, for the purpose of procuring data to enable this Department to put up a lobster hatchery in the Maritime Provinces.

## CONCLUSION.

The usual statements relative to the Expenditure and Revenue of the Department, together with reports on Fishing Bounties and Fisheries Protection Service, will be found in the main report previously printed.

It is hardly necessary to repeat that the statistical statements of fisheries being brought down to the 31st December, in each year, it is impossille to have them compiled and in readiness for Printer in time to be included in first report.

I have the honour to be, Sir, Your obedient servant,

JOIIN TILTON, Deputy Minister of Fisheries.

## APPENDIX A.

## NOVA SCOTIA.

District No. 1, comprising the four Counties of the Island of Cape Breton.Inspector A. G. Bertram.

District No. 2, comprising the Counties of Cumberland, Colchesier, Pictou, Antigonish, Guysboro', Halifax and Hants.-Inspector Robert Hockin.

District No. 3, comprising the Counties of King's, Annapolis, Digby, Yarmouth, Shelburne, Queen's and Lunenburg.-Inspector J. R. Kinney.

## DISTRICT No. 1.

ANNUAL REPORT OF THE FISHERIES OF CAPE BREION ISLAND, COMPRISING THE COTNTIES OF CAPE BRETON, INVERNESS, RICHMOND AND VICTORIA, FOR THE YEAR 1890, BY INSPECTOR A. C. BERTRAM.

$$
\text { North Sydney, C.B., 1st December, } 1890 .
$$

## Hon. Charles H. Tupper, Minister of Marine and Fisheries, Ottawa.

Sirn,-I have the honour to submit my Seventh Annual Report on the fisheries of the coastal waters and streams of the Island of Cape Breton for the calendar year ending 31st December, 1890, with synopses of reports of Overseers for the four counties therein comprised.

The total value of the catch during the year just closed sums up to $\$ 1,510,585.90$, an increase of $127,990.58$ over that of 1889 , and coming within $\$ 57,000$ of the value of the best year since I first had the honour of reporting, in 1884. This is more fully explained by the following table:-

| Year. | Product Value. |
| :---: | :---: |
| 1884. | \$1,421,787 |
| 1885. | 1,501,498 |
| 1886. | 1,561,655 |
| 1887 | 1,554,288 |
| 1888 | 1,481,988 |
| 1889. | 1,382,580 |
| 1890 | 1,510,575 |

It is with much pleasure that 1 note this appreciable increase, for it was manifest that the failures experienced in 1888 and 1889 had greatly discouraged those $8 a-1$
engaged in the fishing industry. The following tabulated statement gives the values by counties for the year 1889 and 1890. Only the County of Richmond shows an increase of $\$ 189,385.56$, while the others show a decrease, the total of which is, however, only $\$ 61,388.98$, which reduces the increase for the Island to $\$ 127,996.58$.

| Counties. | Product. | Value. | Decrease. | Increase. |
| :---: | :---: | :---: | :---: | :---: |
|  | 1889. | 1890. |  |  |
|  | \$ cts. | 8 cts. | \$ cts. | 8 cts. |
| Cape Breton | 195,294 00 | 190,051 26 | 5,24244 |  |
| Inverness.... | 378,326 54 | 377,339 12 | 98742 |  |
| Richmond | 566,346 80 | 755,732 36 |  | 189,385 56 |
| Victoria | 242,612 30 | 187,453 18 | 55,159 12 |  |
|  | 1.382,579 34 | 1,510,575 92 | 61,388 98 | $\begin{array}{r} 189,38556 \\ 61,38898 \end{array}$ |
|  |  |  |  | 127,996 58 |

The increased production in Richmond County is so great over that of Cape Breton, Inverness and Victoria, which have experienced an almost corresponding decrease, that it would appear at first sight as if the first named county was more favoured in those conditions which usually accompany a successful fishing season; such as a plentiful supply of bait, abundance of fish and favourable weather. But a closer study of the facts show that even Richmond's large yield does not prove that the season of 1890 was more prosperous that that of 1889 . The value of 1889 , if divided by the number of men engaged in the business, will be found slightly greater than the production of 1890 divided by the same number of men in that year. Applying the same rule to the other three counties, it will be found that the season's catch has not been such as to be considered favourable or satisfactory.

To more fully illustrate this, the following tabulated statement is prepared, giving a comparison of the yield per man in the four counties:-

| Counties. | Man. |  | Increase. | Decrease. | Yield per Man. |  | Increase. | Decrease. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 1889. | 1890. |  |  | 1889. | 1890. |  |  |
| Cape Breton. . | 1,603 | 1,502 | 101 | ..... .... | $121 \cdot 20$ | 126.54 | $5 \cdot 34$ |  |
| Inverness | 2,637 | 2,191 |  | 446 | $143 \cdot 43$ | $172 \cdot 22$ | 28.79 | 0.50 |
| Richmond... | 2,675 | 3,052 | 375 | . | 211.72 | $211 \cdot 22$ |  | 26.89 |
| Victoria. | 2,049 | 2,165 |  | 116 | $113 \cdot 52$ | $86 \cdot 63$ | \% |  |

Last year's operations were thus quite as unfavourable as in 1888 and 1889, and in seeking an explanation of this fact, I experience little difficulty. The old

[^2]standing complaint of scarcity of bait was as potent as in the two preceding years. It being well known that bait suitable for different kinds of fish come in successive schools, and as these remain but a short time in one place, only those fishermen who are lucky enough to get a share of proper bait can hope to catch fish. It frequently happens that a grod catch of bait is made one day, but for want of means to keep it fresh until it can be used, it proves worthless; and what might, with a little provident forethought, prove a profitable voyage, becomes a failure. I have repeatedly urged the advantages of a little outlay in building ice-houses and securing a stock of ice, where it can be had so easily and so cheaply as in the vicinity of all the fishing stations. I am yet in hopes that the fishermen of Cape Breton will follow the example of those of the western parts of the Province in putting up ice for this purpose, and thus securing themselves against certain loss for want of fresh bait at proper times.

The stormy weather which prevailed during the fall months also proved a serious drawback to the prosperity of the fishing industry. The storms were severe and frequent, and in many instances did serious damage to wharves, boats, vessels and otber property. I attribute the decrease in the catch of the no:th-eastern section of the Island largely to this cause; all fishing in that district being done in boats, and these in many instances could not be launched for weeks in succession. The falling off in the number of men engaged fishing in the County of Inverness during the year 1890 may be accounted for by the fact that the successive failures of 1888 and 1889 discouraged many who used to engage in fishing, but looked elsewhere for employment, and this they found on the railway then under construction through the Island.

COD.
The returns show an increase of about $23,895 \mathrm{cwt}$., notwithstanding a great scarcity of bait in the majority of the districts. Never did a more stormy season prevail than in 1890. A succession of gales was felt during the months of September, October and November, from which fishermen on the north-eastern coast of the Island suffered greatly. This was unfortunate, as during the autumn, cod fish were found in large numbers on the numerous banks adjacent to the shores; and had it not been for this blustering weather, fishermen on that section of the coast would have done well.

There is no doubt but the supply of cod is inexhaustible, and if our fishermen would adopt the plan of keeping a stock of bait on hand, by means of ice, the returns would be more than double what they are now.

## MACKEREL.

There is a decrease of 1,121 barrels of mackerel for the year 1890, as compared with the previous year. The shortage is, no doubt, due to a scarcity of these fish on our coast. Mackerel, like herring, are a very timid fish and are easily diverted from their natural course. Very few of the spring run entered the bays and harbours. The reason of this is not understood by the fishermen. It may be that climatic changes, or currents, had something to do with these fish keeping away from their usual haunts inshore.

The fact that they were plentiful on the coast last year shows conclusively that the supply is not exhausted.

## HERRING.

Though the catch of herring in some localities was not abundant, yet the total result in this standard branch of the fishing industry exhibits an increase of 4,856 barrels over that of the previous year.

There are three distinct kinds of herrings frequenting the waters of Cape Breton Island :

1st. The spring run, so called, because the fish are caught in the early part of the season, during the months of April and May-a small and lean fish, only used for bait, some fresh-the bulk being salted down for lobster and mackerel bait.

2nd. The summer run, caught in the early part of June and July and sometimes in August. A large, fat herring, which, wheu well cured, none are richer in quality nor sweeter to the taste.

3rd. The fall run, caught in September. A large fish in size, but not nearly so fat as the summer or July herring; but of fair quality.

These three kinds of fish being different, it will be seen that no uniform system of curing will answer, and that methods suitable to each kind, season and quality must be adopted to give the most satistactory results.

Our spring herring have little commercial value. Some restrictive measures or regulations should, however, be adopted to prevent its wholesale destruction, as is sometimes the care when they strike in large quantities and are used for manuring purposes. The question of raising the standard of our summer herring is one of lasting importance to the country, and the attention and consideration given to this subject by your Department is in every way praiseworthy and must result in great advantage to an important fishing industry:

That our fish is greatly under-valued, is best known to those who have been fortunate enough to taste some thoroughly-cured Cape Breton summer herring ; and it is much to be apprehended that this low estimation is largely due to causes instanced by the Montreal Board of Trade-bad preparation and frauds practised on buyers.

I believe that were the fishermen of this coast to give better attention to the curing of their herring, and place them on the markets in thoroughly good order, after carefully culling and grading them, the result would be an increase in public appreciation of this article of food which would prove highly satisfactory and remunerative. These remarks apply with equal force to the September herring; but as they are caught at a time of the year when they are not so likely to spoil, the same amount of care in curing is not expected.

The July run of herring are most delicate and sensitive to the influence of the sun and summer heat. These fish are caught in the hotlest season, and when exposed to the sun for even a few minutes, any damage done them at this stage cannot by any possible attention be overcome. This does not apply to our fall or September herring, and I am of the opinion that the Scotch method of curing applied to these would be the best that could be pursued and calculated to bring about most satisfactory results. In the curing of these fish, the utmost pains should be taken to keep them from sun and rain. I have, time and again, pointed this out in former reports. Herring exposed to the sun or rain, for even a short time, cannot afterwards be well cured. All experienced fishermen will admit that even a slight shower is quite as injurious to these fish as a little sun. The latter only injures the surface, while the former affects the whole body.

This class of fish are said by fishermen to be the most timid of the finny tribes. This is proved by the fact that where they could be had in abundance thirty years ago they are hardly seen now. It is claimed that nets and lobster traps frighten them off shore. It is also contended by old and experienced fishermen that were nets and traps taken up in daytime herring would be found more plentiful in our bays and harbours.

## SALMON.

The returns for 1890 show an increase of 24 barrels pickled and 17,442 pounds fresh in ice over the yield of 1889. This increase occurs mainly in Inverness County, where the best spawning grounds are located. No doubt, these fish, like other kinds,
are subject to periodical fluctuations, caused by the influence of wind, rain and currents, over which human agencies can exercise no control; but one thing is noticeable-that while, during the months of June, July and up to the middle of August, salmon may be scarce off the coast, they never fail to put an appearance during the autumn season in search of spawning grounds in our fresh-water streams. This fall, the various rivers frequented by them were unsually well visited, which is a good indication of the supply being well kept up.

HACIBUT.
There is a falling off this year in the catch of halibut, amounting to 19,266 pounds. It appears that year by year, these fish are becoming scarcer in our coastal waters. Their disappearance is attributed to the use of trawls.

## ALEWIVES.

There is an increase of 491 barrels over that of last year. These iish are mainly taken by residents on inland streams. They appear in the spring season, when there is a scarcity of other fish, and therefore form a staple article of food for home consumption. They are also used by native fishermen for bait.

HADDOCK.
There is an increase of $3,576 \mathrm{cwt}$. over that of the previous season. This increase occurs in the County of Richmond, where the fish were unusually plentiful during the months of June and July.
squid.
The decrease of 2,981 barrels in the yield of squid, a fish exclusively used for bait, accounts to a great extent for the falling off in the cod fishery in the districts where no squid were taken. These fish were undoubtedly prevented from visiting our coast by the high winds which prevailed most of the season; their absence being most noticeable on the most exposed parts of the coast.

## LOBSTERS,

The marked increase of 217,344 cans of lobsters over the pack of last season is the most noticeable feature of the year's fishery. This increase is due to three causes; the large number of these crustaceans found on our coast during the season, the extension of ten days' fishing granted by the Department, and an increase in the number of lobster factories in operation. The increase in prices was of great advantage to large dealers more than to the fishermen, as prices advanced at the close of the season. There is a prevailing impression that this fishery is overdone to an extent which threatens its extinction; but so far as this district is concerned, and from past seasons' experience, the increased quantity taken points to an opposite conclusion. The fact that competition is increasing, consequent on an advance in prices, and that cash is paid by nearly all canners on delivery, tend to lure fishermen from other branches of fishery to that of the lobster. Having dealt with this subject in previous reports, I do not deem it necessary to discuss it here at greater length.

## CONCLUSION.

Until quite recently, indeed until the increased demand for coal at Montreal and other points along the St. Lawrence induced the employment of steamers to freight coal, the fish products of Cape Breton Island were marketed at Halifax. The facilities now offered by these steamships has induced the preparation and shipping of a large
proportion of the catch of herring and codfish, hard dried and green, to the St. Lawrence markets. It is, however, with deep regret that I learn that through carelessness in preparing their herring, our fishermen greatly depreciated its value and almost lost the benefit of the unlimited market of the Provinces of Quebec and Ontario. It is to be hoped that the dissemination of the views of experts and of the report of the Commission of 1889 will bring about an improvement.

There can be no doubt but if compulsory inspection were vigorously enforced, a marked improvement in this regard would fellow. None of our dealers have yet undertaken the putting up of shredded or boneless fish, in which a most successful business could be done, the demand being constantly growing, as is seen by the large quantities put up in Gloucester, Cape Cod and other American stations. I observe that in the western part of this Province a good deal of attention is being given to this mode of curing, and it has been found remunerative. If, instead of the practice now followed, of each fisherman curing his own catch of herring and cod, he could be prevailed upon to sell fresh and let the dealer cure, I believe we would have a better preservation of herring, and that the process of putting.up boneless and shredded cod would be profitably prosecuted to the advantage of both fishermen and dealers.

I am looking forward with interest to the effect which the completion and operation of the Cape Breton Railway will have on our fishing industry. Heretofore, we have been debarred from competing in the inland and city markets for fresh fish, which I have long thought could be most successfully pursued by the fishermen of this Island were the necessary facilities, in the way of railway communication, available.

> I have the honour to be, Sir, Your obedient servant, A. C. BERTRAM, Inspector of Fisheries for District No. 1.

## SYNOPSIS OF FISHERY OVERSEERS' REPORTS FOR THE ISLAND OF CAPE BRETON.

## CAPE BRETON COUNTY.

Overseer Francis Quinan, of Sydney, reports the total catch below the average of previous years. Salmon and herring gave better returns, but all other kinds of fish show a decrease. Mackerel were scarce during the whole of the season. Codfish, although reported plentiful on several dates, makes but a poor showing in the total catch. Two reasons are assigned for this, viz., stormy weather and scarcity of bait. The shore fishermen of this district are by no means " masters of the winds and waves," but the overseer thinks they could provide against the frequent occurrence of want of bait. There was a falling off in the catch of alewives, owing to the ice remaining on the coast until late in the season, and to prevailing easterly winds. The yield of minor kinds of fish is under the average ; parties being employed at other work which paid better. With regard to the lobster fishery, the catch, although smaller than that of last year, was fair. The fishermen had to contend against a succession of storms, which destroyed 30 per cent. of the traps. There are three factories in this district, and the lobsters taken were good, both in size and in quality. The law was well observed, the managers of factories showing a desire to comply with the regulations. Packing commenced on the 17th May.

Overseer Alex. McDonald, of East Bay, reports a decrease in the catch of mackerel. These fish were scarce during the spring season, and the fall mackerel fishery was a complete failure. This was a great disappointment, as well as a serious loss, to a large number of fishermen, who were prepared for this fishery to a greater extent
than usual, owing to the fair market prices realized. The herring fishery, also, was below the average. A poor summer run of these fish is the cause of the small catch.

The cod fishery shows better than any of the other branches, and fishermen who prosecuted this branch exclusively have done fairly well. There was a smaller number of fishermen engaged in the cod fishery than last year, which is to be regretted, in view of the failure of the other branches.

The lobster fishery, considering the unusual stormy weather of the season, was good. Lobsters were plentiful and of good quality, and in every respect compared more than favourably with previous years. The fishing industry of this district is not prosecuted so extensively as in former years. Farmers living on the rivers and bays seek employment on the railway or at the mines, where they receive good wages. The inland fisheries of Mira River and East Bay have thus been greally abandoned. The rivers were well protected, and there was a large run of salmon during the month of October. A greater number were taken from the Mira River for the Sydney hatchery than during any previous year.

Overseer William Burke, of Mira Ferry, reports a slight increase in the catch of cod and salmon, but a noticeable decrease in that of mackerel and summer herring. The July or summer run of herring was a complete failure in Mira Bay, where hundreds of barrels have been taken in other seasons. The fishermen cannot assign any plausible reason for this scarcity of fish. The failure of this branch of fishing will be keenly felt by those who combine fishing with farming. The Scattari Island fishing was good, particularly for cod and lobsters. The local fishermen of Mira Bay complain that fishermen from western Nova Scotia and some eastern ports monopolize the Mira Bay fishing grounds with their vessels, and do much injury to nets, as well as ruining the boat fishing. They want the Government to protect these grounds from outsiders.

COUNTY OF INVERNESS.
Overseer D. F. Mc Lean, of Port Hood, reports that the statistics contained in his returns show a considerable falling off in the yield of fisheries, with the exception of salmon, trout, smelts, oysters and lobsters. The principal cause of this decrease is attributed to a scarcity of bait during the greater part of the season. Squid, which is the chief article used for bait, could not be had on this coast at all. The impression gains ground that year after year all kinds of fish keep further off the coast, and that herring, mackerel, cod, haddock and hake spawn in deeper waters than previously, so far off that fishermen find it difficult to prosecute their calling with small boats. That seining has, to some extent, been the cause of this decline, cannot be successfully contradicted. The protection afforded salmon and other fish frequenting rivers for the purpose of spawning is already beginning to bear its fruit. An increase is quite noticeable in the several branches of the fisheries protected by close seasons. Salmon now enter fresh-water streams much later in the season than during the past five years. A large increase was noticed ascending the river to spawn, as compared with the previous two years. Oyster fishing was very fair, and a material increase is noticed in that branch of our fishing industry. There were five lobster factories in operation during the past season. Two persons obtained licenses to set trap nets in the vicinity of Port Hood, and the result was a failure-that is to say, as far as catching fish was concerned. John H. Murphy was one of the parties who obtained a license, and the result of his catch was as follows:-

$$
\begin{aligned}
& \text { Mackerel, } 9 \frac{3}{4} \text { bbls., valued at ..... .. ...... ....... ................... } \$ 126 \\
& \text { Herring, } 10 \text { do do ........... .............. ................ } 9 \\
& \text { Codfish } 3 \text { cwt. do ........................................... } 7 \\
& \text { Squid, 13,800 lbs. do ............................................ } 197
\end{aligned}
$$

The other party holding a license was A. W. Morrison, and his returns show the following catch:-

$$
\begin{aligned}
& \text { Mackerel, } 15 \text { bbls., valued at.............. .............................. } \$ 100 \\
& \text { Squid, 8,000 lbs. do ........ ..................................... } 100 \\
& \text { Total............................. .......................... } \$ 200
\end{aligned}
$$

Overseer David Ross, of North-East Margaree, reports an increase of 700 barrels of mackerel over last year's catch. From the beginning of the season, until about the 1st of July, cod fishing was exceptionally good; but from the latter date until the close of the season, that branch of the fishery was almost a total failure. Notwithstanding the failure of the cod fishery during five months of the season, the total catch exceeds that of last year. Salmon net-fishing also shows an increase, but angling was not good. The close seasons were well observed, and the spawning grounds well supplied, judging from the large number of parent fish which ascended to the head waters of rivers during the autumn.

Overseer James Coady, of South-West Margaree, reports a decrease in the catch of codfish and haddock, chiefly due to scarcity of bait and blustering weather. The lobster statistics show a decrease, owing to only one factory being operated. The factories at Margaree Harbour and Coal Mines were closed down during the whole season. The factory operated, however, did better than before; lobsters being more abundant and larger. Mackerel shows an increase of 293 barrels, herring 238 barrels and alewives 400 barrels. Salmon net fishing about the same as in 1889 . Fly fishing was not good. although fish appeared to be abundant. The weather kept stormy and wet, and this was probably the cause why fly-fishing was so poor. All other kinds of fish show an average yield. The fishery laws were well observed, although great vigilance was necessary to protect the rivers.

Overseer Peter McEachern, of Glendale, reports an average catch. Codfish were more abundant at the close of the season than during the summer months. Nova Scotia fishing vessels purchased all the fresh herring and alewives that could be caught for bait, giving good prices for it. The demand for this kind of bait during the past season was greater than before, owing to squid being scarce. The rivers were well stocked with salmon and trout.

## victoria county.

Overseer William Bingham, of Englishtown, reports the catch of summer herring in Great Bras d'Or and St. Ann's Bay as remarkably good. St. Ann's Harbour was not, however, visited by large schools, much to the disappointment and loss of the harbour fishermen. Cod fishing was poor throughout the whole year. From the beginning of the season until well on into autumn, fish was remarkably scarce on the several local banks. Later in the fall they were more plentiful, but one northeast gale succeeded another, and the boat fishermen could not venture out with safety. Bait being also scarce, this helped to add to the failure of this fishery. The fishermen attribute the scarcity of cod on the banks to trawling by vessels and to fish offal being thrown overboard; thus polluting the grounds, causing the fish to seek purer waters elsewhere, and injuring boat fishing. Mackerel were exceedingly scarce. The cause is attributed to purse seining, which breaks up the schools and frightens the fish off from bays and harbours. A considerable falling off is noticed in the catch of salmon, and this overseer recommends the planting of fry in Clyburn's Brook, Barachois and North River. These streams are well adapted for fishbreeding. North-east gales did much damage to lobster fishing; nevertheless, the returns show a good season's catch. The two weeks' extension greatly assisted fishermen and packers, and this boon was much appreciated by all. St. Ann's and Ingonish Bays are great resorts for vessels in search of bait. Squid, however, was
scarce, owing to prevailing rough weather. This proved a great drawback to fishing vessels as well as to shore fishermen. The Fishery Regulations were well observed, there being only two violations of the law-one for spearing and the other for having small lobsters in possession.

Overseer Duncan McDonald, of Aspy Bay, reports a marked decrease in the catch of codfish. This is attributed to trawling on the banks, particularly during the beginning of the fishing season. Trawlers kept the outside banks well fished, and it is considered that if this system is not prohibited, fishermen in this district will have to abandon boat fishing altogether.

In the mackerel catch there is also a conspicuous falling off. The fish did not strike inshore in large schools. They appeared to be more plentiful outside, and vessels, hand-liners and seiners did well, particularly the former. Boat fishermen, who fished with hand lines, did well, some taking as much as thirty barrels. Spring mackerel were of good quality, and very fair prices were realized. The decrease in the catch of mackerel was owing to a scarcity of the fish in the fall.

Herring exhibits an average catch, and fishermen think that lobster traps may have had something to do in frightening these fish from the shore into deep water. Lobster fishing may be said to have been good, although one or two factories failed to open this seaton. The factories which were operated, however, found lobsters plentiful and large; but stormy weather did much damage to traps, and caused the loss of many days' fishing. The catch of salmon shows a falling off. which is attributed to unfavourable weather. The Fishery Regulations were well observed, only one case of illegal fishing being reported.

Overseer Donald McQuarrie, of Middle River, reports that very little deep-sea fishing is carried on in his division. There was an increase in the catch of herring. Alewives show also a large increase in some portions of this division. These fish were found more abundant in certain places than during any season for the past thirty years. The catch of salmon in Bras d'Or Lakes shows an increase over that of last year. The Middle and Baddeck Kivers were frequented by a large number of salmon. There is no midsummer run of these fish into either of the above-named rivers, but during the months of October and November large numbers ascend to the headwaters to spawn. Trout do not frequent the rivers in as large quantities as formerly. This may be due to changes in the river, caused by heavy freshets. The pools are neither so numerous nor deep as formerly. The law has been well observed. Guardian McKenzie has put a stop to poaching by Indians.

Guardian Mc Kenzie, of Middle River, reports that Indians are inclined to violate the law, and that they require to be closely watched. They go up the river with canoes and spears, and as they are skilled spearsmen, extensive poaching was carried on. The white people have entirely abandoned illegal fishing in Middle River, more from fear of being caught than from a desire to comply with the regulations. A great run of salmon is reported during the months of October and November. These rivers kept high during the whole season which accounts for the increase in salmon.

## RICHMOND COUNTY.

Overseer D. Cameron, of St. Peters, reports a decrease in the catch of mackerel and herring, but adds that this decrease is more than counterbalanced by an increase in haddock and lobsters. The haddock fishery shows an increase of 1,200 quintals and lobsters 35,428 cans over the previous year's catch. The partial failure of the mackeral fishery is attributed to stining vessels, which broke up schools on their first appearance on the coast; the fish then became scattered and disappeared into deeper water. The fall schools were few and small. There was a noticeable absence of codfish, but haddock were abundant, and the fishermen did well. The fishery laws were well observed, but illegal practices at the factories can only be checked by an officer being located at each factory.

Overseer Francis Marmeau, of Arichat, reports an increase in the catch of herring, mackerel, haddock and codfish; and had the weather not been so stormy
after the middle of September, the increase in the cod-fishery would have been greater. The market prices were good, and the fishermen of this district are in fairly comfortable circumstances for the winter. Referring to the lobster fishery, this officer says that, in the early history of the packing business, when the fishery was in the hands of large dealers, it was an easy matter to enforce the regulations and prevent packing during the close season. The business was then confined to factories where the local fishery officer had no difficulty in enforcing the law, as canning was carried on under this officer's eye. Now, however, it is very different; the average fisherman has become an expert in the canning business, and resorts to out-of-the-way places where he can engage in the illegal packing of lobsters during the close season These men receive supplies from factory proprietors, to whom they agree to dispose of their stock. The violators, in many cases, have the sympathy, not only of lobster packers, but of the inhabitants of the district, and it often becomes difficult for an officer to carry out the law. Happily, violators have in most cases been convicted and fined, which has had a wholesome effect on those engaged in this illegal business.

## DISTRICT No. 2.


#### Abstract

ANNUAL REPORT ON THE FISHERIES OF DISTRICT No. 2 OF NOVA SCOTIA, COMPRISING THE COUNTIES OF CUMBERLAND, COLCHESTER, PICTOU, ANTIGONISH, GUYSBOROUGH, HALIFAX AND HANTS, FOR THE YEAR 1890, BY INSPECTOR ROBT. HOCKIN.


Pictou, 31st December, 1890.

To the Hon. Charfes H. Tupper, Minister of Marine and Fisheries, Ottawa.

Sir,-I have the honour to submit a report of the fisheries during the year 1890, within District No. 2, Nova Scotia, as compiled from statistical returns of local overseers, together with synopses of the reports of these officers of the various fisheries within their district. Comparative tables, showing the increase and decrease of the fisheries in each county, as well as the increase and decrease of each kind of fish, are annexed.

The following is a statement of the value of fish caught within this district each year since 1876:-

| Year. | Value. |
| :---: | :---: |
| 1876 | \$1,471,555 |
| 1877. | 1,477,735 |
| 1878. | 1,594,428 |
| 1879 | 1,330,521 |
| 1880. | 1,557,488 |
| 1881. | 1,561,719 |
| 1882. | 1,703,813 |
| 1883. | 1,788,242 |
| 1884. | 2,050,562 |
| 1885. | 2,295,915 |
| 1886. | 2,011,983 |
| 1887. | 1,954,476 |
| 1888. | 1,538,122 |
| 1889. | 1,367,854 |
| 1890. | 1,453,015 |

showing an average catch for the fifteen years of $\$ 1,677,162$.
The value of the catch for 1890 is therefore about 13 per cent. below an average, but about 6 per cent. over that of last year.

There is a noticeable increase in the value of deep sea fish, the catch of mackerel showing an increase of.
$\$ 46,588$

The cod family an increase of...... ............................. 43,365


COD.
The increase in the catch of these fish is partly due to a more vigorous prosecution of the fishery, caused by better prices, and the fish being more abundant.

## MACKEREL

There is a gratifying increase in the value of the tish, as shown byithese returns. The fish taken were of excellent quality, and much better prices obtained than formerly.

## HERRINGS.

The returns show a slight increase in the catch over last year of 2,000 barrels. The noticeable features are, that last year. Gaysboro' reported an increase of about 50 per cent. and Halifax a decrease of a like proportion; this year these figures are reversed.

In the valuable and exhaustive report of the delegates appointed to inquire into the herring fishing industry, there are two important points raised, that the inspection of fish, which it is recommended should be compulsory, and the inspection of barrels. I cannot find any desire among fish dealers for compulsory inspection. A large trade is carried on in lean tish, which, being devoid of fat, keep well in hot climates, and the fat July herring are not sold for the same trade. While under inspection, the lean fish would be branded inferior, while it is, for its particular trade, a No. 1 fish. It is suggested that were packers compelled to brand their own names upon the packages, that so far as the fish are concerned, this would meet the demands of the trade; but all agree in saying that there should be a rigid inspection of fish barrels, and that the regulation barrel should be of $\frac{3}{4}$ inch spruce or larch, free from sap, with sixteen hoops; hoops not to be narrower than $1 \frac{1}{8}$ inches at the narrowest part. It is further suggested that if all persons were prohibited from branding or stencilling fish as Prime or No. 1, Crown Prime, de., or any other classification than that they were herring put up by A. B., and if officially inspected herring were conspicuously marked, the public would soon appreciate an inspection, if properly done.

## LOBSTERS.

Throughout this district, there has been a decline in the catcls as per schedule rates of about 10 per cent. from that of 1889 , which exceeded that of 1888 by about 17 per cent. The accepted theory is, that the lobster is a coast animal, receding. into deeper waters during the winter, to return with a rising temperature; and that over-fishing in one locality will not materially affect any other locality. The returns, this year, seem to lend additional weight to this theory. Throughout those portions of the district where the law has been strictly observed as to season, and upon the whole fairly so as to size, the returns show that to the same number of traps there has been an increased yield-the Straits of Northumberland, for instance, showing an increase of $8 \frac{1}{3}$ per cent. over last year, while upon the southern shore of Halifax the decline has been 10 per cent., and upon that part of Guysboro' most favourable for poaching, the decline has been 16 per cent., while other parts of the coast so exposed that illicit trapping could not be carried on, the fishery held its own. It would therefore seem that were the present law observed, it would preserve the fishery.

Of the various suggestions and schemes to bring about that result, the writer favours that of prohibiting canning lobsters except by license, that licensed canners be required to stamp their cans with a registered stamp; and that lobsters put up in cans not so stamped be liable to seizure by customs or fishery officers. Special
regulations would, however, be required, to permit the importation of lobsters canned in Newfoundland.

Experienced canners say that fresh fish caught during the autumn months are watery, and do not possess the flavour of summer fish. They also contain more of an alkali which blackens the can and then the fish. The placing of such goods upon the market is claimed to be pernicious and injurious to the whole business. It will be observed that if a licensed canner put up this grade of fish, it could only injure his special brand. Another important feature is, that three fish in the autumn do not equal in bulk for canning purposes two of them in the spring.

In order to enforce the law, in addition to the active service of the cruisers, which did much to chcek the illegal business this year, the employment of special guardians, under vigilant overseers, will be necessary upon the Atlantic coasts. The licensing of canning establishments would yield a revenue sufficient to pay for daily inspection by fishery officers-the only practicable way of controlling the size limit,-and even then there would be a danger that it might simply become an additional tax upon the canner. The present size law, with the present force, can only be valuable in so far as it is educational.

SHAD.
The shad fishery of this ditrict is confined to the counties bordering upon the Bay of Fundy, viz., Hants, Cumberland and Colchester. Ninety-five per cent. of all the shad taken during the past fifteen years have been in the waters of the Basin of Mines, Cobequid Bay and Cumberland Basin; and of the remaining 5 per cent. it is probable that 3 per cent, have been taken in Shubenacadie River. These fish are caught in the river by means of nets set in eddies along the shore when the water is high, or set one-half or two-thirds across when the water is low. In the bay they are caught by means of weirs and drift nets-that is, nets allowed to drift up and down in the strong tides of the Bay of Fundy. The time of fishing in the rivers is the last week in May and first week in June, but not later than 15th June. In the bay shad were formerly taken from 20th June, but in later years there are scarcely any taken till the middle of July.

The history of this fishery has been one of rapid decline; the total catch for successive three years being:

| 1878-79-80. | 14,755 |
| :---: | :---: |
| 1881-82-83. | 13,037 |
| 1884-85-86. | 6,192 |
| 1887-88-89. | 17,777 |

The catch of 1890 shows a slignt increase over the average of the three last years, being 750 as compared with 592 barrels.

The following table will show the decline in each year and the catch in each county :-

| Years. | Hants. | Cumberland. | Colchester. | Total Barrels. |
| :---: | :---: | :---: | :---: | :---: |
| 18.6. | 528 | 1,078 | 1,980 | 3,586 |
| 1877 | 491 | 1,025 | 1,935 | 2,451 |
| 1878. | 795 | 1,051 | 3,083 | 4,929 |
| 1879. | 2.247 | 1,030 | 5,458 | 8,735 |
| 1880. | 2,016 | 683 | 3,392 | 6,091 |
| 1881. | 2,004 | 730 | 4,362 | 7,096 |
| 1882. | 1,630 | 647 | 1,000 | 3,277 |
| 1883. | 440 | 730 | 1,500 | 2,670 |
| 1884.. | 503 | 868 | 916 | 2,337 |
| 1885.. | 570 | 187 | 1,693 | 2,450 |
| 1886. | 695 | 172 | 538 | 1,405 |
| 1887. | 277 | 134 | 385 | 796 |
| 1888. | 170 | 106 | 171 | 447 |
| 1889. | 222 | 112 | 201 | 534 |
| 1890.. | 228 | 160 | 362 | 790 |

To meet this decline, it is evident that legislation is necessary. Shad frequent the waters of the Bay of Fundy to feed upon what is called the shad-worm. The possibility suggests itself that this supply of food might become exhausted by large numbers of shad, and the locality require a period of years for the food to become abundant. This year, for instance, the fish appeared in abundance early in the season, but remained only a short time. The theory has been advanced that the shad taken in the bay are not the result of spawn deposited in our rivers, but in rivers further soutb, and that there is no necessity for legislation affecting the spawning season. While it may be possible that all the fish that come into the bay did not spawn in our rivers, still I see no reason for believing that they are not contributing nurseries of the fishery, and that some remedial legislation is necessary. Nearly all the shad taken in Shubenacadie River, for instance, are full of spawn, and the fish ascend the river for the purpose of depositing it. 'There is, therefore, an immense destruction of ova, and at the very lowest calculation, the catch this year, of 164 barrels, in this river alone, must have destroyed $50,000,000$ of ova. Of course, the conflict is between the inhabitants along the river, who have been in the habit of taking shad, and those fishing in the bay. I know of no reason that would prevent all from participating in the bay fishery, except the inconvenience of residence. To adopt a law entirely prohibiting the catch of shad in the rivers would, of course, be felt severely by those who have been in the habit of catching the fish; and the enforcement of such a law would be expensive and difficult, because it would fall entirely upon the officers, and would not be supported by the residents along the river. The alternative would be to make a close season during May and June for three years, or to extend the present season, which begins at sunset on Friday evening and ends at sunrise on Monday morning. Of the several courses, I would prefer the latter, making the close season to begin at sunset Wednesday evening and ending at sunrise Monday morning.

SALMON.
The returns show a large decrease in the value of the catch of these fish, the total value being :

$$
\begin{aligned}
& \text { For 1889....................... ........................... ............. \$85,113 } \\
& \text { For 1890................................................................. 57,276 }
\end{aligned}
$$

I am satisfied that this decrease is more apparent than real. First, fully 5,000 barrels falling off is attributable to the withdrawal of vessels from the Labrador fishery, while the apparent decline of $\$ 15,000$ in the returns from Pictou County requires explanation. Last year, owing to the death of the overseer in the fall of the year, the duty of collecting statistics had to be placed in inexperienced hands, and the return of salmon showed an increase of 50 per cent. over that of 1888. This was questioned at the time by the Inspector, but he was assured the returns had been carefully compiled. However, from interviews had with fishermen from the locality, I am of opinion that this abnormal increase of 50 per cent. over 1888 cannot be accepted as established.

The returns this year were regularly made by the overseer appointed, giving the names of the persons catching the fish and the quantity caught by each. Upon the whole, there has been a considerable decline, notwithstanding the large expense involved in promoting this valuable fishery. Inquiry, however, makes one wonder that this decline is not greater. I made the remark in my last annual report that several things in nature pointed to the fact that the headwaters, brooks and streamlets of a river are the nurseries for this fish. First, we have the gravid fish ascending a river as far as it can find spawning grounds, and the young fish when spawned and passed the fry stage and acquired strength to swim, instinctively beading up stream, where it not only finds the food to sustain itself, but also where there will probably be fewer predacious fish which feed upon them. Further consultation confirms me in this opinion, which I look upon as important, because of the bearing it has upon legislation for the preservation of the fishery, as well as indicating how far artificial cultivation has assisted in maintaining it. Take for example, the salmon fishing in
the Straits of Northumberland, of twenty-seven important rivers, which at one time were the nursery of this fish. I only know of four that are unobstructed by mill dams. a short distance above tidal waters, and these unprovided with fish-ways. The unobstructed rivers are the East, West and Cariboo Rivers, in Pictou County, and the West River of Antigonish County.

In view of this, it is difficult to understand how the fishery has been kept up, if not by the deposit of fry in the rivers flowing into these waters.

Pursuant to instructions, I reported what fish-ways were necessary in this district. I have found, and so reported, that about ninety-five fish-ways are required ; the total cost of which would be covered by one year's catch of salmon alone, apart from other considerations of the acknowledged effect anadromous fish have upon the coast fisheries.

With the opening of rivers, the next matter of importance is the protection of fish during the spawning season. Where permanent wardens have been replaced by special guardians, appointed from time to time, it has shown to have been a step in the right direction, and has an electrifying effect upon the officers.

FISH-WAYS.
Upon examination of the fish-ways in this district, I found that of those constructed fully 90 per cent. were not at the time of examination in such a condition as to allow fish to pass within spawning grounds, and that they were not fulfilling the parpose for which they were intended. These structures, as built, extend from 80 to 100 feet into the pond above a dam, and slope from the bottom of the dam to nearly the surface of the water. They, therefore, present a large area of surface, which requires to be water-tight; the ice, too, forming under them, has materially injured some; others have been torn by freshets; many were found choked by débris, or the openings were not adapted to the height of water in the dam. With those fish-ways that could be repaired, notice has been served upon the mill-owner to do so, and in most cases this has been done; there are some, however, that it will be cheaper to build anew than to go to the expense of repairing. A system of weekly returns from the fishery officer living nearest to the fishway has been adopted, and during the spawning season, the Inspector is keptinformed as to the condition of each fish-way. Deciding that the great defect of fish-ways in use was from the fact of their being fed from the surface, and that it would be of great value if one could be obtained that was fed from beneath, I instituted a series of experiments last winter with this object in view, and succeeded in inventing a pass which is a simple solution of the difficulty. It may be shortly described as a hole in the bottom of the dam, with the velocity of discharge so reduced that a fish may contend against the current and swim into the pond above. It consists of a series of compartments, having approximately a level floor, with side walls, ends and transverse partitions (every 4 feet of its length), from the bottom of the dam to above the water line; these compartments, connected with one another, and with the pond above and the river below the dam, by submerged apertures approximately on the level and preferably in alignment for the passage of fish. The water in the several compartments will be lower, step by step, from inflow to outlet, and will flow out of the last aperture under a head of about 2 feet (it can be made less), and therefore with so little velocity that fish can swim into the first compartment and into the pond above.

Here, then, is a fish-way which is not of very great length, 28 or 32 feet, sufficient for any average dam. It is built trom the bottom of the pond up, so that ice cannot form under it nor raise it, and from its structure with partitions every 4 feet it is, necessarily, strong and compact. Freshets can make no torrent through these passes and tear them out. The apertures being submerged, cannot be choked with debris, and they can be so far removed from the bottom as to obviate any danger from that source. What is perhaps most important is, that it adapts itself to the height of water in the dam; for so long as there is water in the dam, the fish-
way will be supplied. The importance of this will be recognized when it is remembered that a fish-way has no friend in the mill-owner, and that the maintance of the public rights of free access to spawning grounds by fish depends upon the vigilance of fishery officers.

The velocity of discharge being so reduced, the loss of water does not materially affect the mill-owner.

Plate I. gives a side view of the fish-way as constructed, with aperture of discharge under the water in the river below the dam. Hereunder, the darkened shadows of the dam the light shining through the aperture is quite noticeable.

Having submitted models and descriptions to the Department, I was honoured with permission to prescribe this form for a fish-way. Four of them have been put in; the first in Cumminger dam, Melrose, Guysboro' County ; one at Doyle's dam, Tidnish, Cumberland County, one in the Rhino dam, and one at the foot of Little Indian Lake, in Halifax County. Had the season not been so wet, others would have been constructed.

Plate II. shows the heights the water attained in the several compartments in the fish-way on Cumminger dam, and Plate III. in the fish-way on Doyle's dam. In the latter fish-way, the partitions were spaced to suit the upright support as of bridge. The aperture was oval shaped; 11 inches high and 9 inches wide. In the Cumminger dam it was 9 inches high, 7 inches wide and of the same shape. Of the fact that fish will go through them, I have the statement of Thomas McKim, Warden, Melrose, that he has seen them go through with a full head of water in the dam. I have myselt seen them go through, but there was not at the time a full head in the dam. Residents in Tidnish say fish have been seen to go through, and indeed any person examining one, as constructed, must see that there cannot be a shadow of doubt as to its efficiency.

It has met the approval of Mr. Wilmot, Superintendent of Fish Culture, and of Col. Marshall McDonald, Fish Commissioner of the United States, at Washington. Arrangements are about completed for their construction in Massachusetts, and I have a patent for Canada and the United States.

During the year the following rivers have been cleared, so as to allow fish to have access to the headwaters, viz., Country Harbour River, Guysboro; St. Mary's River, below Two-Mile Lake; St. Mary's, East Branch, below Garden Lake.

The work of the Inspector for the year past has, besides the time devoted to overseeing the building of fish-ways and the preparing of reports upon subjects referred. involved correspondence covering 915 pages of letter book; traval by rail, 3,295 miles; travel by road, 1,458 miles.

I have the honour to be, Sir, Your obedient servant, ROBERT HOCKIN.
Inspector of Fisheries for District No. 2, Nova Scotia.

## SYNOPSES OF OVERSEERS REPORTS.

## ANTIGONISH COUNTY.

Overseer John McDonald, Doctor's Brook, states that the fishing season was a discouraging one to the fishermen. Two new lobster factories were started in Arisaig Cove. Owing to the want of good fishermen, they did not succeed well and one of the boats was unfortunately wrecked in the storm of 1st December. Hake were abundant, and remained on the coast during the greatest part of the season; but fishermen

PLATEI.


## PLATE II.

Side Section of Hockin Fishway as constructed in Cummingers Dam, Guysboro Co., N. S. Lines in red showing actual hight attained by water in the several compartments.


## PLATE III.

Side section of Hockin Fishway constructed at Doyles dam Tidnish, County of Cumberland, Nova Scotia, built at the same time and made part of a Road-Bridge : compartments adapted to the upright supports of the bridge. Lines in red showing hight attained by the water in the several compartunents also showing incline given to fishway to adapt it to the grade.

could not secure bait enough for more than one night in the week. Herring were abundantin the spring, but not fished for except for bait. Summer herring did not appear at all. Having been informed that parties were racking oysters at Tracadie during the close season, this officer visited the locality, when he found an old scow and other oyster fishing implements and had them destroyed; being satisfied of their having been illegally used shortly before. He also destroyed a net found set right across James River. Many fishermen lost boats and valuable gear in the storm of 1st December, which they will not be able to replace, unless fish become more plentitul than for years past.

## COLCHESTER COUNTY.

Overseer H. Gass, Tatamagouche, reports salmon scarce in the rivers this year, owing to the dredge boat working in the channel. Attempts at poaching were made by boys and irresponsible parties, but this was generally pretty well stopped. The fish-way at Balfour's mill is out of repairs, and the owner will not repair it.

Overseer R. J. Pollock, Lower Stewiacke, says that shad and salmon are on the increase in Stewiacke River; the catch being nearly $\$ 300$ in excess of that of 1889. The close season was well observed and carefully looked after. Poaching was done by some parties spearing nine or ten miles up the river. Three of them were fined, one of whom occupies a high position in the community, and his example to young men in this respect is not what should be expected. The returns do not show any fish caught above the Middle Stewiacke Bridge.

Overseer J. W. Davison, Upper Economy, reports a small increase in the shad catch of the previous season, but it is small when compared with former years. There is little to encourage fishermen to make preparations for next season. Few shad were seen until 8th July, when quite a school struck into Five Islands; one crew taking, 3,000 in one day and another 1,000 . There was quite an excitement among the fishermen, but it lasted only a short time, as this was the only catch worth mentioning for the season. Shad were not plentiful throughout the bay, and disappeared quite suddenly in the latter part of July. This is held to be a bad indication for next season's catch. The great decrease in the catch cannot be attributed to over-fishing, because the apparatus used are small when compared with former years. No doubt, this has had something to do with it; but for a number of years, while the yield in the bay is not one-tenth of what it formerly was, the catch in the rivers during the spawning season has been on the increase. Neither is it reasonable to suppose that there will be a speedy return of these fish, when they are altogether unprotected during the time of breeding. There should be a close season, both in Nova Scotia and New Brunswick, during the spawing season. Were this done, there would soon be a return of this valuable fish. Shad sold readily at $\$ 12$ a barrel, shipped to Philadelphia, and re-sold at a profit, after paying duty and freight. This officer is of opinion that shad which go up our rivers are the parents of those caught in the bay. Doubtless, these shad stock some waters, and it seems natural they should return to their native haunts. Early in July, in the weirs set on the flats, there is quite a number of very small shad, some not more than 2 inches long, mixed with the large ones. These have evidently come from the riverf. Salmon are taken while fishing for shad. As that fishery closed much earlier this year, fewer salmon were taken. The close season for salmon has been pretty generally observed, and the overseer thinks that the number of those who would break the law is becoming smaller. There are now no fish-ladders in this division; formerly there were a number of the old style, which are all gone, and should be replaced.

## CUMBERLAND COUNTY.

Overseer A. M. Wills, Puguash says the smelt fishery in his division was almost a failure; not in quantity, but in size. The run was abundant, but the fish were too small for market. In many cases, nets raised contained from one to two tons of fish, and not one out of ten more than 4 inches in length. This shows that the regulation net of $1 \frac{1}{4}$ inch, extension measure, is valueless as a preventive against $8 a-2$
the taking of young or small smelts. The main abuses to the fisheries were caused by mill refuse, old trees and sawdust. All the oysters taken in this division were caught in Pugwash River, and men who were raking there reported acres of grounds in the river so covered with sawdust they could not get their rakes down. There are three fish-ways in this division-one at Doyle's mills, and two on the Shinimicas. That at Somer's mills is in good order, but the one in McPherson's mills is choked. A fishway is required in Comer's mill-dam, on the Pugwash River.

Overseer Wh. Murphy, Wallace, reports that canning lobsters began on the 5th May. Lobsters were then plentiful and of excellent quality. Some of the largest catches were made in May. During June, stormy weather and heavy winds caused the fish to leave the shore, and the result is a falling off of 8,200 cans from last year. Herring were abundant, and the catch about the same as last year. Smelts, a total failure; most of the fishermen not making enough to pay for their license. A great deal of dissatisfaction exists with regard to smelt licenses. Fishermen think it unjust that they should be compelled to pay license fees when wealthy lobster canners pay none. About the same quantity of oysters were taken as last year. Alewives were abundant, more so, in fact, than for the last twenty years; but very few can be taken with mesh nets, and seines are prohibited. Salmon appeared in September, when the river was high, and they passed right up over Rhindress and Seaman's dams in October.

GUYSBOROUGH COUNTY.
Overseer Jas. A. Tory, Guysborough, says that in his district fishing as a whole was fair, although in some portions, it fell short of other seasons. Smelt and eel fishing have become a new enterprise. The squid fishery is prosecuted for the purpose of supplying bait to bankers, and the demand has exceeded everything heretofore known. The Newfoundland Bait Act has no doubt been instrumental in increasing this demand. The fishery is carried on by means of traps, and in no other way can the fishing be made profitable. There will, therefore, probably be increased applications for trap licenses. Ice, too, is as necessary to the bankers as bait, and this has been another profitable source of trade. Mackerol were abundant, large and fat, averaging 140 to 160 to the barrel, and brought remunerative prices. More would have been taken, had fishermen been prepared with nets of a sufficently large mesh. Large bodies of small mackerel were scen on the shores, which bids well for the future. The falling off in the yield of herring seems to be generally attributed to a failure of the autumn catch. This season, nearly all the alewives were taken at sea along with the mackerel. There has been a falling off in the lobster catch, which will continne in a greater ratio year by year till that fishery is totally destroyed, unless protective measures are adopted. The increase in codfish and haddock may be accounted for by the fact that a larger number of persons were engaged therein, and as the prices were good, this led to a more general and determined prosecution of the fishery. Salmon and trout were scarce during the first part of the season, owing to the waters being low ; but as soon as the autumn rains came on, they ascended in considerable numbers. Rivers generally are clearof obstructions, excepting the milldams; most of these are at a considerable distance in the country, and are not so injurious as if nearer the coast. At the same time, proper and efficent fish-ways ought to be erected in every dam.

Overseer Allan McQuarrie, Sherbrooke, says there has been an increase in the smelt and mackerel catch. The latter, however, is far below that of former years. There was a decrease in salmon, trout, lobsters and herrings. Many tishermen are of opinion that the taking of fall herring, when full of spawn, and consequently the breaking up of schools when on their spawning grounds, is productive of most disastrous results. The returns show a falling off of nearly 50,000 cans of lobsters. Spring being cold and backward, the fish kept in deep water, making the season two or three weeks shorter than the average. There are almost insuperable difficulties in enforcing the regulations for the protection of lobsters. In the main, this officer believes that factories are not in sympathy with poachers; but some unscrupulous traders
encourage the poorer classes to violate the laws. If caught. they have nothing of any value to lose, and to imprison them is to enlist the sympathy of the community. Many fishermen favour a close season from the 10 th September, to continue as long as the weather will permit in the fall. This would enable them to attend to their farms, which remain neglected since the beginning of this fishery. Their fathers made more than half their living from the farms. Such a season might conflict with the interest of packers, but the interest of the fisherman is as important, if not more so. Codfish were abundant in the spring, but bait was scarce; and both fish and bait were scarce in the fall. The weather was rough and blustering, so that the average fall catch was unusually small. The inland fisheries were well protected. A decline in the yield of salmon is due to the ommission of vessels fishing in Labrador, which imported over 800 barrels of salmon in 1884. The fish-ways in this division are in good repair, and the new model placed in McKim's dam by Inspector R. Hockin is highly spoken of by the Wardens and others as being well adapted to the ingress and egress of fish and the saving of water. Warden John Smith reports having removed the obstructions at the head of Country Harbour rivers and that fish now have a clear passage from the tide to the grand lakes at the head. There are obstructions in Cooper's Brook, flowing into Wine Harbour, which should be removed. This could be done for about $\$ 40$ This stream is a favourite resort for smelts and trout. The beach at Indian Harbour has been kept well opened out this fall, at a moderate expense. There is a dam being built at the head of the tide on Gaspereaux Brook, where Mr. W. H. Himlow, the owner, proposes to excavate an artificial fishpass at the east end, which will answer every purpose, as there is a considerable fall from the dam to tidal water. During the year, there were taken in St. Mary's River some small salmon, apparently of a new species, and supposed to be from the hatchery on the Antigonish branch, Lochaber.

## halifax county.

Overseer John Fitzgerald, Portuguese Cove, reports that the decrease in Iobsters, as compared with last year, was caused by stormy weather in May. Mackerel and herring were abundant in summer, but fall fishing was a failure. Fishermen complain greatly on account of seine fishing amongst their nets, as destroying them. They also blame them for keeping mackerel from striking the shore.

Overseer Geo. Rowlings, Musguodoboit, reports that in the early part of the season codfish were abundant. Many more could have been taken, but the large majority of boat fishermen seem to prefer lobster fishing, and several of them are not prepared for anything else. Those who own vessels and fish about Prince Edward Island and in North Bay have all done well in the cod fishery, but they caught scarcely any herring or mackerel-indeed, not half enough for bait; and they had to use clams in large quantities. There were not so many alewives caught as last year. The decrease in the case of Lake Porter is explained by the fact that the outlet through the beach was filled up for a time, and in addition to the loss in alewives, it caused a loss in the catch of smelts, large quantities of which ascend every fall and are taken through the ice. Since the outlet has been re-opened and dipping stopped, there is every reason to believe that the fishery there will be as good as ever. Salmon fishering along shore did not yield an average catch. The reason is ascribed to so many mill dams with poor fish-ways, and so much dipping about them. This officer suggests that the natural passes at the end of Hill's dam, Musquodoboit River, and Anderson's, on the Petpeswick, be covered with strong lattice work, so as to prevent persons taking fish with dip nets. On Tangier River, which was one of the best for salmon, trout and alewives, there is a very good Rogers' ladder; but the outlet does not appear to be in the right place. Fish seem to go all about and under the dam, where they are dipped, and do not find the entrance to the fish-way. Lobster poaching was carried on to a large extent during the last two years, and it will take considerable money to stop it entirely. Traps are now set on trawl lines in such places as are hard to find; and the lobsters are boiled in large pots in out-of-the-way places, on islands. These places are changed from time to
time, and the canning is done at home. This overseer has come to the conclusion that it would be well to allow lobsters to be caught in October and if the fishermen found it was an injury to the fishery, they would more readily comply with the law. The sawdust law was not so well observed as the Department might have wished, but the largest portion was kept out of the water.

HANTS.
Overseer J. B. Colter, Milford, states that there were not so many fish caught in his division of the Shubenacadie River as last year, water being high when the different kinds of fish went up. Fish of all kinds were plenty, and a great run went into Grand Lake.

PICTOU.
Overseer $R$. Sutherland, River John, reports a fair fishing season; the lobster fishery being the principal one. This overseer asks that salmon fry be deposited in River John and Cariboo Rivers, where salmon abounded at one time previous to the building of dams without fish-ways. Oysters could also be cultivated there at a very small cost, as a trial was made a few years ago with good results.

Overseer A. O. Pritchard, of New Glasgow, reports a large run of salmon in East River, the most important stream of this district. The decrease in Middle and West Rivers he attributes to over-fishing for the purpose of procuring parent salmon for the hatchery. Illegal netting is almost entirely stopped; spearing is more difficult to cope with. Guardian Cummings was brutally assaulted in the performance of his duties, but one of the assailants was convicted and tined $\$ 20$. There is only one mill dam on East River, and as this is about to be removed, salmon will have uninterrupted access to the head waters.

## DISTRICT No. 3.

ANNUAL REPORT ON THE FISHERIES OF DISTRICT No. 3 OF NOVA SCOTIA, COMPRISING THE COUNTIES OF KING'S, ANNAPOLIS, DIGBY, YARMOUTH, SHELBURNE, QUEEN'S AND LUNENBURG, FOR 1890, BY INSPECTOR J. R. KINNEY.

Yarnouth, N.S., 31st December, 1890.
Honourable Charles H. Tupper, Minister of Marine and Fisheries, Ottawa.
Sir,-Herewith I have the honour to transmit the fishery returns of this district for the year now ended.

These returns exhibit a decrease in the number of vessels and tonnage employed in the fisheries as compared with the year 1889 :-

| No. of Vessels, 1889 | 399 | Tonnage..... | 25,406 |
| :---: | :---: | :---: | :---: |
| do 1890 | 362 | do . | 22,203 |
| Decrease | 37 |  | 3,203 |

There is an increase in value of production as compared with the previous year, of $\$ 76,866.06$.

> SALMON,
as compared with the yield of 1889 , shows a decrease of upwards of $27,000 \mathrm{lbs}$., or more than 25 per cent., which, taken with the falling off in 1889 , exhibits a state of affairs calling for urgent and intelligent inquiry. The take of 1890 is but 37 per cent. of the catch of 1888, at which rate of decrease the extinction of this fish would seem to be but a question of time. The departmental expenditure for fishways has not led to such good results as were anticipated, and without entering into a discussion of the merits or demerits of the several patented structures called fishpasses or fish-ladders, I cannot too strongly or urgently call your attention to what
is to me intelligently demonstrated, i.e., that any, and all known, devices for facilitating the up-stream progress of anadromous fishes are useless, unless constantly and carefully guarded during the spawning season. Of all the fish-ways in this district, I know of but three or four that are properly cared for. In more than one instance, as I have before pointed out, the fish-ways have assisted in making the streams non-productive. For instance, take the case of the lower dam on Salmon River, County of Digby, where there is a "patent" fish-ladder, built entirely below the dam, without any attempt at an auxiliary or wing-dam below. Before the creation of fish-ways and ladders, this stream was a noted salinon stream, but now the salmon and alewives have been "patented" out of existence. Happily, the lower dam on the Clyde River was so far demolished, that fish have now an unobstructed passage; hence the utility or non-utility of the fish-way at that dam is no longer a live question, as the structure is perfectly dry at all times. Jordan River is wholly destitute of fish-passes, excopting a simple opening at the lower dam.

## HERRINGS.

The catch of 1890 falls short of that of the preceding year by nearly 9,000 barrels. The reason for this I shall not attempt to give, further than to quote from the report of one of the Overseers, who says that this falling off is due to the fact that "there was a scarcity of these fish." There are, however, numerous complaints from the net fishermen that the lobster traps baited with stinking offal are driving herring and mackerel from our shores. As this real or imaginary grievance has become chronic in certain localities, it is unquestionably a subject for investigation. I have received instructions to report on this subject, and before so doing, I shall avail myself of all possible information; but, at the outset, I incline to the belief that all the lobster pots in Nova Scotia could not pollute one square mile of the Atlantic Ocean.

## ALEWIVES.

Had it not been for this fish, the shore cod-fishery would unquestionably have been a dead failure; it having supplied the preponderance of bait during the spring months for the shore fishing. Inasmuch as the catch of alewives in 1889 and 1890 show a marked increase when compared with previous years, it might be asked why these fish do not increase, or decrease in the same ratio as salmon? To this it may be answered that alewives do not offer the same temptation to the poacher as salmon. The latter being of more immediate value, are watched at every dam and in every lake, and are brutally killed on their spawning grounds.

## MACKEREL.

A year ago I thought that these fish were deserting our inshores, but appearances were misleading, as the past year's catch exceeds that of 1889 by so large a quantity that the excess closely approaches $\$ 400,000$ in value; thus saving this district from a deficit in the total yield. An outlay of several thousand dollars embarked in the spring mackerel fishery having become almost a total loss, fishermen dismayed by a staring deficit and placed in almost hopeless extremities, sought for a summer and autumn take by changing their grounds. In this, they were so far successful that several trap companies paid handsome dividends, and seiners were munificently repaid for their outlay.

## LOBSTERS.

In canned lobsters there is a decrease in the output, not due to scarcity of fish but to the fact that some packers became firightened into a closer compliance with the regulations. The export of live lobsters proved a remunerative business and there are indications that this branch of trade will be prosecuted on a still larger scale next season. The lobster regulations were not well observed; the high prices obtained proving too strong a temptation to the average fisherman and packers. How to remedy this evil is a difficult problem to solve. I am inclined to suggest
that the limit in size be reduced to 9 inches; that all canneries be licensed, and heavy penalties imposed for violating the regulations, such penalties to culminate for repeated infractions in a cancellation of the license. It is a physical impossibility for the present staft of outside officers to watch even a small percentage of the lobster fishermen, but as the fish ultimately reach the packer, it is there that I would concentrate efforts for a reform.

## CODFISH.

The total catch of cod shows a decrease of about 50,000 cwt., which is due to two causes, the first being a reduction in the fishing fleet of upwards of 3,000 tons, more than one-half' of which occurs in the County of Shelburne, where to financial disarrangements is charged the deficit; and the other being that herring were not obtainable for bait until the appearance of alewives. I send you herewith a synopsis of the important points touched upon by the several overseers in their annual reports.

> I have the honour to be, Sir, Your obedient servant, J. R. KINNEY. Inspector of Fisheries, District No. 3, Nova Scotia.

## SYNOPSES OF FISHERY OVERSEERS' REPORTS.

## ANNAPOLIS

Overseer W. M. Bailey says that the catch of herring was almost nothing, but that large quantities were observed off shore. The net tishermen believe that the continuous lines of lobster traps constantly hauled up and let down drive away other fish. The herring fishermen, who are more numerous than lobster catchers, feel that these complaints should be looked into. The sawdust law is fairly observed in the western part of this county. Fish-ways are much needed in certain parts, especially on the Nictaux River.

## DIGBY.

Overseer James A. Collins says that bad weather and scarcity of bait caused a falling oft in the take of line fish. The tishermen complain of lobster traps, alleging their injurious effects on the berring fisheries. Prices were good and the fishery regulations were generally observed.

Overseer J. W. Cossaboom says that line fishermen attribute their scanty fare to excessive trawling in St. Mary's Bay.
king's.
Overseer James S. Miller reports that the fishermen still complain of the lobstertraps, and that the year's business has been below the average, notwithstanding a decided improvement in the shad fishery. He has no complaints to make for violations of the regulations.

Overseer $R . F$. Reid states that a very general observance of the fishery regulations has been maintained. The catch of alewives largely exceeded that of the previous year, and these fish appeared to be in quantities as great, if not greater, than ever before since the stettlement of the country. The fish ladders of this district did good service in allowing the parent fish free passage to the spawning grounds.

## LUNENBURG.

Overseer David Evans, of Chester, reports that saln:on visited his district in larger numbers than for several years past, but that fewer men being engaged in this branch of the fisheries is the cause of the slight decrease in the annual catch. The
prices obtained have been more remunerative than for many years past. In short, the whole season proved exceptionaly prosperous. Mr. Evans suggests that no salmon nets be allowed after 10 th of June, as they interfere with other fishing pursuits.

Overseer C. E. Godard, of Bridgewater, says that the catch of fish in the La Have district was about the same as last season. Salmon now have free access to the upper reaches of La Have River through fish-passes.

Overseer W. M. Solomon, of Lunenburg, reports the number of vessels employed in his district as about the same as last year, the dozen or mere new vessels added to the fleet being nearly offset by sales and losses. There were fewer vessels built than for several years past. The bank fishermen did not do so well as last year; shore fishermen did better, their catch being greater than for several years past. Mr. Solomon says that about twenty years ago, Lunenburg vessels were employed in the Labrador cod-tishing, but that the introduction of trawling nearly ruined them. Last year very few vessels went there. These, however, did better than usual. He predicts an increase in the tonnage of vessels to be employed in this branch of the fishing industry. Referring to the lobster fishery, Mr. Solomon states that a fishery overseer, paying only occasional tisits to the canneries, cannot prevent the use of undersized fish, and that to effectually carry out the law, officers would have to be in each factory all the time.

## QUEEN'S.

Overseer John Fitzgerald reports an increase in the catch of mackerel and lobsters, but says he cannot commend the law abiding qualities of lobster catchers. He urges special protection for salmon on the spawning grounds, where there is every facility for evil disposed persons to slaughter them, and suggests an increase in the number of close days for the further protection of these fish.

## SHELBORNE.

Overseer W. J. McGill remarks that the shortage in the catch of eodtish in his division is due to business failures in the eastern section of the county. The arerage take is also smaller, but this is compensated for by an increase in prices obtained. The fall fishing proved a failure, owing to stormy weather. The large inshore and harbour catch of mackerel is attributed to the abundance of young alewives, on which, he says, mackerel greedily feed. Mr. McGill considers that the protective regulations have tended to increase the alewive catch, and he looks forward to a continued abundance of this fish, great numbers of the young herring have been seen in Shelburne Harbour.

Overseer E. S. Goudey reports that some of the local fishing vessels were during the past year put in the coasting trade, owing to the poor trips of the preceding year; hence, the take of live fish is small, when compared with the vessels and men employed, but, on the whole, there is a slight gain. He reports alewives plentier in Barrington River than for thirty years past. He also reports an increase of these fish on Clyde River, where there is no need of a fish-way, the dam having been demolished. Extensive preparations are being made for carrying on the live lobster trade.

## YARMOUTH.

Overseer John A. Hatfield reports increased activity in lobster fishing. This class of fishermen need constant watching; the remunerative prices obtained being a great temptation to catch undersized lobsters. The fish-ways are in good condition, the one at Carleton having been improved in such a manner as to work more effectually than before.

NOVA SCOTIA.-
Return showing the Number, Tonnage and Value of Vessels and Boats engaged in and the Total Number of Men Employed, \&c., in the


DISTRICT No． 1.
the Fisheries，Quantity and Value of Fishing Material，Kinds and Quantities of Fish， Province of Nova Scotia，for the Year 1890.

| Kinds of Fish． |  |  |  |  |  |  |  |  |  |  |  |  | Fish Pronects． |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Herrings, smoked, in boxes. |  |  |  |  |  |  |  |  |  |  |  |  |  | Fish used as bait, barrels. | Valce． |
| 125 865 |  | 72 5 | 250 1190 |  | 25 127 | 300 5500 | 6 | 1000 300 | 2000 1500 |  | 6 | ｜．．．． | 125 595 | 6 51 | 62 298 |  |
| 240 |  | 10 | 295 |  | 20 | 1800 |  | 1500 | 1800 |  |  |  | 148 | 4 | 74 | 3，223 20 |
| 510 |  |  | 90 |  | 5 |  |  | 400 |  |  |  | 15343 | 45 | 2 | 22 | 5，286 76 |
| 250 | 120 | 75 | 33 |  |  | 500 |  | 2200 |  | 33 |  |  | 15 |  | 8 | 2，690 50 |
| 270 |  | 8 | 1660 |  | 215 |  |  |  |  |  |  | 114320 | 900 |  | 200 | 25，634 40 |
| 84 |  |  | 180 |  | 125 |  |  |  |  |  |  |  | 150 |  | $80_{i}$ | 2，456 00 |
| $480$ |  | 16 | 2400 |  | 400 |  |  |  |  |  |  | 24000 | 1200 |  | 260 | 19，522 60 |
| 490 |  | 10 | 2400 |  | 500 |  |  | 50. |  |  |  |  | 1200 |  | 260 | 16，312 00 |
| 230 |  |  | 960 |  | 180 |  |  |  |  |  |  |  | 480 |  | 150 | 7，327 00 |
| 100 |  |  | 360 |  | 100 |  |  |  |  |  |  |  | 180 |  | 100 | 3，402 00 |
|  |  | 20 |  |  |  |  | 7 | 100 | 500 |  |  |  |  |  |  | 25000 |
| 100 |  | 10 | 60 |  |  |  |  | 150 | 300 |  |  |  | 30 |  | 6 | 78900 |
| 1100 |  |  | 680 |  |  |  |  | 800. |  | 14 | 10 |  | 127 |  | 23 | 7，455 30 |
| 770 |  | 21 | 3620 |  | 378 | 5460 |  | 800 |  | 34 |  | 55481 | 704 |  | 249 | 26，623 32 |
| 320 |  | 30 | 560 |  | 15 | 1200 |  | $150$ | $1200$ | 12 |  | 5581 | 81 |  | 22 | 4，34740 |
| 75. |  |  | 465 |  |  |  |  | 1030 | 2600 | 8 |  |  | 82 |  | 18 | 2，590 80 |
| 410 |  | 6 | 1775 |  | 225 | 4200 |  |  |  | 6 |  | 26500 | 1025 |  | 250 | 17，176 00 |
| 650 |  | 10 | 1600 | 10 | 240 | 6720 |  |  | 600 |  |  |  | 950 |  | 160 | 14，151 00 |
| 200 |  | 8 | 2000 | 10 | 60 | 6600 |  |  |  |  |  | 2400 | 1300 |  | 110 | 11，713 00 |
| 7269 | 120 |  | 20515 | 30 | 2615 | 34280 | 13 | 8480 | 21350 | 225 |  | 242428 | 9337 | 63 | 2352 | 190，051 26 |

Return showing the Number: Tonnage and Value of Vessels and Boats engaged in

the Fisheries, Quantity and Value of Fishing Material, de.-Nova Scotia-Con.


Return showing the Number, Tonnage and Value of Vessels and Boats engaged in

| Distrier. | Vegsels and Boats Employed in Fishing. |  |  |  |  |  |  | Fishing: Material. |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Vessels. |  |  |  | Boat. |  |  | Nets. |  |
|  |  |  |  |  |  |  |  |  |  |
|  | $\stackrel{\circ}{z}$ | 安 | $\stackrel{\text { ¢ }}{\stackrel{\text { ® }}{\sim}}$ | ${ }_{\text {y }}^{\text {y }}$ | \% | $\xrightarrow{\text { ¢ }}$ | ${ }_{\text {en }}^{\text {¢ }}$ | 成 | $\xrightarrow[\text { ¢ }]{\text { ¢ }}$ |
| Richmond Co. |  |  | 8 |  |  | 8 |  |  | 8 |
| Arichat...... | 3 | 100 | 1600 700 | 30 | 80 | 1000 1000 | 150 | 70000 40000 | 8000 |
| Petit de Grat | 2 | 90 | 760 | 14 | 200 | 2000 | ${ }_{200}$ | 90000 | 10000 |
| Cape au Guet. |  |  |  |  | 70 | 800 | 180 | 60000 | 80000 |
| Port Royal. | 2 | 40 | 900 | 12 | 14 | 400 | 24 | 20000 | 3000 |
| D'Escousse. | 20 | 900 | 20000 | 300 | 40 | 150 | 90 | 50000 | 7000 |
| Polimand.. | 2 | 90 | 2200 | 24 | 10 | 100 | 20 | 1000 | 4000 |
| Port Richmond. | 4 | 180 | 4000 | 40 | 10 | 100 | 20 | 1000 | 4000 |
| Cape LeRond. | 1 | 45 | 800 | 15 | 40 | 400 | 60 | 5000 | 3000 |
| Rocky Bay. |  |  |  |  | 40 | 650 | 80 | 8000 | 4000 |
| Little Anse |  |  |  | ${ }^{\text {a }}$ | 50 | 800 | 100 | 8000 | 4000 |
| Gros Nez.... | 1 | 40 | 600 | 10 | 60 | 90 | 100 | 8000 | 4000 |
| River Inhabitants. | 3 | 120 | 1900 | 18 | 20 | 200. | 20 | 9050 | 5000 |
| Black River....... |  |  |  |  | 20 | 200 | 20 | 900 | 400 |
| Lower d'Escousse... | 6 | 1800 | 3000 | 60 | 40 | 200 | 80 | 1000 | 500 |
| Martinique and Lennox Pa |  |  |  |  | 12 | 400 | 20 | 1000 | 500 |
| Fourchu. ........ ........ | 2 | 42 | 1100 | 7 | 20 | 765 | 60 | 2800 | 420 |
| Framboise |  |  |  |  | 15 | 375 | 45 | 3040 | 454 |
| St. Esprit. |  |  |  |  | 5 | 100 | 10 | 1400 | 280 |
| I'Archeveque. |  |  |  |  | 9 | 180 | 18 | 2520 | 504 |
| Grand River. |  |  |  |  | 29 | 580 | 58 | 10440 | 2088 |
| Point Michaud |  |  |  |  | 14 | 225 | 27 | 2500 | 700 |
| L'Ardoise. . | 1 | 15 |  | 5 | 270 | 5100 | 560 | 14600 | 12890 |
| St. Peter's Island. |  |  |  |  | 60 | 1250 | 120 | 7500 | 4180 |
| St. Peter's.. | 4 | 88 | 1200 | 22 | 40 | 650 | 80 | 12000 | 2000 |
| River Bourgeois.... | 22 | 551 | 11000 | 175 | 17 | 200 | 20 | 2200 | 1100 |
| Totals. | 75 | 4161 | 49850 | 744 | 1276 | 17915 | 2308 | 431860 | 166929 |

the Fisheries, Quantity and Value of Fishing Material, \&e.-Nova Scotia.-Con.

*Amount used for home consumption, not included above.

Return showing the Number, Tonnage and Value of Vessels and Boats engaged in

the Fisheries, Quantity and Value of Fishing Material, \&e.-Nova Scotia-Con.


## RECAPITULATION

Of the Yield and Value of the Fisheries for the Island of Cape Breton, for the Year 1890.

| Kinds of Products. |  | Quantities. | Rate. | Value. |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | 8 cts. | 8 cts . |
|  |  |  |  |  |
| do fresh, in ice | Lbs. | 80,914 | ${ }_{0} 20$ | 16,182 80 |
| do preserved. | Cans. | 6,036 | 015 | 90540 |
| do smoked... | Lbs. | 150 | 020 | 3000 |
|  |  |  |  |  |
| do | Cans. | 24,600 | 012 | 2,952 00 |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Cod, dried. | Cwt. | 170,065 | 400 | 680,260 00 |
|  |  |  |  |  |
| Hake and Pollock. ..... | Cwt. | 1,590 | 400 | 6,360 00 |
|  |  |  |  |  |
| Haddock. | Cwt. | 21,992 | 400 | 87,96800 |
|  |  |  |  |  |
| Shad. | Brls. | 13 | 1000 | 13000 |
|  |  |  |  |  |
| Squid. | Brls. | 4,428 | 400 | 17,712 00 |
|  |  |  |  |  |
| Eels | Brls. | 1,379 | 1000 | 13,790 00 |
|  |  |  |  |  |
| Lousters. | Cans. | 2,078,906 | 012 | 249,468 72 |
| Fish Oil.. . .......................... ....... ..... Gals. 44,322 年 40 17,728 80 |  |  |  |  |
| do Guano. | Tons. | 63 | 2500 | 1,575 00 |
|  |  | 7,942 | 150 | 11,91.3 00 |
|  |  | 1,870 | 050 | 93500 |
| do used for home consumption in Richmond County......... . |  |  |  | 22,500 00 |
| Total |  |  |  | 1,510,575 92 |

Comparative Statement of the Value of Fisheries for the Four Counties of the Island of Cape Breton, for, the Years 1889 and 1890.

| Counties. | 1889. | 1890. | Decrease. | Increase. |
| :---: | :---: | :---: | :---: | :---: |
|  | 8 cts. | 8 cts. | 8 cts. | s cts. |
| Cape Breton | 195,293 70 | 190,051 26 | 5,242 44 |  |
| Inverness... | 378,326 54 | 377,339 12 | 98742 |  |
| Richmond. | 566,346 80 | 753,732 36 |  | 189,385 56 |
| Victoria | 242,612 30 | 187,453 18 | 25,159 12 |  |
| Total | 1,382,579 34 | 1,510,575 92 | (61,388 98 | 189,385 56 |
| Increase |  |  |  | 127,996 58 |

Table showing the Number and Value of Vessels and Boats, Nets and Seines, \&c., engaged in the Fisheries of the Island of Cape Breton, and the Approximate Estimates of the Value of other Material not included in the Returns for 1890.

| Material. | Value. | Total. |
| :---: | :---: | :---: |
|  | $s$ | 8 |
| 103 vessels--5,000 tons. | 71,140 |  |
| 3,754 boats. .... ... | 83,400 |  |
| 676,775 fathoms of nets. | 284,216 |  |
| Canning establishments.... | 58,200 |  |
| Seines, not included in returns | 5,420 |  |
| Lobster traps.. | 32,500 |  |
| Hand lines, trawls, \&c | 34,100 |  |
| Steamers, smacks, punts, canoes, \&c. | 14,300 |  |
| Fishing piers, houses and other sundries. | 58,000 | 202,520 |
| Total |  | 641,266 |

NOVA SCOTIA,
Return showing the Number, Tonnage and Value of Vessels and Boats engaged in and the Total Number of Men Employed, \&c., in the


## DISTRICT No. 2.

the Fisheries, Quantity and Value of Fishing Material, Kinds and Quantities of Fish, Province of Nova Scotia, for the year 1890.

$8 a-3 \frac{1}{2}$

Return showing the Number, Tonnage and Vaiue of Vessels and Boats engaged in

the Fisheries, Quantity and Value of Fishing Material, de.-Nova Scotia-Con.


Retorn showing the Number, Tonnage and Value of Vessels and Boats Engaged in

the Fisheries, Quantity and Value of Fishing Material, \&c.-Nova Scotia-Con.


Return showing the Number, Tonnage and Value of Versels and Boats engaged in

the Fisheries, Quantity and Value of Fishing Material, de.-Nova Scotia-Con.


Return showing the Number, Tonnage and Value of Vessels and Boats engaged in

the Fisheries, Quantity and Value of Fishing Material, \&e-Nova Scotia-Con.


Recapitulation of the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, Quantity and Value of Fishing Material, Kinds and Quantities of Fish, and the Total Number of Men Employed, \&c., in District No. 2, Province of Nova Scotia, for the Year 1890.


Recapitulation of the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, Nova Scotia-Concluded.


## RECAPITULATION

Of the Yield and Value of Fisheries in District No. 2, Nova Scotia.

| Kinds of Products. |
| :---: |

Comparative Statement of Value of Fisheries in eách County of District No. 2, Nova Scotia, for the Years 1889 and 1890.

| Counties. | 1889. | 1890. | Increase. | Decrease. |
| :---: | :---: | :---: | :---: | :---: |
|  | \$ | 8 | \$ | \$ |
| Antigonish | 101,773 | 81,720 |  | 20,053 |
| Colchester.. | 9,212 | 10,209 | 994 |  |
| Cumberland.. | 54,121 | 48,115 |  | 6,006 |
| Guysborongh | 404,173 | 457,682 | 53,909 |  |
| Halifax. ... | 640,922 | 728,246 | 87,324 |  |
| Hants... | 12,378 | 6,870 |  | 5,508 |
| Picton. | 145,576 | 120,176 |  | 25,400 |
| Total.... | 1,368,1555 | $1,453,015$ | $141,827$ | 56,967 |
| Increase. |  | 84,860 | 84,860 |  |

[^3]Comparative Statement of Increase and Decrease of the Several Products of the Fisheries in District No. 2, Nova Scotia, for the Years 1889 and 1890.

| Kinds of Products. |  | Increase. | Decrease. |
| :---: | :---: | :---: | :---: |
| Salmon, pickled | Brls. |  | 311 |
| do fresh, in ice | Lbs. |  | 109,917 |
| do smoked........ | Lbs. |  | 4,639 |
| do preserved, in cans. | Lbs. | ${ }_{3}^{214}$ |  |
| Mackerel, pickled do preserved in cans | Brls. Lbs. | 3,388 | 35,240 |
| Herring, pickled..... | Brls. | 2,405 |  |
| do smoked. | Boxes | 275 |  |
| Alewives, pickled | Brls. |  | 2,174 |
| Cod, dried. | Cwt. | 16,672 |  |
| Cod Tongues and Sounds | Brls. | 156 |  |
| Pollock, dried. | Cwt. | 51 |  |
| Hake, dried. | Cwt. |  | 8,228 |
| Hake Sounds | Lbs. |  | 4,469 |
| Haddock, dried | Cut. | 3,061 |  |
| Halibut. ..... | Lbs. |  | 77,474 |
| Shad.. | Brls. | 221 |  |
| Bass | Lbs. |  | 22,564 |
| Trout. | Lbs. |  | 7,178 |
| Squid | Brls. | 4,176 |  |
| Smelts. | Lbs. |  | 53,53.5 |
| Eels | Brls. | 179 |  |
| Oysters.... | Brls. | 299 |  |
| Lobsters... | Cans. |  | 105,394 |
| Fish Oil | Galls. |  | 4,957 |
| do Guano. | Tons. |  | 200 |
| do used as bait | Brls. | 1,337 |  |
| do used as manure. | Brls. |  | 3,033 |

Table showing the Number and Value of Vessels, Boats, Nets and Weirs, engaged in the Fisheries of District No. 2, Nova Scotia, and Approximates of other Material not included in the Returns.

| Articles. | Value. | Total. |
| :---: | :---: | :---: |
|  | 8 | 8 |
| 110 vessels, 2,574 tons... | 77,510 | 513,414 |
| 5,592 boats . $\ldots$....... | 130,027 |  |
| 1,368,167 square fathoms of nets. | 302,552 |  |
| 14 werrs ... | 3,325 |  |
| Canming establishments. | 148,000 |  |
| Lobster traps and nets... | 94,328 |  |
| Ice houses for bait..... | 20,000 |  |
| 4,418 seines (not included in above). | 117;920 |  |
| Total. |  | 893,662 |
|  |  | 830,032 |

Return showing the Number, 'Tonnage and Value of Vessels and Boats engaged in and the Total Number of Men Employed, de., in the

| District. | Vessels <br> ann Boats Employen in Fishing. |  |  |  | Fishing Mattrial. |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Vessels. |  | Boats. |  |  | Nets. |  | Weirs. |  |  |  | - |
|  |  |  | $\dot{8}$ | $\frac{\stackrel{y y}{\leftrightarrows}}{\stackrel{y y}{\pi}}$ | 豆 | $\stackrel{\dot{\Delta}}{\underset{y}{c}}$ |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  | 荮 |  |
| Annapolis Co. |  | \$ |  | 8 |  |  | 8 | 8 |  |  |  |  |
| Margaretville | $4 \quad 59$ | 177016 | 14 | 920 | 28 | 2100 | 1050 |  | 1(9) |  | 150 | 420 |
| Port (ieorge... |  |  | 14. | 280 | 20 | 1400 | 7002 | 300 | 2300 | 20 | 20 |  |
| Port Lorne and Hampton. | 116 | 480. 3 | 26 | 520 | 40 | 4000 | 2000 |  |  |  | 100 |  |
| Phinney's Cove. . |  |  | 12 | 240 | 14 | 1200 | 600 |  |  |  | 192 |  |
| Parker'sand Young's Cove |  |  | 34 | 1880 | 31 | 2000 | 1000 |  |  |  | 110 |  |
| Litchfield and Hillsboro. | $1{ }^{76}$ | 228014 | 19 | 380 | 46 | 1140 | 570 |  |  |  | 40 |  |
| Thorne's Cove and Gut. . | 4150 | 4650.30 | 45 | 900 | 70 | 2700 | 1350 |  |  |  | 10 |  |
| Thorne's Cove to Ferry. . |  |  | 10 | 175 | 14 |  | ... 3 | 300 |  |  |  |  |
| South side Basin....... East side Basin. | 230 | 9006 | 23 | 540 | 45 | 500 | 250 5 | 1200 | 2000 | 10 | 5 | 3000 |
| Lequille River. |  |  |  |  |  |  |  |  | 450 |  |  |  |
| Round Hill River. |  |  |  |  |  |  |  |  | 340 |  |  |  |
| Inland Lakes. |  |  |  |  |  |  |  |  |  |  |  |  |
| Totals. | 12336 | 1008069 | 197 | 4635 |  | 15040 | 752010 | 1800 | 5190 |  | 627 | 6020 |

District No. 3 .
the Fisheries, Quantity and Value of Fishing Material, Kinds and Quantities of Fish, Province of Nova Scotia, for the Year 1890.

| Kinios of Fish. |  |  |  |  |  |  |  |  |  |  | Fish Pronucts. |  |  |  | Valce. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  | 圱 |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 8 cts. |
|  |  |  | 127 |  | 44 | 2700 |  |  |  |  | 120 |  | 25 | 500 | 4,108 00 |
|  |  | 1 | 25 |  | 15 | 800 |  |  |  |  | 55 |  | 5 | 265 | 1,924 50 |
|  | 310 | 5 | 160 | 160 |  | 3500 |  |  |  |  | 140 |  | 27 | 400 | 4,921 00 |
|  | 76 |  |  | 20 | 38 | 250 |  |  |  |  |  |  | 4 | 262 | 1,862 00 |
|  | 300 | 5 | 80 | 160 | 105 | 700 |  |  |  |  | 200 |  | 20 | 410 | 4,535 00 |
|  |  | 7 | 108 | 490 | 980 | 2000 |  |  |  |  | 500 | 800 | 38 | 340 | 11,422 00 |
|  | 2100 | 10 | 600 | 280 | 2460 | 15000 |  |  |  |  | 700 | 260 | 40 | 1010 | 26,855 00 |
|  | 20 | $\cdots$ | ${ }^{6}$ | $\cdots$ | 25 |  |  |  |  |  |  | 70 |  | 10 | 93900 |
|  | 400 | 3 | 125 | 40 | 314 | 5000 |  |  |  |  | 200 |  | 10 | 220 | 6,176 00 |
|  |  |  |  |  |  |  | 20 |  |  | 10 |  |  |  |  | 1,090 00 |
|  |  |  |  |  |  |  |  |  |  | 6 |  |  |  |  | 46000 15800 |
|  |  |  |  |  |  |  |  |  | 8000 | 10 |  |  |  |  | 90000 |
| 100 | 3905 | 35 | 1231 | 1150 | 3981 | 29950 | 20 | 2500 | 9200 |  | 1915 | 1130 | 169 | 3417 | 65,350 50 |
| Lobsters sold alive, 52,600, at 4 cts..... ........... 2,10400 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 67,454 50 |

Return showing the Number, Tonnage and Value of Vessels and Boats engaged in

the Fisheries, Quantity and Value of Fishing Material, \&c.-Nova Scotia-Con.

Kinds of Fish.


Return showing the Number, 'Tonnage and Value of Vessels and Boats engaged in

the Fisheries, Quantity and Value of Fishing Material, \&c.-Nova Scotia-Con.


Return showing the Number, Tonnage and Value of Vessels and Boats engaged in

the Fisheries, Quantity and Value of Fishing Material, \&c.-Nova Scotia-Con.


Return showing the Number, Tonnage and Value of Vessels and Boats engaged in

the Fisheries, Quantity and Value of Fishing Material, \&c.-Nova Scotia-Con.


Return showing the Number, Tonnage and Value of Vessels and Boats engagerl in

the Fisheries, Quantity and Value of Fishing Material, \&e.-Nova Scotia-Con.

| Kiniss of Fish. |  |  |  |  |  |  |  |  |  |  |  |  | Fish <br> Pronucts. |  | Valce. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | $\begin{aligned} & \dot{3} \\ & \text { B } \\ & \stackrel{5}{5} \\ & 0 \end{aligned}$ |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  | 迺 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 8 ets. |
| 25 |  | 100 | 650 | 2490 | 130 | 350 | 2000 | 500 |  |  | 55 |  | 1600 | 1800 | 19,920 00 |
| 212 |  | 500 |  | 600 | 20 | 88 | 8000 |  |  |  |  | 100272 | 400 | 3300 | 25,954 64 |
| 130 |  | 200 |  | 810 | 100 | 225 | 6000 |  |  |  |  |  | 300 | 310 | 8,475 00 |
|  | 2880 | 137 |  | 246 | 35 | 100 | 1000 |  |  |  |  | 54096 | 95 | 350 | 9,658 52 |
| 1231 |  | 1048 |  | 12500 | 230 | 2850 | 78700 |  | 40 |  |  | 25000 | 5000 | 5200 | 105,707 00 |
| 12 |  |  |  | 3562 |  |  |  |  |  |  |  |  | 5857 | 1340 | 33,368 80 |
|  |  |  |  | 1266 | 300 | 325 | 2000 |  |  |  | 25 |  | 1060 | 375 | ?,120 50 |
|  |  | 125 |  | 1050 | 49 | 150 | 3000 |  |  |  |  |  | 700 | 390 | (6,625 00 |
| 125 |  | 1000 |  | 2800 | 275 | 875 | 3300 |  |  |  |  |  | 2700 | 600 | 23,985 00 |
|  |  |  |  | 16 |  |  |  |  |  |  |  |  |  |  | 2,039 09 |
| 33 |  | -95 | 25 | 830 |  | 128 |  |  |  |  | 10 | .. | 200 | 20 | 5,165 50 |
|  |  |  |  | 836 | 22 | 826 |  |  |  |  |  |  | 705 |  | 10,408 00 |
| 28 |  | 602 | 25 | 760 | 140 | 731 |  |  |  |  |  | 7680 | 805 |  | 10,708 10 |
| 35 |  | 1238 | 75 | 485 | 87 | 365 |  |  |  |  | - |  | 392 | 40 | 9,80930 49660 |
| 67 |  | 1550 | 100 | 7239 | 12 | 291 |  | 4000 |  |  |  | 25000 | 2870 | 130 | 42,66600 |
| $15$ |  | $535$ | ... | 4244 366 | 30 8 | 215 |  |  |  | 5000 |  | 28608 | 1463 80 | . . | 25,53916 6,14400 |
| 150 |  | 2200 | 4 | 23000 | 100 | 1600 | 40000 | 1500 |  |  |  |  | 8000 |  | 115,042 50 |
| 2173 | 2880 | 11140 | 1270 | 63100 | 5029 | 10120 | 147000 | 6000 | 40 | 5000 | 90 | 240656 | 32317 | 13875 | 476,33602 |

Lobsters, sold and exported alive, $1,014,300$, at 4 c
76,572 00
Mackerel, exported fresh, 770,900 , at 6 c .
46,25400
Herrings, canned, 6,336 lbs., at 10c.

Return showing the Number, Tonnage and Value of Vessels and Boats engaged in


[^4]the Fisheries, Quantity and Value of Fishing Material, \&e.-Nova Scotia-COn.


Recapitulation of the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, Quantity and Value of Fishing Material, Kinds and Quantities of Fish, and the Total Number of Men Employel in District No. 3 of the Province of Nova Scotia, for the Year 1890.


Recapitulation of the Number, Tonnage and Value of Veasels and Boats engaged in the Fisheries, dc.-Nova Scotia-Concluded.


## RECAPITULATION

Of the Yield of the Fisheries for District No. 3, Nova Scotia, 1890.

| Kind of Products. |  | Quantities. | Rate. | Value. |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | 8 cts. | 5 cts. |
| Alewives, pickled. | Brls. | 13,222 | 450 | 59,499 00 |
| do smoked | No. | 130,000 | 80c. p. 100 | 1,040 00 |
| Bass | Lbs. | 2,500 | 006 | 150 00 |
| Clams | Brls. | 80 | 700 | 56000 |
| do | Cans. | 6,090 | 012 | 72000 |
| Cod, dried. | Cwt. | 376,755 | $+00$ | 1,507,020 00 |
| Eels..... | Brls. | 614 | 1000 | 6,140 (1) |
| Fish oil. | Galls. | 175,405 | 040 | 70,162 00 |
| do guano. | Tons. |  | 3500 | 7,14000 |
| do used as bait. | Brls. | 36,464 | 150 | 54,69600 |
| do used as manure. |  | 16,338 | 050 | 8.16909 |
| Haddock, dried. . | Cwt. | 79,767 | +00 | 319,068 00 |
| do fresh. | Lbs. | 400,000 | 004 | 16,000 00 |
| do smoked. |  | 158,000 | 1) 08 | 12,640 00 |
| Hake, dried. | Cwt. | 51,358 | 400 | 205,432 00 |
| do Sounds | Lbs. | 20,574 | 100 | 20,57400 |
| Halibut. |  | 606,995 | 010 | 60,699 50 |
| Herring, pickled | Brls. | 47,858 | +00 | 191,43200 |
| do snooked. | Boxes | 15,180 | 025 | 3,795 00 |
| do preserved | Cans. | 6,336 | 010 | -633 60 |
| Lobsters, do |  | 809,031 | 012 | 97,083 72 |
| do shipped alive | Tons. | 3,612 | 3500 | 126,420 40 |
| do do | No. | 2,102,400 | 004 | 84,096 00 |
| Mackerel, pickled and fresh | Brls. | 35,522 | 1500 | 532, 83000 |
| do shipped fresh | No. | 770,900 | 006 | 46,2:54 00 |
| do preserved. | Cans. | 33,880 | 015 | 5,082 00 |
| Pollock, dried . . . . | Cwt. | 49,168 | 400 | 196,672 00 |
| Salmon, sold fresh | Lbs. | 59,908 | $\bigcirc$ | 11,981 60 |
| do smoked. |  | 840 | 020 | 16800 |
| Scallops | Doz. | 600 | (1) 50 | 30000 |
| Shad.. | Brls. | 838 | 1090 | 8,38000 |
| Smelts | Lubs. | 89,790 | 006 | 5,387 40 |
| Squid. | Brls. | 897 | 400 | 3,488 00 |
| Tongues and Sounds. |  | 641 | 1000 | 6,410 00 |
| Trout .......... | Lbs. | 26,309 | 010 | 2,630 90 |
| Total |  |  |  | 3,672,753 72 |

Table showing the Number and Value of Vessels and Boats, Nets and Weirs engaged in the Fisheries of District No. 3 of Nova Scotia, and an Approximate Estimate of other Material not included in the Returns.


Recapitulation by Counties, showing the Number, Tonnage and Value of Vessels engaged in the Fisheries, Quantity and Value of Fishing Material, Kinds and Quantities of Fish, and the Total Number of Men Employed, \&c., in the Whole Province of Nova Scotia, for the Year 1890.


Recapitulation by Counties, showing the Number, Tonnage and Value of Vessels, \&e.-Nova Scotia--Concluded.


[^5]
## RECAPITULATION

Of the Tield and Talue of the Fisheries of the whole Province of Nova Scotia, for the Year 1890.

| Kinds of Fish. | Prices. | Quantity: | Value. | Total. |
| :---: | :---: | :---: | :---: | :---: |
|  | $s$ cts. |  | s cts.' | 8 cts. |
| Salmon, pickled. | ${ }^{1} 1600$ | 2,042 | 32.67200 |  |
| do fresh... | 020 | 287,722 | $57,5 \pm 440$ |  |
| do smoked. | 920 | 2,892 | - 5780 |  |
| do cans... | 015 | 8,032 | '1,205 40 |  |
| Mackerel. | 1500 | 70,509 | 1,057,135 00 |  |
| do cans. |  | 91,408 | 11,985 00 |  |
| do fresh | 006 | 770,090 | 46,20t 00 |  |
| Herring . | 409 | 126,0.94 | 504,216 09 |  |
| do smoked | 025 | 17,160 | 4,29000 |  |
| do cans... | 010 | (6,336 | 63380 |  |
| Alewives | 480 | 21,448 | 96,516 09 | ,19 |
| do smoked | 80c. 1. 100 | 130,000 | 1,040 00 |  |
| Cod | 400 | 607, 904 | 2.431,61.16 00 |  |
| do Tongues and Sounds. | 1000 | 1,3\%\% | 13,550 00 |  |
| Haddock | 400 | 110,17t | 440,6! 100 | 2,1处 |
| do fresh | 004 | 400,000 | 16,000 00 |  |
| do smoked. | 008 | 158,000 | 12,640 00 |  |
| Pollock | 400 | 4!, 428 |  | $\begin{aligned} & 469,33900 \\ & 197,71200 \end{aligned}$ |
| Hake.. | 400 | 59,335 | 237,40000 |  |
| do Sounds | 100 | 30,103 | 30,103 00 |  |
| Halibut | 010 | 685.659 | -.... ....... | $\begin{array}{r}26,543400 \\ 68,765 \\ \hline 00\end{array}$ |
| Bass... | 006 | 11,575 |  | 69500 |
| Trout. | 006 | 147, 941 |  | 14,794 10 |
| Smelts. | 006 | 421,740 |  | 25,304 40 |
| Shad | * | 1.607 |  | 15,314 00 |
| Eels. | 10 09) | 3,242 |  | 32,42000 |
| Squid | 400 | 13,039 |  | 52,05600 |
| Oysters. | 300 | 3,013 |  | 9,039 09 |
| Clams. |  |  |  | 1,280 00 |
| Scallops. |  | ${ }^{600}$ |  | 30000 |
|  | 012 |  |  |  |
| do alive, \&c |  | - 3,632 | 126,920 00 |  |
| do do |  | 2,102,400 | 84,096 00 |  |
| Fish Oil | 040 | 269,418 |  | 107,766 80 |
| Fish used as Bait. | 150 | 57,594 |  | 86,332 00 |
| do Manure. | 050 | 19,208 |  | 9,61400 |
| Fish Guano.. ........ ............... Tons. <br> Home Consumption in Halifax and Richmond County not included above. |  |  |  | 8,715 00 |
|  |  |  |  | 59,300 00 |
| $\begin{gathered} \text { Total for } 1890 . \\ \text { do } 1889 . \end{gathered}$ |  |  |  | 6,636,444 64 |
|  |  |  |  | 6,346,722 00 |
| Increase. |  |  |  | 289,-22 64 |

[^6]$8 a-5 \frac{1}{2}$

Table showing the Value of Vessels, Boats, Nets, \&c.. engaged in the Fisheries of Nova Scotia, with an Approximate Value of other Fishing Material, for the Year 1890.

| Articles. | Value. | Total. |
| :---: | :---: | :---: |
|  | \$ | \$ |
| 597 vessels, 31,077 tons. | 1,412,645 |  |
| 13,693 boats.. .... .. | 320,426 |  |
| 3,130,394 fathoms of nets. | 763,160 |  |
| 3,118 weirs........... | 53,025 |  |
| Seines.... | 139,040 |  |
| Camming establishments., | 252,480 |  |
| Lobster traps............ | 162,828 |  |
| Trawls, hand lines, \&c. | 34,100 |  |
| Steamers, smacks, \&c. . | 25,500 |  |
| Smoke houses.... | 2,106 |  |
| Ice houses. | 20,000 |  |
| Fishing piers, \& ${ }^{\text {c }}$. | :8,000 | 139,706 |
| Total. |  | 3,243,310 |

Statement of Men Employed in the Fishing Industry.

|  | Description. | Number. |
| :---: | :---: | :---: |
| Sailors |  | 6,396 |
| Boat fishermen |  | 21,288 |
|  |  | 27,684 |

## APPENDIX B.

## NEW BRUNSWICK.

District No. I, comprising the County of Charlotte.

Inspector, J. H. Pratt, St. Andrews.

District No. 2, comprising the Counties of Ristigouche, Gloucester, Northumberland, Kent and Westmoreland.-Inspector, R. A. Chapman, Moncton.

District No. 3, comprising the Counties of Albert, St. John, King's, Queen's, Sunbury, York, Carleton and Victora.-Inspector, D. Morrow, Oromocto.

## DISTRICT No. 1.

REPORT ON THE FISHERIES OF DISTRICT No. 1, NEW BRUNSWICK, FOR 1890, BY INSPECTOR J. H. PRATT.

St. Andrews, N.B., 31st December, 1890.

## Hon. Charles H. Tupper. <br> Minister of Marine and Fisheries, Ottawa.

Sir,-I have the honour to submit the following as my second annual report of the fisheries of District No. 1, Province of New Brunswick, for the year ending 31st December, together with the usual statistics and reports of the several officers under my supervision.

STATISTICAL RETURNS.
These returns, I regret to report, show a slight decrease in the catch and value of the fisheries, the relative difference between the years 1889 and 1890 being :-

| Value of product, 1889. | \$1,373,589 26 |
| :---: | :---: |
| do 1890.. | 1,062,756 10 |
| A decrease of. | 310,833 16 |

This deficit is to be found in the decreased catch of large herring, which last winter were unusually late in "striking" our shores, and when they did strike in, the large arrivals of frozen herring from Newfoundland had filled the United States markets, dropping prices down to a very low figure. Many fishermen, in consequence, did not engage in this branch of the fisheries. During the summer season, herring suitable for smoking purposes failed to visit the shores of Grand Manan in such large schools as in former years, and accordingly the number of boxes put up show quite a falling off.

All other fisheries, however, are in a prosperous condition, and show a considerable increase in value.

## DUTY OF FRESH FISH.

I might mention that there is a strong feeling among the inhabitants of this district that an export duty on fresh fish exported in foreign vessels would help our fishermen to a large extent.

## CURING OF HERRING.

A large number of copies of the report of the delegates sent by your Department to investigate the methods employed in catching and curing herring in the United Kingdom and the continent of Europe, has been judiciously distributed among our fishermen, and has been the means of provoking much discussion and argument among them regarding the proper methods of handling this fish. They feel, however, that they can cure and pack herring as well as any fishermen in the world, and they give as a reason for not putting up this fish in a better manner than at present, that on account of the absence of compulsory inspection, the careless and indolent fishermen who put up poor fish receive as good a price as those who are painstaking and preserve their catch in a proper manner.

## BAIT.

Notwithstanding the constant assertions of fishermen in the United States that they have unlimited quantities of bait of all kinds on their own coast, we find numbers of their largest schooners coming to this district each year, especially during the winter season, to procure a supply of bait. At this date, eight fishing schooners are swinging to their anchors off Eastport, willing to give any price for the desired amount of bait. I counted one day, last winter, fifteeu schooners anchored there seeking bait. Many of them come to the Canadian side and purchase a license, then seek some of the fishing centres and buy the desired supply from our willing fishermen; while others, not willing to purchase a license, anchor off Eastport and send trading vessels to purchase and bring them the required amount.

## ST. CROIX RIVER.

I cannot speak too highly of the admirable manner in which the salmon fisheries of the St. Croix River have been protected during the past year by the Warden on the United States side co-operating with the excellent Warden employed on the Cauadian side by your Department. Where, in former years, a number of lawless characters of St. Stephen and Calais defied the officers of both Governments and slaughtered the passing salmon when and how they pleased; now all is changed. Two officers, widely known for their fearlessness, patrol the river each night when the salmon are running, and give these fisheries most excellent protection.

I regret very much to report that there are many fishermen in these waters who are deeply imbued with the feeling that the several provisions of the Fisheries Act were enacted for the guidance of fishermen of other portions of Canada, and that in this district, in their fishing operations, they should be allowed to follow their own will, and treat with contempt fishery officers and their instructions. This class, I am glad to say, is rapidly decreasing in numbers, and during the past jear some of the provisions of the ignored "Act" have been brought to bear on them; and I trust that in the very near future, this troublesome class will imbibe other ideas, which will tend to make them good, law-abiding citizens, and give, when desired, assistance to the several fishery officers to aid them in enforcing the wise provisions of the Fisheries Act, thus preserving our fisheries and handing them down to the coming generation in as good, if not better, condition than they were received from our forefathers.

## Enforcement of the fisheries act and regulations.

It has been my painful duty at different periods during the year to summon before me and impose penalties, more or less severe, on a number of fishermen for violation of clauses of the Fisheries Act, and with very few exceptions the offenders acknowledged the wisdom of the "Act," and without any demur promptly paid their fines. The imposition of fines has in all cases put a stop to the abuses complained of.

In reference to the provisions of The Fisheries Act as they now stand, they seem to be adapted to the requirements of this district; and while some of them
might be altered and improved with undoubted benefit both to our fishermen and fisheries, still, I am of the opinion that if the laws at present in force were strictly carried out by the several officers, much real benefit would be done to our fishing grounds, and very little need of your Department for any new ones for some time to come. When they are tried and found deficient, it will then be high time to think of recommending your Department to adopt other regulations which might be more effectual.

The several close scasons have been very well observed, and it is a pleasure to notice how, year by year, the fishermen, instead of treating the fishery laws as something enacted for their injury, are slowly, but nevertheless surely, beginning to regard them as essential to the preservation of their unsurpassed fishing grounds.

## FISH-WAYS

Witn regard to the fish-ways of my district, they are all in good order, with very few exceptions. These, I believe, would be of more benefit to our fisheries if the few improvements suggested in my late report on the fishways were carried out. One mill-owner, in whose dam there is a fish-way, persisted for a time last season in closing the entrance, and all fish, alewives principally, in their return to the sea, were compelled to pass through the mill sluice, and were therefore ground up in the wheel. However, this case shall receive necessary attention during the coming season.

SALMON,
A slight increase is noticed in the catch of this delicions fish, due to increased numbers seeking the St. Croix River, especially during the latter part of the season. Good sport with the rod was had above St. Stephen by a number of sportsmen, and in Chamcook Lake; the take of land-locked salmon, also, afforded a large amount of pleasure to many foreign and local disciples of Isaac Walton. I placed 5,000 salmon fry in Lake Utopia this year, and trust the experiment will be attended with success.

MACKEREL.
The re-appearance of this fish in the Bay of Fundy, after such a lengthened absence, was a surprise to our fishermen, and no time was lost in their earnest endeavours to capture as many as possible. They were principally of the kind known as number three's, although some schools captured would be classed as number two's. A large number of schools were met with in all parts of the Bay of Fundy, and our fishermen were highly pleased with the hauls they managed to take. It is to be hoped that next season, this valuable fish will again seek these waters in as large, if not larger schools, and after the experience gained during the past summer, our fishemen will be able to give a better account of themselves.

## HERRING.

A large decrease is noticed in this fishery, not, however, in the catch of small herring used for sardines, but among the large kind suitable for export fresh or to be used for smoking purposes. Different reasons, highly contradictory, however; are given by experienced fishermen, to account for the decrease of the schools and their latevess in striking our coast; but after a thorough enquiry among those in a position to understand the matter, I am of the opinion that it would be of great benefit to this fishery if a law were enacted compelling all nets to be taken out of the water each morning and not to be set again till sunset.

In view of the increasing scarcity of schools of large herring which in former seasons struck on the Pennfield shore and in Passamaquoddy Bay so plentifully, and at a much earlier date, it will be necessary for your Department, in the near future, to enact a measure prohibiting the taking of these fish for use as manure.

It does not altogether seem capable of belief that schools of young herring are destroyed at certain seasons of the year, for (in my opinion) rery questionable pur-
poses, that at other seasons the same variety of fish, when their value is greatly
increased, can be expected to frequent our shores in as large schools as would be the
case if their numbers had not been lessened at times of plenty to satisfy the greed of
some reckless fishermen. But, I am surprised to find there are many who expect
the schools of herring, no matter how they are harassed and broken up, and des-
troyed, to remain in the same numbers on our shores, and are greatly astonished
during seasons of scarcity.

## SARDINE HERRING.

During the past year the demand for small herring for sardine purposes has continued brisk, and remunerative prices prevailed; but the weirs nearest Eastport being fortunate enough to make large catches monopolized the business, to the utter neglect of those situated at more distant points. A number of weirs are proving firstclass investments for their owners, and are naturally objects of envy in the eyes of less fortunate weir-owners. During the past summer, a sardine factory began operations at Campo Bello, owned by Costigan \& Co., of Montreal, and their product tound a ready sale in Canada at paying figures. The firm are highly pleased with the quality and quantity of their pack, and, if suitable fish are procurable, will continue operations during the winter season.

## HALIBUT.

Compared with 1889, double the weight of this fish has been taken, and the catch is confined solely to the fishing grounds of Grand Manan. These grounds, in the days of free fishing, were the favourite resort of numbers of United States vessels. who, by persistent fishing, almost cleared them of this much sought for fish. By the reports of reliable fishermen, halibut are returning to the waters of the Bay of Fundy, and with proper protection, it is hoped this fishery will return to its former vigour.

## LOBSTERS.

While the lobster catch has not increased in quantity, it shows a highly gratifying increase in value, almost double that of 1889. This increase I attribute to the opening of new markets, and also to a more active demand in the United States, caused by a decreased catch on the fishing grounds of that country. This great increase in their value led many of our fishermen to be over-anxious in the placing of their traps in the water, without due regard to the close season-so much so that they set them before the open season began, although warned not to do it, by myself and the several officers. I accordingly was compelled to take up the traps, thirty four in number, and to confiscate them, much to the pleasure of law-abiding fishermen, who were awaiting the close time to expire.

## POLIOCK, COD AND HAKE.

The returns show the catch of these fish to be about the same as last year, and those engaged in their capture made a fair season's work. The prices held good during the season, and fishermen found no difficulty in disposing of their catch.

## HADDOCK.

Over double the catch of 1889 is the welcome return for this fishery for the year. The prices given by dealers remained good during the season and the demand continued brisk.

TROUT.
As near as can be ascertained, the catch of trout remains about the same as last year, but it is extremely difficult to procure correct returns. Very little, if any,
illegal fishing is carried on, although reports which, in my opinion, are without foundation, are put in circulation at times regarding fishing through the ice and netting.

## FROST FISH, SMELTS, FLOUNDERS, SQUID AND PICKEREL.

The catch of these fish shows in the aggregate quite an increase, but these fisheries are not prosecuted with any degree of vigour in this district, not being considered of much value.

## OYSTERS

Though the oyster is not a native of this district, it is thought by many wellinformed persons, that the experiment of planting, if tried, would meet with success. Some were planted by a Montreal firm over a year ago at Bocabec and Digdeguash, but with what success has not yet been learned. The presence of starfish, which abound here, will, I am sure, prevent oysters from being cultivated with any degree of success.

I have to thank the several officers in my division for the cordial assistance rendered during the past year in my efforts to manage the valuable fisheries placed under my charge. While some of them, $I$ must say, are inclined to interpret their instructions in a manner rather more lenient than is intended and the preservation of the fisheries demand, still, no matter what his feelings and inclinations are, it should be the duty of every fishery officer to enforce strictly and impartially all regulations, and I believe that if he shows he is endeavouring to do what is fair and just, even the fishermen will like and respect him for it.

I beg to append the salient points of the reports of local fishery officers and the fisheries statistic tables.

> I have the honour to be, Sir,
> Iour obedient servant, JOHN H. PRATT,
> Inspector of Fisheries, District No. 1, New Brunswick.

## SYNOPSES OF FISHERY OVERSEERS' REPORTS.

Overseer Lord, of West Isles, reports as follows:-This has been a prosperous season for the fishermen of this district, as almost all kinds of fish have been plentiful and prices very good. My returns will show that the sardine business was better this year than last, more fish being taken and better prices realized. Hake and cod have also been more plentifu!. Why the returns do not show an increase in line fishing is because the great majority of the men are engaged weir fishing. Pollock were plentiful in the early part of the summer, and although lobsters were not taken in such quantities as in former years, still, owing to the increase in prices paid, the fishermen were enabled to make good wages. There has been quite a falling off in the quantity of herring smoked. This has not been on account of scarcity of herring, but on account of the limited market since the new tariff has been put in force by the United States, which, practically shuts us out from that market.

Overseer Todd, of St. Croix district, reports the run of salmon in the St. Croix River during the season and, especially the latter part of it, to be large. None were taken except with the rod. Poaching was entirely prevented by Guardian Glass, cooperating with the Warden on the American side of the ricer. The take of sardine herring in this district was very small. All were caught in the tarly part of the season, and were followed by immense quantities of squid, which ruined the fishing for the balance of the season.

The fish-ways, seven in number, are in good condition, but that at Baring should be lengthened. The fish-way at Broad's dam, on the Dennis stream, should be kept open until the 1st of October. Hitherto, to save water, the proprietor
closed this fish-way during late summer and early autumn, and the result has been that the young alewives going to the sea passed in large numbers through the penstock into the turbine wheel and been there destroyed all the water of the stream du:ing times of drought being directed to the penstock.

Overseer Barry, of Magagnadavic, reports that the fish-ways at the lower falls on the Magaguadavic River are in good order, and have been during the past season, requiring only some temporary repairs. The freshet in the river was favourable for the fish-ways, not being unusually high, and theretore giving a fair head through the ladders at the different points. There are four ladders in the Gully, so called, placed at different points.

Alewives have been quite plentiful in the river near the mouth of the lower fishway, and he thinks a considerable quantity ascended, judging from the indications above the dam in the main river. The loss of a short dam across the main river, just above the mouth of the lower fish-way at the head of tide water, which was carried away two years ago, will make quite a difference in the quantity ascending the ladders. When the old dam was standing, the fish could only go up the river as far as the mouth of the lower ladder, but now they can go up with the flood tide to the upper dam, about forty or fifty rods, and then return on the ebb tide to the basin below. Some of the ladders will require slight repairs in the spring, and about 20 feet should be added to the lower end of the lower fish-way.

Overseer Campbell, of St. Andrews, states that the fisheries in his district have fallen below the average. Very few net herring were taken in Passamaquoddy Bay last winter, and line fishing, always small, this year amounts to very little. Several resident fishermen have, of late years, left the district or gone into other business. The lobster catch was about the same as last year, with fewer traps used. The catch was poor, and without a few years' close season will, soon be ended. The size of lobsters taken remains about the same, fifty-five lobsters to the hundred pounds. Last spring, the traps had to be moved often, as after a few days no more fish could be caught in the place where they were set.

No trouble has arisen through the taking of undersized lobsters, as they were mostly sold to Eastport buyers and shipped away fresh in ice; small ones not being wanted. The run of herring suitable for sardines was large, but the catch small. The business was so poor in 1889 and 1890 that not more than half as many weirs were put in order as in 1888, and many of those were scarcely tended or seined. The demand of the Maine canneries was not su great as usual, and the supply of sardines from islands contiguous to Eastport was so great that but little sale was fond for them here, and prices were so low that the owners would not seine their weirs. Of late, and at present, there has been more sale and better prices, running from $\$ 3$ to $\$ 18$ per hogshead, and a good many are being taken at present. There were times during the season when the bay swarmed with herring too small for sardines, from 2 to 4 inches in length. There has been few, or none, pressed for pumace and but very little attempt to use them on the land as manure. On the whole, there seems to be a supply of sardine herring in this district far exceeding the demand, which are not taken. The burning of the sardine factory here last winter, which was not re-built, was an injury to the town and the fishery of the district.

There was quite a run of mackerel in the bay this season, and the catch of those fish aided the weir-owners considerably. The fish were small, about number three's, and brought good prices in the market. The presence of the cruiser "Dream" keeps matters straight, and deters unruly fishermen from attempting to violate the fishery regulations, and this makes it easy for the local officers.

Land-locked salmon fishing was carried on in the Chamcook Lakes by numbers of tishermen, and the regulations were very well obeyed. The public are in favour of protecting this fishery, and notice of any violation is quickly given. Some very tine fish were taken with hook and line; but the catch was not large, as this fish is a dainty feeder and hard to take. The fishing season in these lakes should be extended to the 1st of April, or at least to the 15 th, as the fish cease to bite as soon as the
waters become warm, and few, if any, are taken after the first of June. This fish affords fine sport, and, fished legitimately, the number will increase rather than diminish. The best fishing is from 15th April to 15th May. These lakes, four in number, are open to any one who chooses to fish, and are not controlled by any club or other body, and are not likely to be, as several roads open on them. The railroad runs on the shores of three of them, and the number of landowners is large, while the school and church lands extend over a good part of the largest lake.

Overseer Ash, of Beaver Habour, states that all kinds of fish were plentiful in his district during the past year, but not so many line fish have been taken, on account of tishermen being engaged in mackerel and herring fishing. Sardines were plentiful at the western end of this district, but prices were so low that it did not pay to fish weirs. There was a better catch of lobsters than last year, and they ran larger in size, which is attributed to the strict manner in which the law is enforced, prohibiting the taking of those under $9 \frac{1}{2}$ inches. On account of the increasing scarcity of the schools of large herring, which formerly played on the shores of this district, the fishermen here are fast gaining the opinion that the taking of small herring for sardine and fertilizing purposes will in the end ruin our large herring fishery, as each winter they are later striking the shores and are less in numbers. The several close seasons are now strictly observed by our fishermen, thanks to the Fisheries Dspartment for placing the cruiser "Dream" in these waters, and thus compelling a number of would-be violators of the law to make themselves familiar with the provisions of the Fisheries Act, and abide by them. Where formerly a great amount of trouble was caused by owners of weirs neglecting to apply for leases at the proper time; under the regulations enforced now by the Inspector for this district, little or no trouble is caused.

Overseer McLaughlin, of Grand Manan, reports that in his district during the past season the fisheries have been fairly remunerative, and that fishermen are very well provided for the winter which is now upon them. They have strong hopes that the herring which have forsaken the shores unusually early during the past two seasons will return and give them some thing to work at during the present winter. There has been a falling off in the catch of hake and large net herring and a slight decrease in the take of small herring for smoking, but a healthy increase is felt in the catch of cod, pollock, haddock, halibut and mackerel. The North Head has been most affected by the decrease in the catch of hake and large herring, but the fishermen have been diligent and made some good hauls. The herring weirs, from Cheynis and Cow passages, to Long Island, were almost a failure compared to former years, and the herring ran small, or of the sardine size. The weirs to the southward of the passages and on the western side of Grand Manan fished well, and caught large numbers of good smoking herring, but they ran rather smaller than last year's catch. Had sardine fish been scarce in other places, weir fishing would have been a success; but as they were very numerous in the waters along the mainland, they were not of much value here. The fishermen of White Head Island seem to have been the most favoured of any in this district, and the line fish were very auundant on the fishing grounds, and have been taken in large quantities. In the ninety smoke houses, at least half a million boxes of smoked herring bave been put up, and at the close of the season they have taken in their weirs two hundred barrels of fine mackerel, and yet these people have displayed more discontent than the inhabitants of any other part of this district. The catch of lobsters has been less than in any year since that branch of fishing has begun, and they only fished in all about sixty days. As the taking of small or illegal lobsters met with a severe check from the Inspector in the steamer "Dream," the fishermen took up their traps and quit fishing rather earlier than in former years. The fishery regulations have been well observed throughout the year, and the only abuse to which attention is called is the habit fishermen have of leaving their nets in the water for days and weeks at a time. Up to thirty years ago, this practice was unheard of in this district; fishermen put their nets in the water in the evening
and took them up in the morning. Such a thing as day-light net fishing, with nets set to moorings, was not thought of; and it is only since tresh herring have been in such large demand that this practice has been general.

This, and the practice of throwing gibs or offal on the fishing grounds has at last resulted in compelling herring to seek other grounds in the Bay of Fundy. When the close time expires at Southern Head, Grand Manan, the waters are generally swarming with large net herring. A fleet of vessels muster on the grounds and set out a great number of gill-nets. These nets are left in the water for days at a time, with more or less dead or dying herring in them, till the fish are scared to other resorts, and they are followed by these portable fisberies until they are driven to the open ocean. Then, the net fishermen will proclaim through the newspapers that the weirs have destroyed all the herring. About the 1st November, I overhauled about forty gangs of nets set for daylight fishing, and I am satisfied there were herring and mackerel in these nets that had been dead for four days at least. This, in a short time, had the effect of driving or scaring the herring from the grounds, and they have not returned to any part of Grand Manan, except to Dark Harbour.

Last year it was the same, - the herring went to the south-east of Big Duck Island and remained there till late in February, when the heavy easterly gales drove them for refuge to North Head and the north shores of the bay. These are facts, and any one who doubts the cause herein stated can refer to the report of the two delegates sent to Europe to investigate the herring fishery there. It is therefore suggested that the close time at Southern Head be from 15th of July to the 15th of December of each year, and that fishermen be compelled to take their nets out of the water every morning and not set them until evening.

Overseer Brown, of Campo Bello, reports a large increase in the catch of nearly all kinds of fish, large herring and pollock excepted. Hake and haddock were better than for a number of years, and the catch of lobsters, sardines and mackerel was above the arerage. Line fishermen made a good year's work. Most of the weirs had large catches of small herring suitable for sardine purposes, but very few large enough for smoking. The winter herring fishery was small. The fish did not come into the bay until the 15th of February, bringing then a good price, so that the fishermen fared better than they did last year. Lobsters were very scarce during the season, but on account of the extension of time they were allowed to be taken, as well as the good prices obtained, fisharmen did very well. Were it not for the scarcity of bait there would have been a larger quantity of cod and pollock taken. Very few squid were caught. As small herring and squid are most suitable bait for line fishing, and some of the weir owners would not sell small herring to the fishermen when they could sell to American sardine buyers, the consequence was that our fishermen lost a good deal of time and many catches of fish. Owing to the grounds being thoroughly protected and fishermen not being crowded out by foreigners, trawl fishing was better than usual, and, upon the whole, fishermen made a good year's work. The several close seasons were very well observed.

## J. H. SPRaTT,

Inspector of Fisheries, District No. 1, N.B.

## DISTRICT No. 2.

REPORT ON THE FISHERIES OF DISTRICT No. 2, COMPRISING THE COUNTIES OF RESTIGOUCHE, GLOUCESTER, NORTHUMBERLAND, KENT AND WESTMORLAND, FOR THE YEAR 1890, BY INSPECTOR R. A. CHAPMAN.

Moncton, 31st December 1890.

## Honourable Charles M. Tupper, Minister of Marine and Fisheries, Ottawa.

Sir.-I have the honour to submit my report on the fisheries of district No. 2 , comprising the Counties of Restigouche, Gloucester, Northumberland, Kent and Westmorland, in the Province of New Brunswick, for the year 1890, with extracts from the reports of local fishery officers. While there is an actual increase in the aggregate of values of upwards of $\$ 150,000$, the returns, for reasons explained elswhere, show a trifling falling off in the catch : prices for all kinds of fish, with the one exception of smelts, having ruled very high, made it on the whole a profitable year for our fishermen, with a disposition on their part generally to observe the regulations and assist the Department and their officers in taking such steps as may be necessary to permamently increase this great sea harvest. It has been my aim, at all times, to impress upon the minds of fishermen and others interested that their object and the Departments should be identical, and that all should work in accord for the one great end-the preservation of our fishing industries. Owing to the very high freshets this year in what are usually the dry summer months, we have been unable to make much progress in fish-ways but, hope another season to open up two or three fine rivers to the different kinds of fish that formerly frequented them.

## SHAD.

There is a very small catch this year in the rivers and estuaries at the head of the Bay of Fundy where they used to be so plentiful. There is only one way that will restore these fish and that is, not to allow any to be caught anywhere in this Province until the 1st July. I have watched the shad coming into this, the Moncton market from St. John, from the 10th May to the middle of June, and every female shad opened is full of spawn. It certainly seems a great mistake to thus exterminate what was once so valuable an industry, when the cause is so apparent and the remedy so plain.

## SALMON.

The returns show a large increase in the catch on the Miramichi River and estuary, as well as in some sheltered portions of the coast; but the weather was so stormy during the season, that nets were destroyed and fishing almost abandoned in many places. Notwithstanding this, there is an increase in the aggregate over last year, and the officers and guardians everywhere report a fine run of salmon going up to the spawning grounds this fall.

BASS.
Fishing for these fish being prohibited on the Miramichi, little can be said until the effect of this is known ; but officers and others best able to judge speak very hopefully.

## HERRING.

There was the usual abundauce of spring herring, and little attention seems to be given of late years to the fall fishing of this important article of home consumption.

SMELTS.
The catch of 1890 of this little fish was nearly up to that of 1889 , but they were exceedingly small, and everyone was predicting that they were running out, but strange to say they have struck in this fall in large numbers and of good size, very much larger than for the past two years.

## COD,

A falling off from last year's good catch is reported of this very valuable fish, not it appears, however, from their scarcity, but rather from rough weather and want of bait.

## MACKEREL.

There is, as usual, a small catch of this fish, and there appears to be little effort made on our coats to increase it.

## TROL゙T.

Rather more trout are reported caught than last year, but as most of these fish are taken by anglers acting under leases from the provincial authorities, reports of catch are not very reliable.

## LOBSTERS.

There has been a marked improvement in this fishery in 1890 over 1889 amounting to over half a million pounds, and which would have been a million or more had it not been for the very stormy weather, which in some exposed districts prevented fishermen getting at their traps more than half the time. The lobsters were also of larger size than for some years past, which goes to show that the shorter time for taking them and the longer close season is beginning to show results which make large packers especially opposed to any extension whaterer of the time for fishing.

## OYSTERS.

There appears to be little diminution of oysters in the beds of Northumberland and Gloucester counties, but with the continually decreasing quantities taken in Kent and Westmorland there is great danger of over-fishing

R. A. CHAPMAN, Inspector of Fisheries.

## SYNOPSES OF FISHERY OVERSEERS REPORTS.

## RESTIGOUCHE COUNTY.

Overseer J. A. Terge, of the River Division, reports that salmon fishing in the estuary of the river did not come up to last year's catch. This shortage is attributable to strong gales from the east during the first run of fish, the nets being torn, and could not for several days be mended. It is evident from the large number of salmon reaching the fluvial portion of the River to the fly fishing grounds that there is no decrease in fish coming to their summer haunts. The failure is not due to any over fishing, there being no increase of stands for the last eight years, and from reliable information from the chief guardian of the R.S. Club, Matapedia, the spawning beds on the main River Restigouche and on the Tomkedgwick never contained more salmon than during this season. The Sunday close time is well observed, so is the close season.

Overseer A. Mc Pherson writes: In the salmon fishery, which is our staple fishing industry I have again to report a falling off in my district, not however, from any scarcity of fish, but owing to heary freshets and prevalence of stormy weather
especially of easterly gales which caused the fish to keep off shore. On th other hand, the causes which led to the partial failure of the salmon fishing acted favourably in the interests of the lobster fishing, which was greatly benefited by the continued easterly winds, which drove the lobsters up the bay, so that those engaged in this business made a profitable season, both in largely increased cateh and high prices obtained.

## GLOUCESTER COUNTY.

Overseer F. Comeau reports a rather smaller salmon catch, owing to unfavourable weather and an increased take of lobsters, which he believes is due to the careful observance of the regulations; herrings very abundant, large increase in cod, due to the more vigorous prosecution of this fishery.

Overseer $G$. Cormier reports a smaller take of herring and codfish in his district, which he attributes to bad weather and not to scarcity of fish.

Overseer J. L. Hache also reports a falling off from last year's catch, especially in cod, which he says is owing to rough weather and scarcity of bait. He complains that oysters are very recklessly fished; small and large being taken indiscriminately, and then the small ones thrown away, in place of being put back into the water while alive. He believes some regulations should be made for their preservation, and recommends a limit as to size.

Overseer A. Ache states that codfishing shows a decrease from last year, caused by stormy weather and want of bait. Other fisheries (except mackerel, which was better) have been about the same as in 1889.

Overseer A. Boyd reports a large increase in fishing, with corresponding results, and that the regulations with reference to size of lobsters, de., were observed.

Overseer W. Walsh reports a much larger catch of fish than last your, which he says were of excellent size and quality, and indications are that many more will be engaged in fishing next year. The regulations have generally been well observed, and he urges strongly that the close time for alewives begin 20 th June, as after that date they are nearly worthless, and trout begin to come in and are caught in the nets.

Overseer O. Robichaud says, in general, the fishing has been good. The catch of smelts was better than Jast year, but smaller in size. Herring were very plentiful, and great quantities were caught. There is an increase in the take of alewives and lobsters, but a slight decrease in salmon, owing to stormy weather. Cod and hake about the same as last year, and mackerel much more plentiful, but hard to catch by hook and line. The several close seasons have been well observed, and fishermen generally are satisfied with the regulations.

## NORTHUMBERLAND COUNTY.

Overseer $P$. Robichaud reports herring and salmon fishing good, except in exposed situations, where rough weather interfered with the salmon fishing. Smelt good, but a great quantity of small ones. Lobster take fair ; would have been much better but for stormy weather. Regulations generally well observed.

Overseer J. G. Williston writes that salmon tishing was good, much better than in 1889 ; fish came in early, and many more would have been taken only for the gales when they were thickest. Salmon were also very plentiful in Bay du Vin and Black Rirers this fall spawning. Owing to rough weather, lobster fishermen could not overhaul their traps more than halt the time, and still made a fair pack, the size being much larger than last year. Oyster fishing has been followed up for all it is worth. Newbeds are forming and oysters are now raked where no one ever knew of one being found before. The close season should be from 1st May to 1st October, as those caught in September, being so far from market, often become worthless and are dumped. Smelts were plentiful, but very small in size. The close seasons have been well observed, and fisheries, are in a heallhy condition. The present system so far is working well.

Ocerseer Wm. Wyse reports a large increase in the salmon catch, especially in the early part of the season, and believes it would have been much larger only for the débris carried off the ballast wharves and out into the river by every high tide, to which the harbour master pays no attention whatever, notwithstanding the damage to the navigation of the river and to the fact that salmon will at once leave when their natural waters are polluted. Smelts very small in size. The present regulations for the protection of bass will resuscitate this fishery to its once prolific state. The guardianship and patrol of the river has had a very beneficial effect on the much better protection of all the fisheries.

Overseer T. Parker reports a fair catch of salmon, especially in the early part of the season, and a great run to the spawning grounds this fall.

## KENTT COUNTY.

Overseer L. Guimond reports that he rrings struck in about the 5th May and were very plentiful. There is a large falling off iu salmon, owing to rough weather; the storms having destroyed the nets. There is also a decrease in codfish caught, for the like cause and want of bait. Less oysters were raked than last year, and winter fishing is destroying the beds and young oysters. Recommends the prohibition of winter fishing. Lobsters struck in about the 13th May. There is an increase in this fishery, both in size and numbers, having not been so large and plentiful for ten years past. The regulations were generally well observed.

Overseer M. A. Girouard reports fishing generally better than last year. Lobsters better in quantity and size ; smelts smaller in size, and somewhat less taken.

Overseer Chas. Cormier says the spring herring were in abundance, the fishermen catching all they could take care of. The take of mackerel was small. The catch of lobsters was very large, and the fish were of a somewhat larger size than last year. All the packers report herring done well. There was a falling off in smelts, and they were of much smaller size than in past years. The close seasons were generally well observed.

## WESTMORLAND COUNTY.

Overseer W. B. Deacon writes: In my district thirty-five factories were operated this year, being twenty more than last year, and I am informed teu or twelve more are being built for next year. The catch was fair, considering the great number of stormy days when they could not fish, being 222,672 lbs. more than last year, and 411,456 more than in 1888 . Smelts were a good yield, being 283,950 lbs. more than last year.

Overseer R. Goodwin reports a small falling off taken as a whole, compared with last year. Spring herring were abundant and a large quantity taken. Alewives were caught in increased quantities in all the rivers. Shad fishing in Sackville was fair for a few days in the first part of the season. Those interested complain that the taking of parent fish in St. John harbour, before spawning, is utterly destroying this once valuable fishery. There are no abuses to complain of in this district; the several close times are well observed.

Overseer D. T. Cormier reports a very small catch of shad this year, and urges a close time up to the 25 th June, to give the fish a chance to deposit their spawn, or otherwise this fishery will become extinct.

> I have the honour to be, Sir,
> Your obedient servant,
> R. A. CHAPMAN,
> Inspector of Fisheries for District No. 2.

## DISTRICT No. 3.

REPORT ON THE FISHERIES OF DISTRICT No. 3, COMPRISING THE COUNTIES OF VICTORIA, CARLETON, YORK, SUNBURY, QUEEN'S, KING'S, ST. JOHN AND ALBERT, FOR THE YEAR 1890, BY INSECTOR DAVID MORROW.

Oronocto, 31st December, 1890.

## Hon. Charles M. Tupper, <br> Minister of Marine and Fisheries, Ottawa.

Sir,-I have the honour to submit herewith my second annual report of the fisheries of District No. 3, New Brunswick, for the year 1890, with condensed reports from local fishery officers, and statements of product and values. The several close seasons, as a rule, were well observed. Still, there are fishermen, I regret to say, who can only be kept in line by the sharp lash of the law. In this district are a number of rapid streams and rivers, clear of sawdust and of foreign matter, most favourable for the production of fish, any of which would be an excellent location for the reception of salmon fry.

## SALMON,

The returns show a small catch of salmon; the decrease is very considerable. The falling off has been confined to net fishing alone. The angling catch is reported good. The rains and high water enabled the fish to get up the rivers early in the season, and although the take has been small, it is reported that there were more salmon on the spawning grounds this fall than usual. This is no doubt due to prohibiting the capture of the fish in non-tidal waters. I would respectfully ask that more protection he given this fish on the way to, and on, the spawning grounds.

BASS.
The number of this fish somewhat increased, in consequence of more attention being given to the fishery; but the supply is diminishing. The great bulk of the catch is from Belle Isie Bay, King's Co., and as few were taken at any other place, danger of exhaustion exists.

## SHAD.

There is an immense increase over the catch of last year. The bay fishery above St. John has again fallen off; the returns for Albert County showing but 10 barrels. In St. John River, an increase has been going on for some time. Previons to 1880 , the catch was about 500 barrels per year; since which time there has been a regular and very considerable increase. The bay fishery for 1879 amounted to over 14,000 barrels; since then it has fallen off rapidly, until last year the harbour and river fisheries of St. John produced considerable more than one-half of all the shad taken in Nova Scotia and New Brunswick. The bay fisheries have all fallen off alike, and it is a question whether this falling off of the bay fisheries had not something to do with the increase in the St. John. I think it has. The fish return to sea after spawning, instead of going to the head of the bay, as formerly ; and for some reason seek other feeding grounds and escape the fall fishermen. The additional close time from Friday evening was a much needed protection, and should be strictly enforced.

## ALEWIVES.

The catch exceeds that of last year by over $\mathbf{5}, 000$ barrels. The fish were more numerous in the river than they haye been for some years.

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## PICKEREL AND PERCH.

The catch shows a small falling off. This fishery was not prosecuted as vigorously as formerly, owing to the high rate of wages along the river. The supply is abuodant. Nets used in the gaspereaux fishery up to the 30 th June are then set, it is claimed, for pickerel.

## TROUT.

It is difficult to ascertain the catch of this fish; it can only be approximated. Trout are plentiful in most of our lakes and streams, fishing being confined to angling; and with prohibition of fishing through the ice, an increase may be expected.

> COD, POLLOCK, HAKE AND IIADDOCK.

The returns again show a small increase over the catch of last year.

## HERRING.

The catch is less than that of last year. Winter and spring fishitg were a failure. The fall fishing proved better and the fish sold at remunerative prices.

## LOBSTERS.

The returns show an increase over last year's catch. The fishing season commenced early. This fishery is considerably exhausted. A larger quantity was taken in 1887 than for three years past. The care with which fishermen in this district are conducting this branch of the tisheries, by allowing all undersized lobsters to escape, was shown by an improvement in size of what was taken this season. About one-balf the product of this fishery is used for home consumption, and the balance shipped fresh to the United States; none are canned here. The fishermen are of the opinion that no lobsters under $9 \frac{1}{2}$ inches should be taken at any time.

DAVID MORROW,
Inspector of Fisheries for District No. B.

## SYNOPSES OF OVERSEERS' REPORTS.

## ALBERT COUNTY.

Overseer Stewart says, that the catch was small, owing in a great extent to the fishermen not prosecuting the fisheries so actively as formerly. Salmon were plentiful in both the bay and streams. Trout were unusually plentiful this season. The fish-way on Upper Sulmon river was kept open, and plenty of salmon and trout passed through. In this overseer's opinion, until mill-owners are stopped from putting their refuse in the water, the fish in the Bay of Fundy will not increase to their former numbers. Close seasons well observed.

## CARLETON COUNTY.

Overseer Burtt reports that owing to the prohibition of netting, very few salmon were taken in his divisior. In the spring of 1889 , ten thousand salmon fry were put into the south branch of the Beckaguimic River, many of which were scen last summer. This stream is a grod one for salmon, and with proper protection from sawdust and illegal fishing would, in a short time be well stocked with fish. Salmon have been taken with the fly at the month of this stream during the past season. Salmon and trout are the principal fish in this division. Too much care cannot be taken to prevent their destruction.

YORK COUNTY.
Overseer Orr reports a small catch of salmon on the Saint John River. This he attributes, in a measure, to the late spring freshet during which the fish went up river.

The catch of shad was larger than that of last vear; the fish were abundant and of good quality. On the South-West Miramichi, the run of salmon was equal to that of former years. Illegal fishing was not carried on to any extent.

Warden Glendenning reports a decrease in the catch, owing to less active prosecution of the fisheries.

Warden Cronkite reports that there was very little illegal tishing done during the season. In his visits through his district, he noticed accumulations of sawdust and other refuse several feet deep in some places. The eddies in the St. John River are fast filling up with sawdust, shavings and shingle waste. He suggests that a fish-way be built in the milldam across Eel River, so that salmon may go up as formerly.

## sENBURY COUNTY.

Overseer Hoben says it is a remarkable fact that after the county has been settled over one hundred years, the gaspereaux fishery should exceed any year he can remember. The oldest fishermen report that in many places they never saw the fish so plentiful. Shad fishing in some districts was also very good. The salmon fishery was not so good. Fishermen attribute this to the summer freshet. Other fish were a fair average. Fishermen are very unanimous in saying they think it hard that they should be deprived of fishing Friday night, when in the harbour of St. John they are allowed to fish until Saturday night. This is the cause of trouble. They consider all should be treated alike. Le recommends that the regulation be the same in St. John Harbour as it is up the River St. John and tributarios. The close season was well observed. In some places there is a disposition to crowd narrow channels with nets. Fishery officers should see to this. Fishermen seem quite willing to conform to the law, when made acquainted with it and its operations.

## QUEEN'S COUNTY'.

Warden Phillips reports a good run of salmon in Canaan River. They were a long, slim fish, different from the fry put in the river some years ago. Since sawdust has been stopped on the river, fish are on the increase. He recommends that a quantity of salmon fry be put in the river next spring, at any place above Flat Rock.

## king's county.

Overseer Gosline reports that heavy rains and high water were favourable for the run of fish, especially salmon, and a greater number reached the spawning grounds than during the past three years. Alewives and shad were plentiful in the upper tidal waters of the Kenebeccasis. The yield was at least ten thousand shad. A market is found for these along the line of railway from St. John to Moncton. As the fish increased in the stream there were more attempts to bar the whole chanuel with nets. Spearing salmon is not so much practised as formerly. Mill rubbish and sawdust are still the grievance of farmers and the great hindrance to an increase of any kind of fish in the rivers of this part of Kings County. He suggests prohibiting fishing for alewives and shad in Darling's Lake, a favourite spawning ground for these fish. They are taken both at the inlet and outlet of the lake in considerable numbers, before they have a chance to spawn.

## ST. JOHN COUNTY.

Overseer O'Brien reports an increase in the catch of gaspereaux, and better prices than last year. Spring shad show in improvement over last year. What wạs shipped fresh to the States sold at remunerative prices. Freshets may have had something to do with this increase. The catch of salmon shows a great falling off., evidently caused by over-fishing in the bay. There were seventy-one boats fishing there this season. Winter herring fishing was a creat failure, very few, if any, of the vessels paying expenses. There was only half a catch of fall herrings. Prices were better than last season, which helped the fishermen considerably.
$8 a-6 \frac{1}{2}$

Lobsters show some improvement over last year. This was caused by earlier fishing, and a larger number of men being engaged in the fishery. Other kinds of fish are about the same as last year, except eels, which show an increase. Attention is called to the inspection of pickled fish. One half the alewives inspected had to be re-inspected. The inspection of herring in St. John is an imposition on fishermen, both in the price and the way it is done. It costs 7 cents to inspect 100 lbs . The inspector breaks one to three hoops, for which he charges 3 cents apiece to replace; this brings the inspection to 10 or 16 cents per half barrel. Herrings brought in the hold of a vessel, in bulk, packed in the slip, and pickled with slip water, get the same brand as fish put up properly.

Overseer Rourke, of St. Martin's district, reports the catch small, the fishery not being prosecuted as in former years. There were but very few herrings on this shore at any time during the past season. No infringements of the regulations were reported.

I have the honour to be, Sir,
Your obedient servant,
DAVID MORROW,
Inspector of Fisheries, District No. 3, Aew Brunswick.

## NEW BRUNSWICK-District No. 1.

Return showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, Quantity and Value of Fishing Material, Kinds and Quantities of Fish, and the Total Number of Men Smployed, \&c., ill District No. 1, of the Province of New Brunswick, for the Year 1890.


Retuns showing the Number, Tonnage and Valne of Vessels and Boats engaged in the Fisheries, Quantity and Value of Fishing Materials, \&e., District No. 1, of the Province of New Brunswick-Continued.


Clams and fish for lecal consumption

$$
\pi, 450 \text { (0, }
$$

Recapitulation of the Yield and Value of the Fisheries of District No. 1, of the Prorince of New Brunswick, for the Year 1890.


Number and Value of Vessels, Boats, Nets, Weirs, de., engaged in the Fisheries of District No. 1, Province of New Brunswick, during the Year 1894.

| Naterial. | Value. | Total. |
| :---: | :---: | :---: |
|  | s cts, | 3 cts205,80700 |
| I2 vessels, 1,265 tons | 31,45000 |  |
| 1,010 boats.... . . | tia,750 00 |  |
| 59,511 fathoms of nets | 44.74400 |  |
| 250 weirs.. . . . . | 99,080 00 |  |
| 14,776 lobster traps. | 12,783 10 |  |
| 2 sardine factories. | (6,:00 00 |  |
| 1 fertilizer factory | 40,000 00 |  |
| 3 ice houses.... ., | 75000 |  |
| 587 smoke and fish houses with fixtures | 184,045 00 |  |
| 83 oil presses with fixtures. | 6,174 00 |  |
| 605 trawls. . . . . . . . . | 16,100 00 | 253,269 00 |
| Total value.. | ..... .. | 509,376 00 |

## NEW BRUNSWICK-District No. 2.

Return showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, Quantity and Value of Fishing Material, Kinds and Quantities of Fish, and the Total Number of Men Employed, \&c., in District No. 2, of the Province of New Brunswick, for the Year 1890.


## NEW BRUNSWICK-District No. 2—Continued.

Return showing the Number, Tonnage and Valne of Vessels and Boats engaged in the Fisheries, Quantity and Value of Fishing Material, \&c.-Continued.


Return showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, Quantity and Value of Fishing Material, \&e.-Continued.


Return showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, Quantity and Value of Fishing Material, \&c.-Continued.


Return showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, Quantity and Value of Fishing Material, de.-Continued.


## NEW BT:UNSWICK-District No. 2-Continued.

Return showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, Quantity and Value of Fishing Material, dc.-Concluded.


Recapitulation of the Yield and Value of the Fisheries in District No. 2, New Brunswick, for the Year 1890.

| Kinds of Fish. |  | Quantity. | Price. | Value. |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | \$ cts. |  |
| Samon ...... do freeh |  | ${ }_{101619}{ }^{60}$ | 1609 | 9630 110 |
| do smoked. | Lhs. | 1,016, ${ }_{2}$ | 0 0 0 0 | 203,23: 40 |
| do in cans. | Lhs. | 6,400 | (1) 15 |  |
| Mackerel..... | Brls. | 2,200 ! | 1500 | 33,000 O\% |
| do in cans | Lhe. | 45,520 | 012 | 5,462 41 |
| Herring...... | Brls. | 57,110 | 400 | 228, 440 (19) |
| do smoked | Boxes | 2950 | 03 | -737 |
| Alewives. | Brls. | (6,723 | 450 | 30,253 |
| Cod Tongues and Somms | Cut. | 57,490 | 400 | 22:9,960 010 |
| Hake ................. | Cwt. | (6, 399 | 1000 |  |
| clo Sounds. | Lbs. | 3,329 | 101 | 25,568 3 (h) |
| Haddock | Cwt. | 1,524 | 400 | 6,09\% 01 |
| Halibut. | Lbs. | 2.90 | 010 | 2!0 00 |
| Shad. | Brls. ${ }^{\text {d }}$ | 719 | 10 (0) | 7,1990 |
| Bass | Labs. | 4,600 | ${ }^{11} 00 \%$ | 2761019 |
| Tront ${ }^{\text {rex }}$ | Lbs. | 26,200 | $0^{0} 10$ | 2,190 (0) |
| Frost fish. | Lhs. | 220,372 | 0) 04 | 8,814 88 |
| Squid. | Prls. | . 2 | 400 | 208 00 |
| Flounders | Lubs. | 25,500 | 1010 | 5.550 (0) |
| Smelts. | Lbs. | 3,778,952 | 106 | 226,737 12 |
| Perch. | Lbs. | 11,700 | 1103 | 351 (m) |
| Oysttris | Brls. | 16. ${ }_{10} 10$ | 1000 | 8,510 (f) |
| Loksters. | Cans | 2,30, 20.6 | 300 012 | 50,130 |
| do | Tons | -3\%, 246 l | 30 (0) | -1,393 |
| Fish Oil | Galls. | 23, $70{ }^{\circ}$ | 040 |  |
| ${ }^{\text {do }}$ ( Guano. | Tons | 235 | 2\% 00 | 5,875 mu |
| do as bait. | Brls. | 30,383 | 150 | 45,574 50 |
| do as manure. | Brls. | 27,264 | 1150 | 13,632 04 |
| Total for 1890 |  |  |  | 4-45, 194 |

Number and Value of Vessels, Boats, Nets, Weirs, Traps, \&c., engaged in the Fisheries in District No. 2, New Brunswick, in the Year 1890.

| Material. | Value. | Totil. |
| :---: | :---: | :---: |
| 59 vessels (agrregate tonnage, 1,157) | 8 cts. | $8 . c t s$410,95100 |
| 3,564 boats.................. . . | 84,961 |  |
| 217,017 fathoms nets. | 139,311 00 |  |
| 1,715 weirs we. | 3,200 00 |  |
|  | 47,60000 <br> 90,249 <br> 100 |  |
| 2 mackerel traps | 2,000 00 |  |
| $\&$ salmon and mackerel cammeries. | 3,500 00 |  |
| 106 lobster facturies. | ! 18,50000 |  |
| 41 freezers.. | 40.06000 |  |
| 10 smoke houses and fixtures. | 2,500 00 |  |
| 4 oil presses with fixtures......... | 4500 |  |
|  |  | 160,350 10 |
| Total... |  | 571,301 00 |

## NEW BRUNSWICK-District No. 3.

Return showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, Quantity and Value of Fishing Material, Kinds and Quantities of Fish, and the Total Number of Men Employed, de., District No. 3, Province of New Brunswick, for the Year 1890.


Return showing the Number, Tonnage and Value of Vessels and Boate engaged in the Fisheries, Quantity and Value of Fishing Material, \&e., District No. 3, Province of New Brunswick-Concluded.


Recapitulation of the Yield and Value of the Fisheries of District No. 3-
New Brunswick.


[^7]Recapitulation by Counties, showing the Number. Tonnage and Value of Vessels and Boats ongagel in the Fisheries, \&e.New Brunswick for the Year 1890.


Recapitulation by Counties, showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, \&c.New Brunswick-Continued.


Recapitulation by Counties, showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, de.New Brunswick-Concluded.

| Counties. | Kinis of Fish-Conchided. |  |  |  |  |  |  |  |  |  |  |  | Fish Pronectis. |  |  |  | Viblee. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | $\begin{aligned} & \dot{E} \\ & \dot{E} \\ & \dot{E} \\ & =0 \end{aligned}$ |  |  |  |  |  |  |  |  |  |  |  |  |
| Ristigouche.. | 1060 |  |  |  | 7000 |  |  |  |  |  | 3 | 82800 |  |  | 400 |  | 40,266 80 |
| Gloucester | 6340 | 1700 | 22 |  | 524100 |  |  | 128 |  | 3000 | 21 | 714400 | 22400 |  | 16950 | 16040 | 644,683 20 |
| Northumberland | 4409] | 190000 |  | 30000 | 1750073 |  |  | 143 |  | 11500 |  | 110129 | 550 | 110 | 2040 | 9509 | 286,601 58 |
| Kent... | $12 \% 60$ | 15672 |  | 23500 | 909569 |  | 11700 | 420 |  | 2160 | ${ }^{71}$ | 775232 | 757 | 125 | 7765 | 144 | 280,602 86 |
| Westmorland. |  | 13000 | 30 | 2000 | 578210 |  |  | 160 |  | 50 |  | (882704 |  |  | 3228 | 1400 | $\begin{array}{r}193,14038 \\ 645 \\ \hline 180\end{array}$ |
| St. John |  |  |  |  |  |  |  | 90 |  |  | $110{ }^{1}$. |  | 750 |  | 600 |  | 133, 13670 |
| King's. | 200 |  |  |  |  | 40000 |  | 2 |  |  |  |  |  |  |  |  | 17,782 40 |
| Queen's. |  |  |  |  |  | ${ }^{66700}$ | (6000 | 70 |  |  |  |  |  |  |  |  | 18,52500 |
| Sunbury | 1000 | $\cdots$ | . |  |  | $2 \% 000$ | 4000 | 30 |  |  |  |  |  |  |  | .... | 8,710 00 |
| York... | 7500 14090 |  |  |  |  | 8000 | 4000 | 10 10 |  |  |  |  |  |  |  | . . | 6,29000 <br> 3,000 <br> , 00 |
| Victoria | 12000 |  |  |  |  |  | 500 | 10 |  |  |  |  |  |  |  |  | 3,015 00 |
| Charlotte | 12200 | 4300 | 47 | 23500 | 8000 | 1500 |  |  | 18770 |  | 6.7 |  | 72724 | 100 | 1.6176 | 6476 | 1,062,756 10 |
| Totals | 74900 | 224672 |  | 79000 | 3786952 | 145200 | 26200 | 1063 | 18820 | 16710 | 1014 | 2365250 | 97181 | 335 | 47159 | 33740 | 2,699,055 02 |

Recapitulation of the Yield and Value of the Fisheries of the whole Province of New Brunswick, 1890.

| Kinds of Fish. | Prices. | Quantity. | Value. | Total. |
| :---: | :---: | :---: | :---: | :---: |
|  | \$ cts. |  | 8 cts. | \$ cts. |
| Salmon........ ................. . Brls. | 1600 | 60 | 96000 |  |
| do fresh in ice...................Lbs. |  | 1,084,805 | 216,996 00 |  |
| do smoked...... . . . . . . . . . . . Libs. | 020 | 2,400 | 48000 |  |
| do in cans.....................Lbs. | 015 | 6,280 | 94200 |  |
| Mackerel . . . . . . . . . . . . . . . . . . Brls. | 1500 | 3,877 | 58,155 00 |  |
| do in cans.... . . . . . . . . . . . Lbs. | 012 | 45,520 | 5,462 40 |  |
| Herring... ... .................... Brls. | 400 | 74,401 | 297,604 00 | 63,017 |
| do smoked... ................. Boxes |  | 1,314,136 | 330,284 00 |  |
| do frozen....................... . ${ }^{\text {No. }}$ | 60c. p. 100 | 13,700,000 | 82,200 00 |  |
| Alewives ... ........ . ........... Brls. | 450 | 20,577 |  | 92,596 50 |
| Cod.......................... Cwt. |  | 77,689 | 311,362 50 |  |
| Cod Tongues and Sounds. ... ..... Brls. | 1000 | 61 | 61000 | 31107250 |
| Pollock....................... . . . . Cwt. | 400 | 18,959 |  | 75,836 00 |
| Haddock. . . . . . . . . . . . . . . . . . . . . do | 400 | 13,615 |  | 54,460 00 |
| Hake.............................. do | 400 | 28,528 | 114,112 00 |  |
| do Sounds.... . . . . . . . . . . . . . . . .Lbs. | 100 | 27,591 | 27,591 00 |  |
| Halibut . . . . . . . . . . . . . . . . . . . . . . . Lbs. | 010 | 103,250 |  | 10,325 00 |
| Shad ............ . . . . . . . . . . . . . . . Brls. | 1000 | 5,116 | .......... | 51,160 00 |
| Bass............... . ............. Lbs. | 006 | 81,600 |  | 4,896 00 |
| Trout ...... ..... .... .......... Lbs. |  | 74,900 |  | 8,71000 |
| Flounders ... ........... . . . . . Lbs. | 010 | 79,000 |  | 7,900 00 |
| Smelts . . . . . . . . . . . . . . . . . . . . . . . Lbs. |  | 3,786,952 |  | 227,537 12 |
| Pickerel . . . . . . . . . . . . . . . . . . . . . . Lbs. |  | 145,200 |  | 8,772 00 |
| Perch ................ . ........ Lbs. | 003 | 26,200 |  | 78600 |
| Frost Fish or Tom Cod..... ... . . Libs. |  | 224,672 |  | 9,244 88 |
| Eels............................ . . Brls. | 1000 | 1,063 |  | 10,630 00 |
| Squid . . . . . . . . . . . . . . . . . . . . . . . . . do do | 400 | 99 |  | 39600 |
| Sardines . . . . . . . . . . . . . . . . . . . . . . Hhds. |  | 18,820 | 94,050 00 |  |
| do in cans.................. Cases. | 450 | 400 | 1,800 00 | 95,850 00 |
| Oysters . ............ ............ Brls. | 300 | 16,410 |  | 50,13000 |
| Clams .................................. |  |  |  | 9,650 00 |
| Lobsters in cans....................... Lbs. do Tons. | 012 | 2,365,256 | 283,830 72 |  |
| Fish Oil........................ . . . . Galls. | 040 | 97,181 |  | 333,960 38,872 40 |
| do as bait.... ................. Brls. |  | 47,159 |  | 71,338 50 |
| do as manure.................... do | 050 | 33,740 |  | 16,870 00 |
| do guano... ${ }^{\text {dist. }}$ do used in Di. 1, not included above | 2500 | 335 |  | $\begin{array}{r} 8,37500 \\ 64,00000 \end{array}$ |
| Total for 1890. |  |  |  | 2,699,055 02 |
| Total for 1889. |  |  |  | 3,067,039 04 |
| Decrease. |  |  |  | 367,984 02 |

Note.-Where prices are not given. Inspectors used different prices.

Table showing the value of Vessels, Boats, Nets, dc., engaged in the fisheries of New Brunswick with approximate value of other fishing material not included in the Returns, 1890.

| Articles. | Value. | Total Value. |
| :---: | :---: | :---: |
|  | 8 | 8 |
| 151 vessels, 2,804 tons. | 76,490 | 603,766 |
| 5,391 boats... ... | 167,451 |  |
| 376,868 fathoms of nets. | 251,245 |  |
| . 332 weirs ........ | 118,980 2,000 |  |
| 1,715 smelt nets...... | 2,000 47,600 |  |
| 118,593 lobster traps | 107,060 |  |
| 106 lobster factories. | 98,500 | 205,560 |
| 8 fish canneries.. | 3,200 |  |
| ${ }_{605}^{2}$ sardine factories | 6,500 |  |
| 605 trawls .... | 16,100 40,000 |  |
| 85 ice houses | 40,009 |  |
| 597 smoke houses with fixtures. | 186,545 |  |
| 87 oil presses with fixtures. | (6,624 |  |
| 1 fertilizer factory | 40,000 | 315,419 |
|  |  | 1,184,745 |

Statement of the Number of Men engaged in New Brunswick.


## APPENDIX C.

## PRINCE EDWARD ISLAND.

## 2EPORT ON THE FISHERIES OF PRINCE EDWARD ISLAND FOR 1890, BY INSPECTOR ED. HACKETT.

Tignish, P.E.I., 31st December, 1890.

Honourable Charles H. Tupper, Minister of Marine and Fisheries, Ottawa.

Sir,-I have the honour to submit my annual report on the fisheries of the Province of Prince Edward Island for the year 1890; also tabulated statements giving product and values by counties, together with an estimate of capital employed in the fisheries of the Province the last calendar year.

The returns show the gratifying increase in value of $\$ \mathbf{1 5} \mathbf{4}, \mathbf{6 7 8 . 3 6}$ over the year 1889, as follows :-

> Total value of Prince Edward Island fisheries $1889 \ldots$.. \$86,430 84
> do do do 1890... 1,041,109 20
> Increase........................... .............s. 154,678 36

The increase is made up as follows :-
Salmon, lbs......................................................... 3,300
Mackerel, brls........................................................... 4,387
do ${ }^{\circ}$ canned, lbs................. ................................ 47,276
Herring, brls........ ............... .. ......... .................... 13,562
Alewives, brls................ .......................................... 54

Trout, lbs................................................................. 6,280
Eels, brls.............................................................. 1,198
Lobsters, lbs............ ................................. .............. 355,847
The decreases are -
$\quad$ Cod, cwt......................................................... 4,764
Hake, cwt...................................................................... 18
Haddock, cwt.............................................. . .......... 130
Bass, lbs................................................................ 1,400
Smelts, lbs............................................... ..... ........ 20,770
Oysters, brls................ ............................................ 6,054
The season opened early and promised to be remarkably favourable. Hig winds and stormy weather in the month of June, however, retarded operations col siderably on the north side of the Island, causing great loss of outfit, especially i the lobster fishery. Spring 'herring'were very abundant and were noticed to be ' superior quality. The quantity taken is generally used as bait in the lobster an mackerel fisheries, and securing a supply early and at small cost is of great adva tage to fishermen. Lobster fishing commenced as soon as the ice left the coast ; ca neries on the south side packing fish as early as the 1st of May. Ninety-eight fa tories were in operation, being seventeen more than during the previous year. Abo ne nnn trans were used, an increase of 19,000 as compared with the year 1889. Lobste
were plentiful and of fair size, showing in this respect a marked improvement over the last three years. The increase in the catch of 355,847 pounds over 1889, cannot, however, be considered large, in view of the fact that seventeen more factories were in operation last season. The number of traps was also largely increased, and the production per trap does not exceed that of 1889 . Stormy weather in June injuriously affected the fishery on the north side of the Island, thereby materially reducing the output for the year. Codfishing was not prosecuted with energy, and the catch shows a decrease of $4,764 \mathrm{cwt}$. This may be attributed to a scarcity of bait, the fish not remaining in shore for any length of time. Mackerel shows an increase of 4,387 brls. This valuable fish was not very plentiful, but the quality being excellent and prices high, the fishery was eagerly pursued. The fish did not "school up" to any extent; consequently seining proved a failure. Hook and line and gill-net fishing proved more successful and were actively prosecuted while the fish remained on the coast.

Oysters show a decrease of $6,0.54$ brls. This falling off may be attributed to the cold and windy weather prevailing in the months of October and November, and not to any scarcity of oysters. The short catch had the effect of increasing the price, and those engaged in the industry are, I understand, well satisfied with the season's operations.

Smelts show a decrease of $20,770 \mathrm{lbs}$. This fishery has not come up to the expectations of those who engaged in it last year. The early closing of navigation and uncertain trips of the winter steamer by which the fish are sent to market, had a depressing effect on the fishery, resulting in the falling off indicated in the returns.

The minor fisheries show a slight improvement. Salmon which are not taken in the Island rivers, but in nets on the coast, were plentiful in the vicinity of St. Peter's Bay, and show an increase of $3,300 \mathrm{lbs}$. Sea trout were fairly plentiful in some of the rivers and the increase of $6,280 \mathrm{lbs}$. as shown by the returns, may be considered satisfactory, as indicating a better condition of the rivers and streams.

The season's operations generally may be considered the most satisfactory since 1886 ; all the principal branches of the coast and inland fisheries showing an encouraging upward tendency, giving promise of such results in the future as must be gratifying to your Department. Other matters, more directly affecting each branch of the fisheries of this Province, are referred to in the body of this report.

## HERRING.

As already noted the principal herring fishery of the Province is known as the "spring herring." The fish come unto the coast from the 1st to the 15th May, and are taken in large quantities by gill nets at all points. When they first arrive, the fish are of good quality ; and if properly cured and packed, would make a fairly good article of food. Very little attention is paid to them however, as they are principally required for bait, and are therefore cured in a very careless and slovenly way. At this season of the year, fishermen are busy preparing for the lobster fishery, and have no time to properly attend to herring; as a result, the fishery is neglected and any increase in the supply is caused by the demand for bait. Last spring they were most abundant; large quantities were landed all around the coast, and fishermen had no difficulty in providing a full supply of bait. Other schools of herring strike the coast during the summer and the autumn months. The latter are large and fat fish, and if properly cured would equal some of the best brands of pickled herring now on the markets. Little or no attention is paid to them however; and what might prove to be a lucrative industry is wholly neglected, through the lack of enterprise on the part of fishermen and deaiers. The report of the delegates, sent in 1889, to enquire into the herring fisheries of Scotland and Holland, contains some valuable information with regard to this fishery, and should have the effect of introducing great changes in the pickled herring industry of Canada.

## CODFISH.

This fishery shows a falling off of $4,764 \mathrm{cwt}$. as compared with the previous year. Cod were scarce in the coast waters of the Province during the whole season. This was due in a great measure to the scarcity of bait. It is evident that cod in the summer months leave their winter haunts and come into shallow water in pursuit of food. They prey largely upon the young of herrings, alewives, lobsters, trout, \&c., and any cause that will deplete the waters of these fisheries will have the effect of reducing the quantity of cod frequenting our coast. Daring the past season, fresh bait for cod was in limited supply, and fishermen, as a result, were unable to prosecute the fishery with success. For many years past, the fishermen of Gloucester County, New Brunswick, have crossed over from their own shores to prosecute the cod fishery in the vicinity of North Cape, in this Province. These men use large, strongly built, well equipped boats, and have met with considerable success in this fishery. Last season, the usual numbers were to be seen on the fishing grounds from North Cape to Cascumpec, and as they fit out exclusively for cod-fishing, succeeded much better than the local fishermen, who divide their time between mackerel, cod, \&c.

## MACKEREL.

The mackerel fishery was prosecuted with vigour, and it is pleasing to notice an increase of 4,387 barrels. Fishing commenced early; some fish of large size being taken near Souris towards the end of May. The fish were of excellent quality and commanded high prices; a few barrels being sufficient to realize a fair summer's wages for the lucky individual who succeeded in catching them. Fishing with seines was not prosecuted to any extent, mackerel did not school as in former years, and seining had to be abandoned for the more primitive hook and line fishery. Gill nets were used at some places, but this mode of fishing has not yet become general, although large additions are being made to the number of fathoms used each year. In 1889, there was a great falling off in the catch on that part of the coast extending from East Point to St. Peter's Bay, and the fishermen fearing that this valuable fishery was about being destroyed, commenced an agitation against the use of gill nets. I am glad to be able to jeport a marked improvement in the catch at this place last season, which will, no doubt, have a great effect in allaying the fears of those interested. Mackerel are very erratic in their habits. Years of great plenty have been followed by seasons of remarkable scarcity. The fish approach our shores in the spring either for the purpose of spawning or in search of food, but as many of the fish have spawned before coming into the Gulf of St. Lawrence, it is apparent that their main purpose is to tind food. The disappearance of the small fishes, their natural prey, may cause mackerel to leave their old feeding grounds for a time only to return again in greater numbers. The mackerel is, however, a wandering, unsteady fish, remarkably timid, and anything unusual occuring in the vicinity of its old haunts has, no doubt, the effect of driving it away. Fishermen allege that the purse seine, by breaking up the schools and scaring the fish off their feeding grounds has caused the present scarcity, and that the use of gill nets, if persisted in, will eventually destroy this valuable fishery. The decline of this fishery has been very rapid and as a consequence those interested are becoming alarmed and ask that some restriction be placed upon the use of seines and nets. The slight improvement this season indicates a favourable change, and another year may show even better results.

## LOBSTERS.

This fishery opened early and was prosecuted with great vigor all through the season. The canneries on the south side of the Island, being favoured with fair weather and an abundance of lobsters, were very successful. On the north side, owing to heavy storms in June, the pack was not so large, and fishermen suffered heavy loss in traps and gear. Ninety-eight factories were in operation, being an
increase of seventeen over the previous year. About ninety-six thousand traps were used, an increase of nineteen thousand. The production per trap was $25 \frac{1}{6}$ one-pound cans, or about $1 \frac{1}{2}$ pounds less per trap than in 1889. This falling off was due, no doubt. to the poor fishing on the north side.

The fishery gave unmistakable signs of improvement, lobsters being more plentiful and of better quality than for the last three years. The shortened fishery season proved of benefit in increasing the quantity of lobsters; but the size continues small, and it is possible that many years must elapse before it is fully restored. By reports received from several factories, I estimate that it took six lobsters, on an average, to fill a one-pound can. The size regulation is difficult to enforce; fishermen now kill the undersized lobsters at the traps, when they find they cannot land them at the factories. This is done to prevent the small fish returning to the bait, thus giving additional trouble to the men in liberating them alive each time they haul the traps. To stop this vicious practice will be found very difficult, as it is carried on beyond the reach of the officers of the Department. It was hoped, in 1887, that those interested in the lobster industry, with the experience of the past before them, would see the necessity of protecting this valuable fishery and render the Department all possible assistance in endeavouring to restore it. So far as assisting to carry out the size regulation is concerned, this hope has not been realized; both canners and fishermen being disposed to continue the same reckless destruction of undersized fish, asserting tbat the present close season affords sufficient protection. It is needless for me here to state what is now so well established with regard to this fishery. Experience the world over has shown that lobsters, unless protected by wise regulations against the ingenious and fatal appliances of the fishermen, are easily exterminated. Our own decimated fishery affords ample proof of this, and, although the present regulations have, no doubt, checked the decline, I fear it will be found extremely difficult to restore its productiveness.

## OYSTERS.

Oysters show a decrease of 6,054 barrels; the total production for the year being 35,203 barrels, against 41,257 barrels in 1889 . The unusually stormy season caused much loss of time in the months of October and November, thereby reducing the output. The cool season, however, favoured shipments; the products reaching the markets in good order and realizing the highest prices obtained for many years. This industry runs pretty much on the same lines each year. The shippers here supply the same customers from year to year; the product being chicfly sold in the Provinces of Quebec and Ontario. The principal fishery is carried on at Richmond Bay, Prince County. The beds of this bay are extremely productive, and although continually raked for years, show no signs of exhaustion; the product this season both in quantity and quality being equal to any former one. The Grand River beds have also produced well this year, and are reported as being in good condition. At the Narrows, however, there is some complaint that the size is decreasing, indicating that the beds are being overfished. The beds in the rivers of Queen's County are becoming less productive each year, and are now fished principally for home consumption. To preserve these beds, drastic measure will be necessary, and it appears to me that nothing short of closing the fishery for a number of years will have the effect of restoring them. The only regulation in force in this Province at present is a close season, extending from the 1st of June to the 15th of September in each year. This regulation, while no doubt of great benefit as a protective measure, cannot be considered sufficient to preserve the beds. There should also be a regulation fixing a minumum size, under which no oysters should be landed. At present, large quantities of immature oysters are brought to the shore by fishermen, and as shippers will not buy them, are left in heaps to rot. Such reckless waste should not be allowed. The same may be said with regard to fishing through the ice, in winter. This mode of fishing is now largely carried on, and where prosecuted, must result in the destruction of the beds. The fisherman, by cutting a suitable hole in the ice, immediately over an oyster bed, and using a single long-handled rake or drag, is
enabled to raise and deposit on the ice, large quantities of oysters of all sizes, together with mud, \&c., from the bed. After selecting all that are marketable, the others are left to freeze and die. This may not be considered any more objectionable than landing immature oysters in the fishing season, and allowing them to rot; but the greatest injury is caused by the dead oysters, mud, \&c., falling back on the bed when the ice melts in the spring, thus smothering any live oysters which may have escaped the fishermen's drag, and utterly destroying the bed. I would earnestly recommend that a regulation prohibiting the fishing of oysters through the ice be adopted as soon as possible.

Oyster culture is now extensively carried on in several of the neighbouring States, as well as in the principal countries of Europe. Oyster farming in those places has become an established industry; the seed being planted and the crop raised with the same regularity, and with as great chances of success as attends farming on the land. The oyster being enormously fecund, increases very rapidly; the spat is sent out by the half million, and if the conditions be favourable, matures very quickly. The bays and estuaries of this Province afford ample opportunities to the enterprising private culturist who may desire to embark in oyster farming; and as the natural beds cannot be expected to always yield the necessary supply, this branch of industry would, in a few years, become profitable. Definite action with regard to this important matter should be taken at an early day. A system that has produced such marvellous results in other countries should succeed here; and would, if adopted, eventually prove a source of great national wealth.

## TROUT

Trout shows an increase of 6,280 pounds. In some of the rivers, trout were more plentiful than last yoar, while in others no improvement has been noticed. The best fishing was at North Lake, Naufrage and Fortune Rivers, King's County. Angling for sea trout affords excellent sport and large numbers of local sportsmen, as well as others, in search of recreation from the neighbouring provinces and the United States, resort to the Island streams during the summer months. It is therefore important that the rivers should be properly protected, and a more than ordinary effort in that direction was made this year. Special guardians were employed on the principal rivers, resulting in the seizure of several nets which were being used by poachers. This practice of netting the rivers for trout has been long carried on here and will be found difficult to stop. One poacher was detected with his net in the stream, and fined the maximum amount.

Mill owners were notified that they would be prosecuted, if sawdust and other mill rubbish was allowed to fall into the streams. As a rule, they endeavoured to comply with the regulation. The officers generally have been vigilant in watching the streams, and it is to be hoped that good results will follow.

## SALMON.

This fine fish shows an increase of 3,300 pounds.
Salmon were reported as being plentiful around the coast, especially in the vicinity of St. Peter's Bay, where the quantity appearing in the returns was taken. They were also reported as being abundant in the principal rivers of the Province during the autumn months to spawn. Poachers gave considerable trouble on the Dunk River in October and November, and although well watched by the wardens, no doubt succeeded in taking some fish. These poachers are disguised, and being well armed, are dangerous men to attack. Officer McBride, in attempting to capture some of them was violently assaulted and received a severe wound on the head. With the hatchery in working order, it will not be so difficult to protect this stream.

OTHER FISHERIES.
Hake shows a decrease of 646 cwt . This fishery is declining every year, not through any scarcity of fish, but because fishermen do not prosecute it with the same vigour as formerly.

The catch of haddock also exhibits a slight falling off. Fishing for haddock is not prosecuted as a separate industry; the quantity appearing in the returns, having been taken accidentally in connection with the cod tishery. The same may be said of halibut, which shows an increase of 1,692 pounds and the catch of which fluctuates from year to year. Smelts have decreased 20,770 pounds. This falling off is due to the difficulty met in getting the product to market in the winter season. Eels show a considerable increase. This fishery was carried on with considerable energy during the fall months, and the results have been satisfactory.

The catch of alewives, shad and bass has been only nominal; the quantity taken heing of little importance as an addition to our other fishery resources.

## FISH PRODUCTS.

Owing to the small catch of cod and other ground fish, oil shows a decrease of 2,491 gallons. Unmanufactured fish manure on the contrary exhibits a considerable increase, which may be accounted for by the increased catch of lobsters, the bodies of which make a valuable fertilizer.

## GENERALLY.

The year's operations may be considered satisfactory. The principal fisheries of the province have during the past season been actively prosecuted, and with one or two exceptions produced good results. The catch of some of the most valuable of our commercial fishes has exceeded that of many years past, and the prices realized came fully up to the expectations of those interested. These favourable conditons gave a healthy stimulus to the industry, and both dealers and fishermen are looking eagerly forward to the coming season, hoping that it may be even more successful.

In conclusion I desire to state that the wardens and other officers under my control, have evinced an earnest desire to assist in enforcing the Fishery Regulations. These Regulations are wisely framed for the purpose of protecting our sea coast and inland fisheries, and thus preserving for the people of Canada one of the most important resources of the country.

> I have the honour to be, Sir, Your obedient servant, EDWARD HACKETT, Inspector of Fisheries, Prince Edward Island.

## PRINCE EDWARD ISLAND.-Con.

Return showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, Quantity and Value of Fishing Material, Kinds and Quantities of Fish, and the Total Number of Men Employed, \&c., in the Province of Prince Edward Island, for the Year 1890.


Return showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, \&c.-P. E. Island—Continued.


Return showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, \&c.-P. E. Island-Continued.


Return showing the Number，Tonnage and Value of Vessels and Boats engaged in the Fisherics，\＆e．－P．E．Island—Continued．

| DISTRIC＇S． | Kinos of Fish－Continucd． |  |  |  |  |  |  |  |  |  |  | Fish Products． |  |  | Valce． |
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| Clifton Quens＇s Co．－Conclutch． |  |  |  |  |  |  |  |  |  |  |  |  |  |  | \＄cts． |
| Clifton ．．．．． | 357 |  |  | 5 |  |  | 500 | 2000 | 200 | 120 | $3+224$ | 200 |  | 116 | $\begin{array}{r}2,530 \\ 14,726 \\ \hline 8\end{array}$ |
| Cavendish．． | 85 | $\cdots$ | 20 | ， |  |  | 950 | 600 | 22 |  |  | 20 |  |  | 14,384 3,384 |
| New Glasgow． | 100 |  | 100 |  |  |  | 1090 | 500 | 15 |  |  |  |  |  | 3，220 10 |
| Rustico．．．．．． | 2000 |  |  |  |  |  | 1500 | 1530 | 120 |  | 31200 | 500 |  | 300 | 55，680 80 |
| Grand Tracadie． | 1500 |  |  |  |  |  |  | 20000 | 340 | 14 | 411104 | 1000 | 400 |  | 49,39448 |
| Point Prim．．．． |  | 1 |  | 55 | 28 | $\ldots$ | 250 | 200 | 2 | 5 | 146880 | 69 | 90 | 18th | 20， 866610 |
| Charlottetown ．Peter＇s Island |  |  |  |  |  |  |  |  |  | 840 |  |  |  |  | 2，520 00 |
| Lot 65 and St．Peter＇s Island |  |  | ．．．． |  |  |  |  |  |  | 780 | 2388383 |  |  | 1409 | 33，983 96 |
| Argyle shore ． |  |  |  |  |  |  | ${ }^{650}$ | 24000 | ${ }^{6}$ | 1340 | 24900 $46 \% 2$ |  |  |  | 8，642 00 |
| Wheatly River | ${ }_{4}^{10}$ |  |  |  | 15） |  | 150 250 | 10009 800 | 4 |  | 46224 |  | 100 |  | 9,03488 1,518 1,50 |
| Seal River ．．．． |  |  |  |  |  |  | 1800 | 4000 | 2 | 460 |  |  |  |  | 1，880 09 |
| Vernon River and Orwell， |  |  |  |  |  |  | 300 | 200 |  | 460 |  |  |  |  | 1，422 00 |
| Rivers，viz．：East＇West，North，Johnston and others．． |  |  |  |  |  | 5 | 1800 | 10000 | 20 | 1100 |  |  |  |  | 4，330 00 |
| Totals | 4162 | 1 | 190 | 60 | 43 |  | 10500 | 73830 | 738 | 5119 | 5701 知 | 1760 | 590 | 3600 | 213，632 60 |

feturn showng the Number, 'Ionnage and Value of Vessels and Boats engaged in the Fisheries, de., in the Province of
Prince Edward Island-Continued.


Recaptuluation showing the Number, Tonnage and Value of Vessels and Boats engaged in the Fisheries, Quantity and Value of Fishing Matcrial, Kinds and Quantity of Fish, and the Total Number of Men employed, \&c., in the Province of Prince Edward Island, for the Year 1890.


## RECAPITULATION.

Yield and Value of the different Fisheries in the Province of Prince Edward Island during the Year 1890.


## ESTLMATE

Of Capital employed in the Fisheries of the Province of Prince Edward Island in the Year 1890.


## APPENDIX D.

## QUEBEC.

## REPORT OF THE FISHERY OFFICER IN CHARGE OF THE GOVERNMENT VESSEL "LA CANADIENNE," ENGAGED IN THE PROTECTION OF THE GULF OF ST. LAW RENCE FISHERIES, FOR THE YEAR 1890.

Gaspe, P. Q., 31st December, 1890.

## The Hon. Charles H. Tupper, Minister of Marine and Fisheries, Ottawa.

Sir,-I have the bonour to submit the report on the fisheries of the Gulf Division for the year 1890, together with synopses of the reports of the local fishery overseers, and tabulated statements of the product and values.

The yield for the year shows the considerable decrease in value of $\$ 267,667.09$ as compared with the returns for 1889 . This decrease is almost entirely due to the diminished catch of salmon, herring and cod in the Counties of Gaspe and Bonaventure, which show a falling off in salmon of 66,851 pounds, valued at $\$ 13,370$ : herring, $14,721 \mathrm{brls}$., valued at $\$ 68,884$, and cod, $36,649 \mathrm{cwt}$., of the value of $\$ 146,596$; the total decrease being $\$ 228,850$.

On the north shore and Labrador, the cod-fishery shows an increase of 6,556 cwt., and salmon of 43,713 pounds over the yield of 1889 . This represents a good fishery, the year 1889 being a fair average one.

This decrease is undoubtedly due to the severity of the season, which has been almost unprecedented in its roughness. In May and June, there was a prevalence of almost continuous east winds and rain, varied with occasional gales. July was comparatively fine; but after the 20th August the weather again became rough, and hardly a week passed without a severe gale. During June, much damage was done to lobster traps and salmon nets, and during the fall gales, many boats were lost.

SALMON.
The total yield of salmon in this division amounts to $591,079 \mathrm{lbs}$. as compared with 584,217 lbs. for the previous season, or an increase of $6,862 \mathrm{lbs}$. As before stated, there was a heavy decrease on the south shore, but this has been more than made up by the increased catch on the north shore. Salmon net fishing began on the south shore about the 25th May. The weather during June, when the bulk of the fishery is usually made, was unfavourable, being cold and wet with constant easterly wind ; many of the nets in exposed situations being carried away. There is no doubt that the fish avoided the shores and kept right up the rivers. All the river guardians, from whom we have reports, agree in saying that fly-fishing was good and that the pools are more than usually full of breeding fish. On the north shore, the salmon net fishery was unusually good, many nets west of the Moisie river and in the neighbourhood of Trinity Bay having done better than ever before. It is worthy of remark that the run of salmon on the north shore is steadier and has not fallen off as it has on the south shore. I am inclined to think that the disappearance of capelin on the south coast, while it is constant on the north shore, has a good deal to do with this state of affairs. A steamer from France the "Frigide," the old "Diana" of the Hudson Bay Company, came out to Natasbquan early in June and purchased all the salmon, not already contracted for, to be had between Natashquan and Agwanus.

When the fishery began to slacken, she left for Chateau Bay in the Straits, where she hoped to complete her load before returning to Havre. She was fitted to freeze the fish on board, and if the venture turns out well, will return to the coast in 1891.

## COD.

Cod-fishing began about the end of May; during the early summer, up to the 20th July, the South shore fishery promised well, aftor that date, bait became scarce, and as the season advanced, the weather got rougher and rougher, and the damage to boats and gear became so great, that the fishery was really abandoned before its close. On the south coast, the tishery is short, compared with 1889 , which was about an average year, by nearly $37,000 \mathrm{cwts}$. After the middle of Jaly, bait wos always scarce, and squid, which constitutes the bait between the end of July and the middle of October, failed altogether. Fishermen are loud in their complaints against the order forbidding seining of smelt for bait. It was unfortunate that this season, the first in which this regulation was enforced, should have been one in which over a great part of the coast there has really no other bait to be had.

On the north coast and Labrador, the fishing was good; cod were distributed abundantly all along the coast from Godbout to Blancs Sablons, but they never took the hook freely for any length of time. The fall fishery between Mingan and Point des Monts was a failure owing to the continued rough weather. Below Mingan, there is no fall fishing; the season ending with the disappearance of capelin, about the close of July. The increased summer catch, however, fully made up for the failure in the fall. The yield on the north coast for this season is 62,972 cwts., against 56,417 cwts. in 1889. The Esquimaux Point fleet, as usual, missed the cod. They held on at Natashquan until the 8th July, when they left for below. By the 21st, many of them had passed back to the Point to fit out for the herring fishery, which they only make in September aud October. Those who remained below gave up the cod-fishery, and hung about the lower harbours, waiting for the herring which never came. Had these people stuck to the cod-fishery, as they should have done. there is no reason why they could not have made as good voyages as did the Nova Scotia vessels, which, between the 28th July and the 3rd August, filled up with cod at Dog Islands and St. Augustin, where for a week the tish were in enormous quantities and took the bait ravenously with the float line, which is the only rig that these Esquimaux Point people ever use. While these men in vessels from Esquimaux Point were amusing themselves sailing backwards and forwards along the coast, a few of those who could not get away began fishing off the Point, and though the boats they had and the lines they were rigged with, were almost past service, yet during the season they took some 600 cwts. of cod. The sooner these fishermen from the Point learn to provide themselves with modern appliances and prosecute the fishery with intelligence and energy, the sooner will there be an end to their complaints. It is impossible that there can be anything else but misery at Esquimaux Point, as long as their various fisheries are conducted in the present badly found and careless manner. They would, in any case, do far better to give up cod-tishing in vessels, and fit out with boats to carry on this fishery from the shore, abreast of their own homes, as is done by all the other communities on the North coast. The vessels, if properly fitted and found, could still be used for the seal and herring fisberies.

## HERRING.

Spring herring were abundant at Magdalen Islands, and in the Baie des Chaleurs, during the first spring tides of May. These herring are taken in enormous quantities io the Bay for manure, and at Magdalen Islands, both for manure, and bait. Many foreign and domestic vessels visit the Islands, for the purpose of getting herring for the bank cod-fishery and for baiting lobster traps.

During the summer, herring were always scarce, and in the fall in many places none at all were found. This scarcity may have been partly due to the heavy
weather which kept herring off shore; that this was so, is evinced by the fact that boats often found herring on the banks, when they could get none ashore. But, this alone does not account for the steady and continued failure of the fall (fat) herring.

I think there can be no doubt that the practice of taking unspawned herring in such enormous quantities for manure must be wrong. There is a growing feeling that the time has come when the taking of such a valuable food tish as herring for manure should be stopped. I believe that it should not even be permitted to take herring in large quantities for bait for export, until the spawning season is over. I have many times called the attention of your Department to this matter, and I would again urge it upon your favourable consideration.

The fleet from Esquimaux Point again missed the herring. These people who had abandonned the cod-fishery during the middle of July to fit out or prepare for herring fishing which usually takes place in September and October, about the Straits of Belle Isle and the west coast of Newfoundland, with their usual bad luck and in spite of their early preparation, did nothing; the fleet of 19 vessels to ng only 900 brls .

They were again harrassed by the Newfoundland Custom House officers, and compelled to pay duty on salt and barrels which they had on board for the purpose of the fishery, and not for trade. The following vessels paid these duties as follows :-


It certainly seems unfair that our fishing vessels should be compelled to pay duty on fishing outfit which is solely for their own use, is never landed, and is not intended for trade.

This imposition is made worse by the fact that the Newfoundland authorities are not even able to protect these people, after making them pay such duties, as they have frequently been driven off by French cruisers. This matter should receive the attention of our custom anthorities.

## LOBSTERS.

The lobster fishery shows a slight increase; the figures being for this year $616,218 \mathrm{lbs}$, as against $593,950 \mathrm{lbs}$. for 1889 . This increase is more than accounted for by the openning of two new canneries on the Island of Anticosti. These canneries were opened by people from Nova Scotia, who had lett in the early spring with the intention of establishing themselves on the west coast of Newfoundland, but owing to the troubles there were driven off. Instead of returning to Nova Scotia, they decided to give Anticosti a trial. After making arrangements with the owners of the island for sites, they put up two canneries, the material for which they had on board their vessels. They were late in getting to work, and were much hampered by the drift ice in June. In spite of these drawbacks, they made a good fishery, putting up $60,000 \mathrm{lbs}$.

Lobsters are abundant all around the Island of Anticosti, and as the ground is new, the run of fish is large. The trouble will be that owing to the rociny nature of the bottom, and the complete want of shelter, the loss of traps will be something enormous.

In most localities, the season was not a favourable one; the loss of traps in some cases having run up to 80 per cent.

There is no doubt that in the Baie des Chaleurs where there has been many factories in operation for some years, the run of lobsters is improving. In fact, on the main
land shores of Gaspe and Bonaventure, no falling of in the size of lobsters was noticed during the past three seasons. The coast is not overfished, and the shortened season is beginning to tell.

At Magdalen Islands, this stoppage in the decreasing size of the lobster is not so apparent, though some of the more intelligent fishermen claim that even here the new regulations are beginning to tell. If these regulations are to remain in force, it will be necessary to have a number of local guardians to assist the fishery officer in watching the canneries.

## MACKEREL.

Mackerel were fairly abundant around the Magdalen Islands throughout the season, and 5,018 brls. were caught by the local fishermen with hook and line. A fleet of about twenty United States fishermen fished there from early in August until late in October. No very large catches were made, and they took nearly all their fish with hook and line. In some instances, the fish were tolled to the surface; and the seine shot around them, but, as a rule, the seine was not used, several of the vessels were fitted solely as hook and liners, and others left their seine boats ashore. The mackerel did not school at the surface; the run was large and fat.

A few schools were noticed between Point des Monts and St. Ann's, in the River St. Lawrence ; but in Gaspé Bay, Port Daniel and Seven Islands Bays, no mackerel whatever were seen. The price of mackerel continued high.

## seals.

The seal fishery was a failure; the Magdalen[sland fleet taking only 11,628 seals among 21 vessels-not half a fishery-while the vessels from Esquimanx Point took only $2,15 \check{5}$. Seals were abundant; in fact owing to the poor fisheries of recent years; they are accumulating, but the ice was so packed that these small, poorly found sailing vessels were not able to reach them.

> BAIT.

Bait in the shape of spring herring was fairly abundant in May and June, but the summer and fall herring was everywhere either scarce or altogether absent.

Capelin were unusually abundant on the north coast and Labrador; but this bait is now a thing of the past along the south shore, it being only about Paspebiac that any is taken.

Squid, the bait usually relied on from the end of July until well into October, missed altogether. It is impossible to account for this failure, but it happens this way now and then.

Fortunately, over most of the coast, clams are found in abundance in the estuaries and sandy Barachois. They are used fresh, and furnish reliable bait. Some of our large fishing firms have, at various times, imported salted clams from Halifax, but they were found so little useful as bait that the fishermen refused to go out with them. The scarcity of bait was much felt on some of the larger fishing rooms, such as at Percé, Bonaventure Island, Point St. Peter, Cape Cove, and Grand River, where there are no clam banks.

Appended hereto are synopses of the reports of the various local officers in the division.

> I have the honour to be, Sir, Your obedient servant,, WM. WAKEHAM, Fishery Officer in charge of the Gulf and lower St. Lawrence Division.

> SYNOPSES OF FISHERY OVERSEERS' REPORIS.

## RISTIGOUCHE SUBDIVISION.

Ocerseer J. A. Verge reports the catch of salmon as only 33,465 lbs., as against 52,880 lbs. in 1889 . This is, of course, only for the Quebec side of the estuary. This shortage is supposed to be due to the prevalence of easterly gales during the main
run of the fish. Many nets were torn, and all more or less cast adrift. The fish also kept to the channels and avoided the shores. After the rough weather had passed, it was noticed that salmon were very abundant above the tide, in the lower portions of the river; and in October, the spawning beds on the main river and Kedgewick. never contained more fish. Due regard was paid by licensees to the fishery laws and regulations, and the Sunday close time was striculy complied with.

The smelt fishery was a failure, owing to the shifting of the ice ; only $11,000 \mathrm{lbs}$. being taken.

## CARLETON SUB-DIVISION.

Overseer P. Cyr reports salmon fishing a failure. Many nets did not half pay expenses; the take beng only 27,334 lbs., as compared with $37,805 \mathrm{lbs}$. in 1889. Fishermen attribute this failure to the prevalence of easterly wind, causing the fish to keep in deep water while passing in to the estuaries of the Ristigouche and Grand Cascapedia.

Cod was abundant right up the Bay to Maguasha, but bait was scarce. Herring were plentiful, but the catch was small, owing to continued rough weather which prevailed throughout the whole season, and caused much damage to nets and gear.

BONAVENTURE SUB-DIVISION.
Overseer J. $L$. Smith reports that salmon fishing in his division shows a decrease of $3,382 \mathrm{lbs}$. as compared with last year. Spring herring were plentiful at Paspebiac, New Carlisle and Bonaventure, but scarce at other stations. Lobster tishing began on 10th May, with a good catch. Two factories were open, and in proportion to the number of traps fished, the catch was good; lobsters being larger than last year.

Capelin were scarce; only a few being taken at Paspebiac and New Carlisle.
The summer catch of cod was fair, but bait was scarce, and fishermen had to, use clams. Fall fishing was about an average, but bait was always scarce. Mackerel and fall herring were a failure.

PORT DANIEL SUB-DIVISION.
Overseer $J$. Phelan reports that the salmon fishing season began on 27 th May and closed 21st July, being 15 days shorter than last year. There is a shortage of 3,000 lbs., as compared with last year; this was confined to one stand, that of Jean Langlois. The failure of this stand was due to the work going on at Port Daniel wharf during the fishing. The catch otherwise was fully up to an average.

Cod-fishing began on the 5th June with good indications, but these did not continue; bait failed in July, and by the 1st of August it was evident that the summer fishery would be a failure. It was hoped that the fall fishery would make up the loss, but bait never come in; herring and squid missed entirely. From the end of August to the close of navigation, there was nothing but a succession of gales, such as have seldom been experienced on the coast. There was no scarcity of fish; the failure of the fishery was entirely due to want of bait and stormy weather.

In the last few years, summer herring have been falling off; this year there could not be had half enough for bait. Though Mr. Phelan does not think that the seining of spring herring for manure is the only cause of this failure; yet, he favours the prevention of seining for manure. Spring herring were plentiful, and were largely taken for manure. Many Nova Scotia vessels baited at Port Daniel in the spring, paying from 60 cents to 75 cents a barrel for spring herring. No mackerel were caught, nor were any seen on the coast.

Lobster fishing began on the 13th of May and closed 10th July. Lobsters appear to hold our well both in size and quantity; the cacth during the first two or three weeks of the season being exceedingly good. Later on, fishing operations were interrupted by frequent storms, causing considerable wreckage of traps. The fishery was ten days later in opening than in 1889.

Fishermen of all classes sustained considerable loss, through wreckage, this season. At l'Anse an Gascon, several boats were broken, and some protection in the shape
of a breakwater is much needed there so that boats can remain afloat in safety. Fishermen complain bitterly against the smelt regulation, especially with such a season as this, when no other bait was to be had. Owing to the enforcement of these regulations, many codfishermen were prevented from earning their living.

## Grand-River Subdivision.

Overseer $H$. Jones reports the salmon catch about the same as last year; the yield this season being $16,000 \mathrm{lbs}$, as against 16,008 for 1889 . Salmon nets in this sub-division are all on the sea coast and as a natural consequence are disturbed by rough weather more than the sheltered nets in the estuaries. The lobster fishery was late in beginning by fully ten days, and the loss of traps was so great that after the rough weather in the end of June most of the factories closed down.

Cod-fishing was a failure, owing to want of bait; herring being scarce all summer and squid still scarcer in the fall. The weather was constanly bad, and during the unusnally heary gales of the 28th August and the 5th October, many boats were broken at the mooringsand lost. The falling off in this sub-division alone amounts to $15,000 \mathrm{cwts}$.

Smelt fishing was also a failure ; only $2,080 \mathrm{lbs}$. being seined, against $20,000 \mathrm{lbs}$. lastyear. The smelt kept out and did not run into the estuaries until after the close of navigation.

## GAspe subdivision.

Overseer $G$. Annett reports salmon fishing a failure- 1 he take being 46,456 lbs. compared with $75,023 \mathrm{lbs}$. in 1889 . This is held by net fishermen to be altogether due to the bad weather which prevailed during the end of May and June.

Lobster fishing gave about the same return as in 1889; there being a decrease this season of only $2,500 \mathrm{lbs}$. which would be more than accounted for by the unfavourable season. Most of the lobster factories closed down before the end of the season; during the first weeks of the fishing, the rus of lobsters was good and the size fair.

Cod fishing was decidedly poor; not on account of any scarcity of fish, as when the boats went out with bait, good fares were made, but owing to scarcity of bait and rough weather. At Point St.Peter, on the 5 th and 6 th of October, several boats were destroyed during an unusually heavy gale. Smelt fishing was also a failure. There were taken this fall $74,665 \mathrm{lbs}$. as compared with $101,860 \mathrm{lbs}$. in 1889 . These fish kept on shore during the early part of the season in October, owing to the rough weather and heavy floods in the rivers. It was only during the last week of the fishery, between the 10 th and 17 th of November, that anything was done. After the close of the fishing season, on the 18th November, when the Str. "Admiral" stopped running, smelt came in and were abundant in the bays and estuaries.

## Magdalen RIVER sẗb-dIVISION.

Overseer J. Lemieux reports salmon fishing as poor. Cod struck in on the Sth June; the fishery is below the average. Cod seemed to be plenty but bait was always scarce; for weeks at the time none being had. Squid missed entirely in this division. No mackerel were seen, and the white porpoises, which have so disturbed the codfishery of recent years, did not, this season, put in an appearance.

## ST. ANNE DES MONTS SUB-DIVISION.

Overseer Jos. J. Létourneau reports the cod-fishery as being slightly better this year than last. Cod were late in arriving, and bait was scarce. The white porpoises did not fail to visit the coast as usual; and at each visit they drove away the cod and the bait for fully a week. The salmon net fishery amounts to nothing, as there are now only two small nets licensed, which caught about 3 brls. of salmon. The salmon were late in entering the river, but the spawning pools were unusually full this fall. No trout nets were set this season. Herring were scarce, and always poor in quality. A good many schools of mackerel were noticed well off shore in the River St. Lawrence, but they never came in-shore and none were taken.

MAGDALEN ISLANDS SUB-DIVISION.
Overseer A. Chevrier reports a poor spring seal fishery. Owing to the motion of the ice, the schooners could not reach to the seals. It is now several years since the Islands shooners have made a good seal fishery. In the meantime, seals are accumulating; immense herds were seen, but the vessels only killed 11,628 . The take of lobsters was fair, $341,088 \mathrm{lbs}$. being canned, being 11,676 lbs. more than in 1889. The season began well, but during the end of June an easterly gale broke up many of the traps. In one case, a canner reported 80 per cent. of his traps destroyed. The fishery was pretty well over by the end of June, damaged traps not being replaced. The cod-fishery was poor. The fish did not seem to be plenty on the inshore grounds, and, as soon as the mackerel struck in, the buik of the fishermen gave up the cod and took to mackerel fishery.

The mackerel fishery was fairly good, local boats taking 5,018 barrels, altogether with the jig. The Islands fishermen complain that their hook-and-line fishing was very much curtailed by the great quantity of gill nets set off the Islands, especially off Grand Entry and Pleasant Bay, by foreign fishing vessels. The prices paid for mackerel continued high.

Spring herring were abundant, and large quantities were taken by vessels from the United States, Nova Scotia and Newfoundland. Several French vessels come over from St. Pierre to buy herring for bait.

## POINT DES MONTS SUB-DIVISION.

Overseer $I^{\top}$. Comeau reports a considerable increase in the catch of salmon in his division, 61,465 lbs. being taken, as against 43,250 lbs. in 1889 . The weather was very unfavourable, and the heavy easterly winds did much damage; several fishermen losing their nets entirely. The run of salmon was late, but steady and regular all through the season. Angling was also good; the Trinity River giving one-third more than the usual catch, while on the Godbout, three rods took the enormous number of 509 fish. Trout seemed scarce. Cod struck in early, a few being taken at Trinity Bay in May, fully a month earlier than usual. The fish remained on the banks all season, and as late as the 8th November they were still abundant. The catch was considerably more than last year. Herring and halibut were not as abundant as usual. Bait, herring and squid were scarce; in fact, no squid were seen this season. The principal bait used was clams. One or two schools of mackerel were seen off Godbout in July, and a few barrels were taken in herring nets. There was a large decrease in the number of seals killed at Point des Monts during the winter. At Manicouagan, the summer seal fishery was fair. The seal taken in summer at Manicouagan is the common harbour seal (Phoca Vitulina), while at Point des Monts, in winter, the seal killed is the Greenland seal (Phoca Groenlandica).

## moisie sub-division.

Overseer T. Migneault reports that salmon net fishing began on 28th May, and was at its best between the 5th and 23rd June. Some of the nets in the bay, west of Moisie River made enormous catches. The run of salmon was smaller than usual ; 198 salmon were taken with the fly by six rods, but the gentlemen gave up fishing on the 3rd July, when the fishing was at its best. The river was full of fish. The cod-fishing was fuir, especially in the fall; $3,855 \mathrm{cwts}$. being taken as against 3,051 cwts. in 1889. Bait was scarce towards the end of the season. Had it not been for this, the catch of cod would have been much more considerable. No mackerel were seen at Seven Islands. Fall herring were scarce, the take being short of last season's by 251 barrels.

## MINGAN SUB-DIVISION.

Overseer G. L. Duguay reports salmon fishing good in his division. The summer cod-tishing was also good, but fall fishing was a failure, owing to continuous rough weather. There were taken $17,600 \mathrm{cwts}$. of cod, as compared with 18,550 cwts. during the previous year. In view of the fact that fall fishing was a failure, this represents a good summer fishing. The fishermen from Esquimaux Point failed at each of their three fisberies: 1st. At the seal fishing in the ice, twenty-two schooners taking only 2,000 seals, yielding about 6,000 gallons of oil. 2nd. At the
cod-fishery, the fleet which went below returned with only about 900 cwts . 3rd. At the herring fishery made in the Straits and on the west coast of Newfoundland, the same vessels took only 900 barrels. As a consequence, the people at the Point are poorly off, and some fifty families have had to leave. Twenty boats which carried on the fishery in deep water right abreast of the Point took 600 cwts ; this in spite of the fact that they were poorly rigged, and owing to the absence of other bait but clams.

## NATASHQUAN SUB-DIVISION.

Overseer $G$. Gaudin, reports the seal fishery a failure, only 485 seals being taken by the six schooners of Natashquan, against 5,318 the year before. The first salmon was taken in the river on the 5th June; the river gave about the same quantity as last year. The outside stations did well, in spite of drift ice which remained until the 21 st June. Three rods took 203 salmon in the Great Natashquan in three weeks. A few herring were caught in the spring, but during the summer and fall none were taken. Cod struck in abundantly with the capelin on the 12th June, but no great loads were made; fishermen complaining that the fish would not take the bait. The fish disappeared from the grounds on the 5th July, leaving with the capelin. After this date, the boats made several trips to the off shore banks at Kegashka; the trips often taking a week or more. Seven families left this season. Two removed to the upper part of the province, two returned to Magdalen Islands, from which they came a few years ago, and three crossed to Port Daniel, in Baie des Chaleurs.

## WASHEECOOTAI SUB-DIVISION.

Overseer G. Mathurin reports that salmon fishing began only on 20th Jane, owing to the quantity of drift ice kept on shore by prevailing easterly winds. Many nets were carried away by the ice, and fishermen were too poor to replace them. A number of boats came down in July and August to fish for cod off Kegashka; they did fairly well. There are only two boats carrying on cod-fishing in this division.

## st. AUGUSTIN SUB-DIVISION.

Overseer J. Legouvie reports that the salmon fishery was late in beginning, owing to the field ice which remained on shore, so that nets could not be set in many places before the 24th June. Only 96 brls. were taken, compared with 116 in 1889.

Cod was very abundant from Harrington to Chicatica, between the 15 th June and the 7th August, but it was only during the last ten days of this season, that they would take the bait at all freely. At the large fishing stations at Harrington and Mutton Bay, the fishermen took most of their fish in deep water. Bait was scarce after the passing of the capelin, and most of the cod was taken on clams. Fall herring were very scarce; only 75 brls. being taken against 1,441 the year before.

## BONNE ESPERANCE.

Overseer Wm. Whitely reports that salmon were more abundant than last year. They ran freely for three days, about the 5th July, but slackened off immediately afterwards. The returns give 143 brls., as against 75 the year before.

Cod-fishing was good; the northern ice coming in through the straits in June somewhat delayed the fishery, but after the 27 th June, when the fish struck the coast, they were very abundant for six weeks; unfortunately they would not take the bait, until during the last two weeks; seines and traps were successful.

The seal fishery was a failure, owing to the ice blocking the coast until the end of June.

Herring were very scarce; a few being taken at Bradore, and Middle Bay in the first days of August. This fishery has been a failure, as none were taken on the Newfoundland Labrador.

All the residents of this part of the Labrador are well provided for the winter. The prospects for the cod-fishery are brighter than for some years. Localities that have failed for years back, have this season been visited by codfish in abundance, reminding us all of old times. There was taken in this division $23,650 \mathrm{cwts}$. of cod, compared with 19,770 last year; this does not include the fish taken by vessels from Nova Scotia or Newfoundland.

Return showing the Number and Value of Vessels, Boats and Fishing Materials, County of Bonaventure, Province RISTIGOUCHE SL-b DIVISION


CARLETON SUB DIVISLON


BONAVENTLRE SCB-DIVISIUN


PORT DANIEL SUB-DIVISION


TOTAL FOR COUNTY

the Number of Men Employed, with the Kinds and Quantities of Fish, \&e., in the of Quebec, for the Year 1890.
(Head of the Tide to Maguasha).

(Maguasha to Grand Cascapedia).

( (irand Cascapedia to Paspebiac Point).

(Paspebiac Point to Point Maquereau).


OF BONAVENTURE.

| 11000 | 33465 |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 27334 | 385 | 200 | 200 | 10 5 |  |  | 195 | 80 | 80001 | 1700 | 20,724 |  |
|  | 13667 | 460 |  | 350 | ....... | 32160 |  | 2550 | 2970 | 18850 | 3830 | -4,230 |  |
| 12000 | 20329 | 4400 | 39 |  |  | 63294 | 29 | 2850 | 1370 | 4300 | 149 | 41,36\% |  |
| 23000 | 94795 | 9455 | 539 | 550 | $10 \quad 57$ | 95454 | 29 | 5595 | 3520 | 31150 | 7009 | 123,562 |  |

Rnturn showing the Number and Value of Vessels, Boats and Fishing Materials County of Gaspe, Province GRAND RIVER


GASPÉ SUB-DIVISION

| Barachois. . | 100 | 4000 | 100 | 1662 | 1650 | 2301 | 335 | 23551 | 7600 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Belle Anse. | 28 | 1120 | 28 | 950 | 440 | 20 | 20 |  | 306 |
| Malbaie | 32 | 1280 | 32 | 820 | 400 | 56 | 84 |  | 295 |
| Point St. Peter. | 148 | 5850 | 147 | 3330 | 1595 | 80 | 197 |  | 100 |
| Chien Blanc. | 84 | 3360 | 84 | 1550 | 750 | 80 | 157 |  |  |
| Bois Brollé. | 18 | 650 | 18 | 240 | 180 | 20 | 20 |  |  |
| Seal Cove. | 22 | 880 | 22 | 645 | 370 |  | , |  | 426 |
| Douglastown | 40 | 7601 | 40 | 920 | 770 | 80 | 60 |  | 29305 |
| Haldimand | 10 | 300 | 10 | 345 | 305 |  |  |  | 200 |
| Sandy Beach | 18 | 630 | 20 | 1817 | 1644 | 22 | 15 |  | 7082 |
| Gaspé, North and Sonth | 46 | 500 | 106 | 3916 | 3000 | 900 | 500 | 51114 | 17575 |
| Peninsula ............ | 11 | 110 | 11 | 1424 | 1200 |  |  |  | 5777 |
| Cape aux Os | 13 | 300 | 14 | 355 | 230 | 20 | 40 |  | 600 |
| Seal Rock. . | 7 | 80 | 9 | 140 | 96 | 20 | 25 |  |  |
| Little Graspé | 10 | 304 | 10 | 473 | 739 |  |  |  | 1434 |
| Grande Grève. | 24 | 1225) | 34 | 1018 | 220 | 82 | 160 |  | 1616 |
| St. George's Cove. | 18 | 810 | 17 | 259 | 590 |  |  |  | 122 |
| Indian Cove. | 22 | 880 | 16 | 360 | 275 | 20. | 32 |  | 364 |
| Ship Head . . . . . . . . . . | 28 | 790 | 26 | 600 | 386 | 20 | 40 |  |  |
| Totals.. | 679 | 23829 | 744 | 20829 | 14800 | 1700 | 1645! | 74665 | 46451 |

the Number of Men Employed, with the Kinds and Quantities of Fish, \&c., in the of Quebec, for the Year 1890.
(Point Macquereau to Barachois of Malbaie).

(Barachois of Malbaie to Cape Gaspé).


## Return showing the Number and Value of Vessels, Boats and magdalen river sub-division



Fishing Materials, \&c., in the County of Gaspé, \&c.-Continned.
(Cape Gaspé to Rivière à Pierre.)


Return showing the Number and Value of Vessels, Boats and STE. ANNE: DES MONTS SUBDTVISION.-


TOTAL FOR THE


Fishing Materials, \&c., in the County of Gaspe.-Concluded.
(River i Pierre to Cap Chatte.)


## SUBDIVISION.



## COUNTY OF GASPÉ.



Return showing the Number and Value of Vessels, Boats and Fishing Materials, County of Saguenay, Province

POINT DES MONTS RUB-DIVISION


MOISIE SUB-DIVISION


MIN(iAN SUB-DIVISION

the Number of Men Employed, with the Kinds and Quantities of Fish, \&e., in the of Quebec, for the Year 1890.
(Manicouagan to Jambons.)
Kinin of Fish.
(Fambons to Pigon.)

(Pigou to Watsheeshow.)


Return showing the Number and Value of Vessels, Boats, natashedan sub division


Nets, \&e., in the County of Saguenay, \&c.-Continued.
(Watsheeshoo to English Point.)


Return showing the Number and Value of Vessels, Boats, ST, AUGUSTIN SUB-DIVISION


Nets, \&c., in the County of Saguenay: \&c.-Continued.
(Coacoachoo to Chicatica).


Return showing the Number and Value of Vessels, Boats, BONNE ESPÉRANCE SUB-DIVISION


Nets, de., in the County of Saguenay, de.-Continued.
(Chicatica to Blanes Sablons.)


Return showing the Number and Value of Vessels, Boats,
ISLAND OF ANTICOSTI


RECAPITLTLATTON FOR THE


Nets, \&e., in the County of Saguenay, de.-Continued.
SUB-DIVISION.


## COUNTY OF SAGUENAY.



Return showing the Number and Value of Vessels, Boats and Fishing Materials, the Number of Men employed, with the Kinds and Quantities of Fish, \&c., in the Gulf Division, Province of Quebec, for the Year 1890.
totals for the gulf division.


## RECAPITULATION.

Statement of the Yield and Value of the Fisheries of the Gulf Division, Province of Quebec, for the Year 1890.

| Kinds of Fish and Oil. |  | Quantities. | Price. | Value. |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | S cts. | 8 cts. |
| Smelts, fresh. | Lbs. | 100,745 | 005 | 5,037 25 |
| Salmon, salt. | Brls. | $442{ }^{\frac{1}{2}}$ | 1600 | 7,08000 |
| do fresh, in ice | Lus. | 480,454 | 020 | 9609080 |
| Cod, salt, dry. ..... | Cut. | 153,709 | 400 | 614,836 00 |
| Haddock, salt, dry. |  | 1,298 | 400 | 5,192 00 |
| Halibat. | Lbs. | 92,001 | 010 | 9,200 10 |
| Herring, salt | Bris. | 6,773 | 400 | 27,108 09 |
| do smoked | Boxes. | - 865 | 025 | 21625 |
| Mackerel, salt. . | Brls. | 5,023 | 1500 | T5, 34500 |
| Trout, salt. |  | 153 | 1000 | 1,530 00 |
| Eels, salt. |  | T2 | 1000 | 72000 |
| Cod tongues and sounds, salt |  | 183 | 1000 | 1,830 00 |
| Lobsters, cans, one llb. | Lbs. | 616.218 | 012 | 73,946 16 |
| Coarse and mixed fish. | Brls. | 29 | 300 | 8700 |
| Seal skins | Pieces, | 17,003 | 100 | 17,003 00 |
| Porpoise skins | " | 75 | 500 | 37500 |
| Seal oil.. | Galls. | 82,369 | 040 | 32,94560 |
| Porpoise oil |  | 904 | 040 | 36160 |
| Whale oil |  | 190 | 040 | 7600 |
| Cod oil. |  | 95,533 | 040 | 38,221 20 |
| Fish for bait | Brls. | 49,492 | 150 | 74,238 00 |
| do manure |  | 35,936 | 050 | 17,96800 |
| do local use |  | 18,885 | 400 | 75,540 00 |
| Total Value, 1890. |  |  |  | ,174,948 96 |
|  |  |  |  | 1,442,616 05 |
| Decrease for 1890.. |  |  |  | 267, 66709 |

Statement of Lobster Canneries in the Gulf Division, for the Season of 1890. COUNTY OF BONAVENTURE.

| No. | Lucality. | $\begin{gathered} \text { Number } \\ \text { of } \\ \text { Traps. } \end{gathered}$ | Value of Trajs Buats, de. | Valum <br> of <br> Factory and Machinery. | Total Vilue. |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | Bonaventure Suldivision. <br> Port Daniel do $\qquad$ Totals | * | $\times$ | \$ | $s$ |
| $\stackrel{2}{3}$ |  | 1,600 2,1100 | $\begin{aligned} & 1,500 \\ & 1,6,100 \end{aligned}$ |  | $\begin{aligned} & 2,400 \\ & 4,100 \end{aligned}$ |
| j |  | 3,700 | 3,100 | 3,400 | (6, 200 |

COUNTY OF GASPÉ.


COUNTY OF SAGUGNAY.


TOTAL OF LOBSTER CANNERIES IN G(ILJ J)IVISION.

| a) | Comity | Bonaventure | 3,700 | 3,100 | 3,4(0) | (;,0) 0 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 25 | ro | Craspei. | 31,500 | 31,500 | 2e, 200 | 33,740) |
| 3 | do) | Saguemay | 3,400 | 3,690 | 2,400 | 1,000 |
| 33 |  | Totals | 38,1500 | 38,200 | -28,000 | (36, 200) |

Statement of the Value of Material Employed in Fisheries in the Gulf Division, Season of 1890 .


Statement of Men Employed in Fisheries of the Gulf Division, Season of 1890.

|  | Description. | Number. |
| :---: | :---: | :---: |
| Sailors. . . . . . . . . . . .Fishermen and menen |  | 364 |
|  |  | 8,208 |
|  |  | S,5i\% |

## SYNOPSES OF FISHFRY OVERSEERS' REPORTS IN THE PROVINCE OF QUEBEC, EXCLUSIVE OF THE GULF DIVISION, FOR THE YEAR 1890.

south shore, river st. lawrence, from cape chatte to point lévis.
Overseer J. Joncas has charge of the sonth side of the St. Lawrence, from Cape Chatte to River Blanche, including Matane River. He reports a further decline in the yield of salmon, the catch having only amounted to $2,970 \mathrm{lbs}$. this season, or 15 per cent. less than last year. This is chiefly attributed to the water in Matane River, which, for the past two seasons, kept so low that salmon could not go up the fishway. Mr. Joncas thinks that the fishway is not properly located, and that this is why it fails to give the satisfactory results expected from it. Only 154 porpoises were killed, against 400 in 1889 . The laws relative to sawdust and mill rubbish were strictly enforced in this division, and several ines were imposed upon the millowners. The total value of the fisheries in this district is reckoned at $\$ 7,035$.

Overseer L.S. E. Grondin, whose division extends from Rivière Blanche to Rimouski, reports an increase in the catch of herring but a falling off in that of salmon. This was caused by the strong gales which prevailed during the first part of the fishing season. Some fishermen, who were in the habit of catching from thirty to forty salmon, only caught a couple this season. The total value of the fisheries of this division a mounts to $\$ 36,000$.

Overseer H. Martin has charge of that part of the coast extending from Rimouski wharf to Pointe à la Loupe, including Rimouski River. He reports a shortage in the the catch of salmon, owing to the destruction of a large number of nets by storms, and which were not repaired. The South-West Bic River is reported to be very much neglected by its lessee, especially at spawning time. Shad has almost disappeared from this coast, and no apparent reason can be ascribed for it. Herring and sardines were abundant. The fishery regulations were generally well observed. No nets were allowed at the Government wharf, and the brush weirs at Barnaby Island were kept in proper check, so as to give due protection to the breeding fish in Rimouski River. The total value of the fisheries of this division is given at $\$ 15,000$.

Overseer Napoléon Levesque reports a falling off in the salmon and shad fisheries on that part of the River St. Lawrence fronting on the County of Temiscouata, but an improvement in all other yields of fish. The enormous catch of over 12,000 brls. of small and coarse fish swells the value of the fisheries in this division to $\$ 56,000$. Forty-two seals and twenty porpoises were killed opposite Green Island and Cacouna. The five fish-ways built in this division are said to be in good order.

Overseer Xavier Pelletier, who has charge of the fisheries fronting the County of Kamouraska, reports a falling off in the yield of nearly every kind of fish, but most particularly in that of shad, which hardly amounts to $6,000 \mathrm{lbs}$.; while the catch of 1889 was more than double that quantity, although it was considered a poor season. One hundred and forty-one porpoises were killed in the fisheries of River Ouelle and St. Anne. The total yield of the fisheries of this district amounts to $\$ 20,000$.

Overseer Eugene Pelletier's division extends from St. Anne to Lévis. He writes to say, that with the exception of shad, which failed in his district, as well as everywhere else on the south shore, fishing was satisfactory. The absence of shad was compensated for by a bigger catch of eels and whitefish. Seining for smelts is now almost entirely stamped out; but this Overseer complains of another evil, the destruction of millions of young and immature fish, which are yearly killed in the brush weirs. He is of opinion that were parties offering young fish for sale at ridiculously low prices made liable to fines, it would greatly aid the saving of fish life, and benefit both fishermen and consumers. The total value of the fisheries of this division exceeds $\$ 30,000$, being an increase of 50 per cent. over that of last year.

NORTH SHORE RIVER ST. LAWRENCE, FROM QUEBFC TO BERSIMIS. QUEBEC AND MONTMORENCY DIVISION.
Overseer L. P. Huot's division comprises the shores of the Island of Orleans, and that part of the north coast of the River St. Lawrence extending from St. Joachim to Chateau-Richer. As anticipated by this officer, nets which have been too close to one another have begun to thin out. Seventeen stands and eight brush weirs were abandoned last season, fishermen seeking other employment. This accounts, to a certain extent, for the apparent falling off in the fisheries of this division, which can only be ascribed to a less vigorous prosecution of this pursuit. The overseer states that, with the exception of shad, which was a total failure, the other kinds of fish were as abundant as usual, a decided improvement being especially noticeable in the yield of salmon. The total catch of this division, valued at $\$ 16,392$, is disposed of in Quebec markets,

Overseer $U$. Bhereur has charge of that portion of the north shore of the River Lawrence extending from Rivière du Gouffre to Rivière aux Canards, including Isle aux Coudres. The yield of salmon shows a slight improvement, especially at Malbaie and St. Fidèle. There were only 31 porpoises killed in the fisheries of Isle aux Coudres, against 146 in 1889. The total value of the fisheries of this division amounts to nearly $\$ 23,000$, including the estimated yield of the inland waters of the County of Charleroix.

Overseer L. N. Catellier, who attends to the Saguenay Division, from Rivière aux Canards to Bersimis, states that although the catch of salmon in 1889 was considered a good one, that of last season exceeds it by 60 per cent. Carelessness on the part of some fishermen to properly secure their nets resulted in heavy loss instead of large catches. It now seems an established fact that the best hauls were made during the prevalence of strong north-easterly gales. There were 980 salmon caught in five weeks in the Department's net at Point Rouge, 325 of which were kept for the hatchery, and the remainder liberated alive. The several fishing guardians and anglers agree in stating that the rivers are well stocked with breeding fish. Never before were they noticed in such large numbers in St. Margaret River. The fishway on Rivière à Mars needs repairs. This will be attended to as soon as navigation opens. The total value of the fisheries of this division is estimated at $\$ 21,286$.

## FROM QUEBEC TO UPPER OTTAWA.

## SHERBROOKE AND MEGANTIC DIVISIONS.

Overseer $P$. W. Nagle attends to the inland waters of the County of Stanstead. He reports a slight falling off in the catch of his division, as compared with the yield of the previous year. The staple fish is trout, of which $12,000 \mathrm{lbs}$ are returned, the whole being used for local consumption. No violations of the law came to this Overseer's notice, the close seasons being well observed. The fishways were kept in good repair, and no obstructions at present prevent the gravid fish from reaching their spawning grounds.

Overseer Joel Shurtleff, who has charge of the waters of the County of Compton, also reports a decrease in the fisheries of his district, which he ascribes to the fact that sawdust is still allowed to drift into the streams and to pollute them. There was less poaching last season than formerly.

Overseer L. A. Darche, whose division comprises the waters of the countics of Wolfe and Richmond, reports the yield as being equal to that of 1889. The principal kinds of fish caught are trout and bass, of which over $16,000 \mathrm{lbs}$. of each were caught, besides $18,000 \mathrm{lbs}$. of pickerel. The sawdust nuisance is loudly complained of. The four fish-ways in this division were kept in efficient order during the season.

Ocerseer J. B. McDonald, who has charge of Lake Megantic, writes that trout fishing was not so good as last year, but that bass fishing was better. No further trouble is experienced regarding sawdust in this division, the several mill-owners having provided their mills with the necessary furnaces to immediately consume the sawdust and rubbish. It would be advisable that the close season for lunge or lake trout be not later than the 15th September, as by the 1st October, when the present close season begins, these fish have mostly done spawning in Lake Megantic.

## MAGOG AND BRいME. DIVISION.

Overseer N. A. Beach, who attends to the whole Lake Memphremagog, writes that fish are increasing, especially bass and whitefish. For want of sufficient assistance, some trout fishing occurred during the close season, which this officer was anable to prevent. He suggests that parties going upon the spawning beds at night with lights be liable to fine.

Overseer W. G. Greene, who replaced T. Marchessault, resigned, is charged with she guardianship of Brome Lake. He reports black bass, whitefish and pickerel as che principal kinds of fish frequenting this lake. Whitefish are caught through the ce. Bass fishing was good, especially during the month of September.

## MISEISQUOI BAY DIVISION.

Overseer $P$. $E$. Luke reports an increase in the catch of every kind of fish at Missisquoi Bay. No violation of the law came to his notice, and the various close ;easons were well observed. Only one fish-way was kept open in the lower dam on Pike River. The mill on the other dam has changed owners, and a fish-way will be suilt there next summer, as well as on two other dams further above. The value of the fisheries of this division is given at about $\$ 5,000$. Most of the fish are shipped resh to the States.

## IBERVILLE DIVISION.

Overseer J. B. Chevalier's division includes the Richelieu River, from Lake Champlain to St. John's. He reports a slight decline in the gield of bass and pickerel, due so high water in the river during the season. Fishing with night lines was good. The cath of cels amounted $41,540 \mathrm{lbs}$. These are the staple fish of this district, and ure mostly all exported to the United States. The total value of the fisheries of this livision exceeds $\$ 5,000$.

Overseer J. O. Dion has charge of the lower portion of the Richelieu River, lown to Sorel. He reports no improvement in the condition of the fisheries of this livision, and states that he cannot hope for any, so long as the fish-pass at St. Ours
is not properly arranged. He is under the impression that the ashes thrown ovel board by steamers, as well as the chemicals escaping from manufactures, contribut to the destruction of fish life by polluting the water.

## CHATEAUGUAY DIVISION.

Overseer J. Laberge, who attends to this division, reports a slight decrease i the yield of nearly every kind of fish, excepting maskinongé. The returns giv $75,000 \mathrm{lbs}$. of sturgeon, $50,000 \mathrm{lbs}$. pike, $30,000 \mathrm{lbs}$. eels, over $40,000 \mathrm{lbs}$. of bass an pickerel, valued in all at $\$ 19,500$. Mr. Laberge again urges the prohibition of fishin. of any kind during the spring close season, from 15th April to 15th June. Th proximity of the Montreal markets is of great convenience and value to the fisherme of these districts, being easy of access, and enabling the men to get remunerativ prices for their fish.

## BEAUHARNOIS DIVISION.

Overseer John Kelly's division comprises that part of Lake St. Francis frontin on the counties of Beauharnois and Huntington. He reports a falling otf in th catch of bass, pickerel and maskinonge occasioned by excessive seining in the sprin time, when such practices are apt to destroy young fish, and recommends the toti prohibition of seines and gill-nets for a term of years, in order to allow all kinds c fish a chance to recover their former abundance. The enforcement of the la regarding sawdust has already produced beneficial effects in the Chateauguay Rive: and given great satisfaction to settlers on the banks. The total value of the fisheric of this division is estimated at $\$ 11,000$, being a decrease of 25 per cent. as compare with 1889.

## laprairie and verchères division.

Overseer John Morris has charge of the above divisions, which comprise the sont side of the River St. Lawrence fronting on the counties of Laprairie, Chambly an Verchères. Shad fishing was a complete failure. Eels appear to be the staple fis of this division ; but although the returns show a yield of 400,000 lbs., there is sti a shortage as compared with last year's catch. Bass were plentiful before the clos season began, butafter it was over, only a few were taken. Pickerel were not s abundant as last year. The fishery laws were generally well observed, and few vi lations occurred. The total value of the fisheries of this division exceeds $\$ 40,000$.

## THREE RIVERS DIVISION.

Overseer Joseph Lambert, of Three Rivers, whose division comprises that part, the River St. Lawrence fronting on the County of St. Maurice, reports a falling off i shad and sturgeon, but an increase in eels, pike and tom-cods. The yield of the latte fish is given at 50,000 bushelf, being an increase of 65 per cent. over 1889. This ites makes up for shortages in other kinds of fish, and brings up the total value of th division to $\$ 51,560$.

## BERTHIER AND MASKINONGE DIVISION.

Overseer S. A. Grant has charge of that part of the River St. Lawrence frontin on the counties of Maskinonge and Berthier. He reports the season's operation : having been quite unsatisfactory. He issued 62 licenses, but the value of the who catch hardly exceeds $\$ 3,000$, a decline of over 40 per cent.

## TERREBONNE DIVISION.

Overseer Joseph Lauzon, who attends to the Rivers Jesus and des Prairies, repor an imporement in the general yield of the fisheries of his division, with the exce tion of shad, which failed there, as everywhere else. No violation of the law can to his knowledge. Few strangers were noticed last season in this district.

Overseers Cloutier and Filiatrault, who have charge of the inland waters of tl County of Terrebonne, return a larger quantity of trout than in 1889. The forme
fficer complains of sawdust being thrown in the streams. The total value of fish aught in this division is set down at $\$ 6,581$, nearly all used for local consumption.

## LOWER OTTAWA DIVISION .

Overseer R.W.Jones, who looks after the north side of the Ottawa River, from )ka to Carillon, reports a general decrease in the yield of last season. This, he ays, is due to a less vigorous prosecution of the fishery, and to the smaller number $f$ fishermen than formerly, most people finding remunerative employment on the ${ }^{\text {r audreuil and Ottawa Railway, now building. Sixteen nets were seized for Sunday }}$ shing. Mill-owners on the North River attempted to construct fish-ways, but the rater kept so high that it was impossible to go on with the work. The total value $f$ the fisheries of this division is given at $\$ 4,560$.

## UPPER OTTAWA DIVISION.

Overseer Joseph Marion, who has charge of the fisheries of the County of Ottawa, eports as follows:-The statistics of fisheries show that the catch was not quite as good s last year's, and the general complaint is that the quality of the fish is graduallydeclinng. There is only one voice among fishermen, to attribute this result to sawdust and aill rubbish, which, after filling up the bays of the Ottawa and covering the spawning eds, is slowly but surely encroaching upon the navigable channels of the river. $t$ is unnecessary to repeat lere what $I$ have said on this subject in my report of last ear. So long as the mills on the Ottawa and its tributaries are permitted to throw 11 their refuse into the water, we cannot look to any improvement in the fisheries $f$ this noble stream. The Government dam at Carillon is a great source of comlaint, as it effectually bars the ascent of fish, and prevents the fishermen of this ivision from taking a share in the rich harvest which those below it are now reaping. hope it may be possible for the Department of Public Works, some day or another, o devise a scheme by which fish will be able to surmount this obstacle, and add to he wealth of the Upper Ottawa. There were 15 men fishing this season for the local arkets between Ottawa and Carillon. The catch consisted of pike, carp, catfish, rudpouts, \&c. About 12 men have also been fishing on Thirty-one-mile and Pemihogan Lakes, between the Gatineau and Lièvre rivers. They were employed for bout three months, and their average catch was from 20 to 25 bls . of large grey rout, pike and bass, every day. Most of the lakes in the County of Ottawa are now sased to clubs and to private parties by the Government of the Province of Quebec. mong these are Lake St. Germain, in Wakefield; the Plomb Lakes, in Denholm; icho Beach Lakes, in Villeneuve; Graham's and other lakes in Mulgrave; Lake Sernard and Long Lake in Masham, \&c. All these lakes abound in speckled trout, nd some of them, as Lakes Bernard, Long and Mahon's Lakes, are famed for black ass. The owners of these lakes have erected club houses, and keep a regular staff f private guardians to prevent poaching and protect their wators. From all that can hear, the law is strictly observed, and the fish, being fully protected, are on be increase everywhere.

Warden Joynt, who has charge of Lake Bernard, as well as of other lakes in Lasham, Aldfield and Onslow, states that the fishing was good, and that netting, pearing and other violations of the law are no longer heard of. No other fishing fut angling with hook-and-line or with the fly being allowed, $i$ t is somewhat difficult o give correct figures; but Mr. Joynt, estimates that there were caught in Lake Bernard during the past season about $3,000 \mathrm{lbs}$. of bass, $1,000 \mathrm{lbs}$. of trout and , 000 lbs . of other fish; in Long Lake, 2,200 lbs. of bass, $1,000 \mathrm{lbs}$. of trout, and 00 lbs. of other fish; in Mahon's Lake, $1,700 \mathrm{lbs}$. of bass, 700 lbs . of trout, and 1,200 bs. of other fish; in Sinclair's Lake, $3,000 \mathrm{lbs}$. of trout and 2,200 lbs. of other fish; h Wilson's Lake, about the same as in Lake Sinclair; Wolf Lake, $1,500 \mathrm{lbs}$. of trout nd 700 lbs . of other fish. There are two or three other small lakes where the verage catch was about $2,000 \mathrm{lbs}$. of fish.

Net fishing is prohibited on Lac des Chênes. From all the information I can get, he catch was fully equal to that of last year, and no poaching or illegal fishing was eported.

## STATISTICS OF FISHERIES IN THE PROVINCE OF QUEBEC

Return of Fishing Stations, Number and Value of Fishing Boats and Nets, Number
the River St. Lawrence from Cape Chatte


EXCLUSIVE OF THE GULF OF ST. LAWRENCE.
of Men, together with the Yield, Value and Kinds of Fish, dc., on the South Shore of to Point Lévis, during the Year 1890.


* 42 seals were killed in this division.

Return of Fishing Stations, Number and Value of Fishing Boats and Nets, together St. Lawrence from Quebec to


[^8]with the Yield, Value and Kinls of Fish, \&e., on the North Shore of the River Bersimis, during the Year 1890.


## Retcrn of Fishing Stations, Number and Value of Fishing Boats and Nots, extending from Quebec to Upper



[^9]together with the Yield, Value and Kinds of Fish, de., within the District Ottawa, during the Year 1890.


## COMPARATIVE RECAPITULATION

Of the Quantity and Value of the different Fisheries, from Cape Chatte to Point Lévis, in 1889 and 1890.

| Kinds of Fish. |  | Prices | 188\%. |  | 1890. |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Quantity. | Value. | Quantity. | Value. |
|  |  | \% cts. |  | 8 cts. |  | 8 cts. |
| Shad. | Lbs. | 006 | 52,585 | 3,153 10 | 26,998 | 1,619 ss |
| Eels. | Lus. | 005 | 375,410 | 22,524 60 | 425,980 | 25,558 80 |
| Herring | Brls. | 400 | 17,576 | 46,30400 | 12,730 | 50,920 00 |
| Sturgeon | Lbs. | 005 | 41,2:10 | 2,447 40 | 2T, 770 | 3,466 20 |
| Sardines.. | Brls. | 300 ! | 5,230 | 15,69000 | 6,164 | 18,492 00 |
| Trout. | Lbs. | 010 | 21,700 | 2,170 00 | 35,300 | 3,53000 |
| Salmon. | Lbs. | 020 | 32,235 | 6,44700 | 24,630 | 4,92600 |
| Whitefish and bar fish. | Lbs. | 008 | 18,101 | 1,44808 | 54, 010 | 4,32000 |
| Pickerel ...... ... . | Lbs. | 009 | 2,169 | 13002 | (6,330 | 379 80 |
| Porpoise skins |  | 400 | 436 | 1,74400 | 318 | 1,27200 |
| do oils. | lialls. | 040 | 26,160 | 10,464 00 | 19,080 | 7.63200 |
| Coarse and mixed fish. | Brls. | 300 | 1,291 | 3,873 00 | 13,108 | 34,32400 |
| Fish for manure. | Brls. | 050 | 12,508 | 6,304 00 | !,020 | 4,510 00 |
| Seal skins. | No. | 100 |  |  | 42 | 4200 |
| do oil. . | Galls. | 040 |  |  | $4 \geq 0$ | 16800 |
| Total Yalue of the Fir |  |  |  | 122,731 20 |  | 166,160 68 |
| Increase |  |  |  |  |  | 43,42! 48 |

## COMPARATIVE RECAPITULATION

Of the Quantity and Value of the different Fisheries, from Quebec to Bersimis, in 1889 and 1890.

| Kinds of Fishl, | Prices | 1889. |  | 1890. |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Quantity: | Value. | quantity. | Value. |
|  | * cts. |  | \$ cts. |  | \$ cts. |
| Shad.. .... . . .. ...... . . . . ..... Lbs. | 006 | 22,170 | 1,330 20 | 4,300 | 25080 |
| Eels... ............. ...... ....... Lbs. | 0 ¢ ${ }^{\text {\% }}$ | 135,750 | 8,145 36 | 198,031 | 11,882 16 |
| Herring ..... ... ... . ......... Brls. | 400 | 858 | 3,432 00 | 385 | 1.54000 |
| Sturgeon . . . .. ... .............. Brls. | 004 | 1!, 800 | 1,188 00 | 14,800 | s88 00 |
| Sardines ......... . .......... ... . Brls. | 300 | 429) | 1,287 00 | 40 | 1,410 00 |
| Salmon....... ....... . ...... .... Lbs. | 020 | 41,628 | 8,3256 | (65,672 | 13,134 40 |
| Trout.... ......... ...... ... .... Lhw. | 010 | 133,20) | 13,320 00 | 128, 675 | 12,867 50 |
| Pickerel ....... . .................. . Lb . | 006 | 123,092 | 7,385 32 | 72.72 | 4,365 32 |
| Pike.. ..... .... ... .. ... .... Lls. | ()09 | 40,00\% | 2,00000 | 25, 010 | 1,250 (4) |
| Whitefish...... . ...... ..... ... Lus. | 008 | 137,272 | 10,981 76 | 87,868 | 7,029 44 |
| Winninish................. . . . . . . Lbs. | 006 | 100,000 | (5,000) 00 | 100,000 | 6,000) 10 |
| Coarse and mixed fish. .... ........ Brls. | 300 | 1,040 | 3,120 00 | 802 | 2,406 00 |
| Fish as manure . . . . . . . . . . . .... . Brls. | 0.50 | 6,956 | 3,47800 | 15,110 | 8,05500 |
| Porpoise skins.......... ....... No, | 400 | 298 | 1,19200 | $15 \%$ | 132400 |
| do sil. ........... .. ... Galls. | 040 | 17,880 | 7,152 00 | $8,2 \times 0$ | 3,312 04 |
| Total Value of the Fisheries. |  |  | 78,3374 4 |  | 75,022 82 |
| Decrease. |  |  |  |  | 3,31+ 6 |

## COMPARATIVE RECAPITULATION

Of the Quantity and Value of the different Fisheries, from Quebec to Upper Ottawa, in 1889 and 1890.

| Kinds of Fish. | Prices. | 1889. |  | 1890. |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Quantity. | Vilue. | Quintity. | Value. |
|  | 8 cts |  | 8 ets. |  | \$ cts. |
| Shad. | 006 | 95,575 | 5, 73430 | 76,805 | 4,608 30 |
| Hels. | 006 | 725,425 | 43,525 50 | 640,800 | 40,548 00 |
| Sturgeon | 006 | 397,235 | 23,834 10 | 257,800 | 15,468 00 |
| Trout. | 010 | 334,800 | 33,480 00 | 2:2,000 | 25,200 00 |
| Whitefish | 008 | 37,960 | 3,036 80 | 31,, 800 | 2,94400 |
| Maskinongé | 006 | 129,130 | 7,74780 | 118,440 | 7,106 40 |
| Bass | 006 | 110,920 | 6,665 20 | 105,300 | 6,318 00 |
| Pickerel | 006 | 357,360 | 21,441 60 | 195,660 | 11,739 60 |
| Pike. | 005 | 314,880 | 15,744 00 | 285,200 | 14,260 00 |
| Mixed fish. | 003 | 1,277,000 | 53,31000 | 1,526,500 | $4.3,79500$ |
| Tom Cod.. |  | 30,000 | 18,000 00 | [00,000 | 25,000 00 |
| Total Value of the Fi |  |  | 232,50: 50 |  | 198,98730 |
| Decrease |  |  |  |  | $33,5 \geq 20$ |

RECAPITULATION.
Yield and Value of the Fisheries of the Province of Quebec (Exclusive of the Gulf Division) for 1890.

| Kinds of Fish. |  | \{uantity. |  | Value. |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | $3 \mathrm{cts}$. |
| Shad |  | Lhs. | 108,103 | 6,486 18 |
| Eels |  |  | 1,299, 216 | 7, 7 ,988 96 |
| Herring. |  | Brls. | 13,115 | 52,460 00 |
| Sturgeon |  | Lbs. | 330,370 | 19,822 20 |
| Sardines. |  | Brls. | 6,634 | 19,902 00 |
| Trout.. |  | Lbs. | 415,975 | 41,597 50 |
| Salmon |  |  | ! 0,302 | 18,060 40 |
| Pickerel |  |  | 274,762 | 16,485 22 |
| Pike |  | " | 310,200 | 15,510 00 |
| Whitefish. |  | ' | 178,068 | 14,293 44 |
| Maskinongé. |  | " | 11s,440 | 7,106 40 |
| Bass |  | $\cdots$ | 105,300 | 6,318 00 |
| Tom Col. |  | Bush. | 50,000 | 25.00000 |
| Wimminish. |  | Lhs. | 100,000 | 6,000 0\% |
| Mixed fish |  | Brls. | $\bigcirc 1,581$ | 87.52500 |
| Fish as manure |  |  | 25,130 | 12,505 00 |
| Porpoise skins. |  | No. | 47 | 1,896\% 00 |
| do oils.. |  |  | 27,360 | 10,944 00 |
| Seal skins |  | No. | 42 | $4200$ |
| do oils. . |  | (xalls. | $4 \geq 0$ |  |
|  |  |  |  | 440, 17080 |
|  |  |  |  | 433,57814 |
|  |  |  |  | (6,592 66 |

## GENERAL RECAPITULATION.

$\mathrm{Y}_{\text {Ield }}$ and Value of the Fisheries in the Whole Province of Quebec, for 1890.

| Kinds of Fish. |  | Quantity. | Vahu. |
| :---: | :---: | :---: | :---: |
|  |  |  | 8 cts. |
| Cod. | Cwt. | 153,709 | 614,836; 00 |
| Herring, pickled. do | Bros. | 19,892 | 79,568 10 |
| do smoked. | Boxes. | [863 | 21625 754500 |
| Haddock. | Cwt. | 1,298 | ¢, 19200 |
| Halibut. | Lbs. | 92,001 | 9,200 10 |
| Salmon, pickled. do fresh | Brls. Lus. |  | 7,080 114.151 1,20 |
| do tresh | Lelos. | 970,76 108,103 | 114,15120 6,486 18 |
| Eels. | do | 1,299,816 | 7,988 |
| do pickled. | Brls. | 1,2m,72 | 720 O1 |
| Sardines... | - do | 6,634 | 19,902 00 |
| Smelt. | Lbs. | 100,745 | 5,037 25 |
| Sturgeon | do | 330,370 | 19,822 20 |
| Trout | - do | 415,975 | $\begin{array}{r}41,597 \\ 1,530 \\ \hline 00\end{array}$ |
| Winninish |  | 100,000 | 1,530 6,000 000 |
| Whitefish | do. | 178,668 | 14,293 44 |
| Maskinongé | - do | 118, 440 | T,106 40 |
| Bass |  | 105, 300 | 6,318 00) |
| Pickerel | - da | 274,762 | 16,485 72 |
| Pike... | . do | 310,200 | 15,510 00 |
| Tom cod.. . . . . . . . . | . Bush. | 50,000 | 25,000 00 |
| Cod, tongues and sounds | Brls. | 183 | 1,830 00 |
| Lobsters, canned. | Lbs. | 616,21.8 | 73,94616 |
| Small and mixed fish | Bris. | 21,610 | 8 8,612 00 |
| Sealskins.. |  | 17,045 | 17,045 00 |
| Porpoise skins | No. | 549 | 2,27100 |
| Fish oils | Galls. | 206,796 | 82,71840 |
| Fish used as bait ... do Manure | Brl.s. | 49,492 | 74,23800 |
| do Manure................... Fish used for local consumption not included |  | 61,066 | 30,53300 |
| Fish used for local consumption not included. |  | 18,885 | 78,54000 |
| Total for 1890. |  |  | ,615,119 76 |
| do 1889. |  |  | , 876,194 19 |
| Decrease. |  |  | 261,074 43 |

## STATEMENT

Of the Number and Value of Boats, Nets and other Fishing material employed in the Province of Quebec (Exclusive of the Gulf Division).

Articles.
Value.


Nore. - The number of men engaged fishing is given as 2,431, but they cannot be considered as regular fishermen as most of them only fish during a short period of the year.

Statement of Value of Vessels and Boats and Fishing Material employed in the Whole Province of Quebec, 1890.


Statement of Men Employed in the Fisheries of Quebec, for 1890.

| Sailors. | 314 |
| :---: | :---: |
| Fishermen and shoremen. | 10,639 |
| Total. | 11,003 |

# APPENDIX E. MANITOBA AND NORTH-WEST TERRITORIES. 

ANNUAL REPORT OF INSPECTOR ALEXANDER MCQUEEN, ON THE FISHERIES OF MANITOBA AND THE NORTH-WEST TERRITORIES, FOR THE YEAR 1890.

Winnipeg, 31st December, 1890.

## Hon. Charles M. Tupper, Minister of Marine and Fisheries, Ottawa.

Sir,-I have the honour to submit my seventh annual report on the fisheries of the Province of Manitoba and the North-West Territories, being for the year ending 31st day of December, 1890. Accompanying this report will be found various statistics as to the catch, the number of men engaged, and boats employed in connection with the fisheries; also, the quantity of twine used, and the appliances necessary to preserve fish, preparatory to their being sent to market.

Lake Winnipeg is still, as it always has been, the principal place for trade fishing in the North-West. There was no addition to the number of firms engaged in fishing in this lake during the past year, nor much increase in the quantity of plant used. One firm added a small steam tug to its fishing fleet, and another floating freezer was constructed at Selkirk. I may state, that during the short season when fishing was carried on, there were about the same number of boats and twine used as in the previous year, and that although the season was shorter, the catch was slightly in excess of that of 1889.

In addition to those engaged fishing during the summer, with steam tugs and sail boats, there are quite a number of men who devote a couple of months to winter fishing, principally Icelanders, half-breeds and Indians. They fish and sell to the trade. Their catch, this year, has not been as good as usual, owing to the extension of the close season for whitefish from the 10th to the 30 th of November. One good result, however, of the change, will be that a better grade of fish will be put on the market, as fish caught in winter are better preserved than those obtained formerly in open water, early in November.

The Indians fished, as usual, during the spawning season, but not to the same extent as formerly, because they have been prohibited from selling their catch during that period. Indians have been deluded into the idea that they had a legal right, under treaty stipulations, to fish during the close season; but a late decision of the Department of Justice has set this matter at rest. The Minister, after fully reciting the terms of the several treaties, concludes by stating: "The regulations are binding upon the Indians there to the same extent as they are binding upon the other subjects of Her Majesty. The close seasons, created by the regulations, apply to the Indians, subject to the proviso contained in section 5 of the Act; and the Indians have no rights of fishing without license or during the spawning season, or on the spawning grounds, as provided for by that section." In view of this decision, and rather than at once enforce a suspension of Indians fishing in close season, it might be better to act in a tentative way, and issue licenses to permit them to fish for their own immediate use. They have enjoyed this privilege so long that to rigidly enforce the regulations might lead to privation and trouble. It might be advisable in this connection for the Indian authorities to supply the Indians with better appliances for fishing in deep water at all seasons of the year, and thus obviate
the necessity of fishing for their own use, as they now do, during the spawning season. The agents, also, who fully understand the situation, might educate the Indians up to the necessity of protecting the fish in their own interest.

The total catch this year, including that for home consumption, may be summarized as follows :-

|  | Lbss. | Value. |
| :---: | :---: | :---: |
| 1890. | 5,967,271 | \$232,104 05 |
| 1889. | 5,859,927 | 225,1579 00 |

The quantity of fish exported last yoar was $1,781,587 \mathrm{lbs}$., and $4,078,340$ was used in Canada, either for home consumption here or in the eastern Provinces.

The quantity exported, this year, was $2,05 \overline{0}, 988 \mathrm{lbs}$., leaving $3,986,743 \mathrm{lbs}$. for consumption at home.

THE FISH TRADE.
The principal firms fishing on a large scale were: The Manitoba Fish Company; Wm. Robinson\&Co., and the Selkirk Fish Company. They operated in Lake Winnipeg, only, and at the following places: Beren's Island, Reindeer Island, Selkirk Island and Little Saskatchewan Bay. One of the firms fished for a short time, at Pigeon River, Blood Vein River and Grand Marais, for sturgeon.

The total catch of the firms may be summarized as follows :-

| Whitefish |  | Lbs. | Value. |
| :---: | :---: | :---: | :---: |
|  |  | 1,735,492 | \$86,774 60 |
| Pickerel. |  | 114,007 | 3,420 21 |
| Sturgeon. |  | 53,283 | 1,598 49 |
| Pike.. |  | 18,062 | 36149 |
| Catfish |  | 3,380 | 10140 |
|  | Total. | 1,924,224 | \$92,255,94 |

The firms employed during the year 68 fishermen, 3 small tugs and 25 sail boats, valued at $\$ 43,400$, and of 1,067 tons burthen. In addition to the boat fishermen, 120 other hands were employed curing and bandling fish.

Thirty-two thousand fatnoms of gill net were used by these firms during the season, valued at $\$ 4,500$

They have freezers and ice-houses for the purpose of preserving fish at the following points: Selkirk, Beren's Island, Reindeer Island, Grand Rapids, Selkirk Island and the Little Saskatchewan River. These are valued at $\$ 27,000$. They also have four floating freezers or barges in which fish are preserved during transportation to Selkirk, whence they are shipped by rail to different markets. Three tugs are employed in transporting their fish from the different stations to Selkirk. 'The whole plant invested by these firms in the trade is valued at $\$ 75,000$.

There are, besides the above, a number of fish dealers who do not fish themselves, but purchase during the winter months from native fishermen and settlers their winter catch of tish. This trade lasts for about two months, after the close season for whitefish on the lst of December. The principal buyers are Blackwood Bros., Hugh Armstrong and B. Cohen. Icelanders, Indians and settlers who reside on the south end of Lake Winnipeg, find winter fishing a great benefit at a season when other labour is not in demand. The "Logberg," an Lcelandic paper, in discussing this question, says: "Both winter fishing and employment with the traders in summer confers a great boon on the Icelandic community, they having been induced to settle in the vicinity of Lake Winnipeg mainly on account of the fisheries. A large number of them being in humble circumstances find the fishing trade to be of material advantage in the maintenance of themselves and their families. There are now about 3,000 Icelandic settlers on this lake, and probably 2,000 Indians, all of whom are more or less benefited by the fisheries."
$8 a-11$

The fishing companies exported a large quantity of their catch to leading cities in the United States. One firm sold $100,000 \mathrm{lbs}$, of whitefish in Winnipeg alone during the past year. Considerable quantities were shipped to Windsor, Toronto and Montreal, and some were sold in Portage la Prairie, Brandon and other towns along the Canadian Pacific Railway line. Whitefish sold in lots at Selkirk at 5 cents per pound.

## EXPORT OF FISH.

Through the courtesy of Lieut.-Col. Scott, Collector of Customs at the port of Winnipeg, I am able to submit a statement of the export of fish to the United State: during the year $1890:-$

|  | $\begin{gathered} 1889 . \\ \text { Lbss. } \end{gathered}$ | $\begin{gathered} 1890 . \\ \text { Lbs. } \end{gathered}$ |
| :---: | :---: | :---: |
| Whitefish (fresh).. | 1,083,112 | 1,446,289 |
| do (salted). | 63,800 |  |
| Pike. | 364,628 | 339,232 |
| Pickerel. | 154,779 | 250,936 |
| Tullibees. | 58,343 | 42,506 |
| Perch. | 3,601 | 690 |
| Catfish. | 180 | 855 |
| Gold Eyes | 500 | 140 |
| Sturgeon. | 45,830 | 231,986 |
| Suckers. | 5,793 |  |
| Sheepshead | 900 |  |
| Salmon Trout. | 121 | 150 |
| Total. | 1,781,58: | 2,332,774 |

In the export of whitefish, pickerel, pike and sturgeon, allowance must be made for fish caught in American waters, in the Lake of the Woods, by the Baltimore Fish Company. These fish were shipped by way of Rat Portage to Winnipeg; where they were entered for export to Minneapolis. The entry is thus misleading, and might be construed into being products of Canadian waters. The quantity thas caught is as follows :-

Whitefish................................... ........................... 54,629
Pike............................. ......................................... 13.769
Pickerel..................................................................... 29,685
Sturgeon...... ....................... .................................... 178,703
Total...................................................... 276,786
This quantity deducted from $2,332,774$ lbs. will leave $2,055,988$ lbs., as the actual Canadian export.

## VARIETIES OF FISH.

The lakes and rivers of Manitoba and the North-West Territories abound with fish of various kinds. The staple products of our waters are whitefish, trout, pickerel, sturgeon, pike, catfish and tullibees. In addition to these, there are a large number of others, usually classed as coarse fish, but which are, nevertheless, fair food fish, and find a ready market for home consumption. I have, from time to time, collected specimens of the different kinds of fish of this region and forwarded them to Prof. Sweeney, of St. Paul, from whom I have received great assistance in their classification. I submit the following descriptions:-

Whitefish (Coregonus albus.)-This species is to be found in all our great lakes, and in many of the smaller ones, and streams tributary to them. They are a pro-
lific fish, and spawn in autumn. Some deposit their ova in sand or rocky bottoms on the shores of a lake, while others ascend rivers to other lakes, from thirty to fifty miles, for the same purpose. These fish vary in weight from 3 to 20 lbs . A female fish of 5 lbs. will deposit 50,000 eggs. An authority on this subject estimates that for every ounce in weight, a whitefish will exude 600 ova. They frequent clear water, and subsist for the most part on infant mollusks, annelides, the larre of the variouspecies of the ephemere, and most of all the crustacean class of water life. They are undoubtedly the best food fish of this region, and command a higher price than any other fisb in the market. They are migratory in their habits, and change from one part of the lake to another, thus sonetimes giving rise to a clamour that there is scarcity.

The American Angler, in a recent issue, refers to this question, and citing Milner, an authority on the subject, gives the following summarized statement:-

| Weight of Fish. | Weight of Ovaries. | Number of Eggs. |
| :---: | :---: | :---: |
| 2 lbs. | $5 \frac{3}{4} \mathrm{oz}$. | 21,229 |
| 23 " | $7 \frac{1}{2}$ " | 28,500 |
| 4 | 16 " | 48,000 |
| $7 \frac{1}{2}$ | 25 | 66,600 |

"This makes an average of about 10,000 eggs increase for every additional pound weight in the fish, which is the late Mr. Seth Green's estimate, from observations made in spawning white fish. If even 1 per cent, reached maturity, the spawning of a pair of whitefish would give as its result 400 pairs of mature fish, and without interference of other than natural causes, such increase would, in a few generations, completely overstock any area of water occupied by them."

Lake Trout (Salvelinus namasycush).-This species of fish is very scarce it: Lake Winnipeg, but it is said to be more abundant in many of the inland waters of the adjacent district. Some have been found in the vicinity of Beren's and Reindeer Islands, in Lake Winnipeg. They are a good fish, as they naturally must be, belonging as they do to the great salmon family. Those found in our waters are, however. inferior in quality to those caught in Lake Superior. The lake trout inhabits only lakes containing deep, cold, clear water, and readily succumb in waters of a higher temperature. They leave deep water in October and frequent the shoals to spawn. The nest is usually made in the gravel, where the female deposits her eggs, which are immediately after impregnated by the male, as he is in close attendance. I obtained a fine specimen of this fish last year in Sturgeon Bay, weighing 28 pounds.

This species of fish for the most part subsist upon other fish, and are very fond of whitefish.

Pickerel (Stizostethium vitreum).-This species of fish, known as the wall-eyed pike or doré, is abundant in our north-west waters, and is an excellent table fish. They are usually found in the shallow waters of our lakes. They are also found in some of our rivers, disporting themselves where the water is clear and swift. They take a delight in surmounting rapids, and may sometimes be found at the mouth of sloughs, when the water is running out of them. They spawn in April and May. They are highly prized by the Indians who reside on the lakes, and, even in the trade, rank next to whitefish, and command a ready sale in the market.

Sturgeon (Acipenser rubicundus).-These fish are abundant in Lake Winnipeg and some of the other inland lakes and rivers, principally Rainy River, a tributary of the Lake of the Woods. Strange to say, they are not found in Lakes Manitoba or Winnipegoosis. It is an excellent food fish, and always commands a ready sale in the market. The sturgeon is the most prolific of all fish in our waters. It spawns in the spring of the year, usually in May and June. A good sized female fish will deposit one million eggs. The roe of the sturgeon is very much sought after in the manufacture of Caviare, which promises in the future to be a paying industry here. I have seen some sturgeon caught in Lake Winnipeg weighing over 200 lbs. The average weight, however, is from 20 to 40 lbs. Sturgeon prey upon the spawn of other fish, and are particularly destructive to whitefish spawn.
$8 a-11 \frac{1}{2}$

Pike (Esox luscius).-This species of fish, commonly known in the North-West under the name of Jackfish, abounds in all our waters. They are a fair food fish, although not realizing as good a market price as whitefish, trout, pickerel or sturgeon. Pike are very destructive of other linds of fish, and subsist almost entirely upon them. They are exceedingly voracious; I have opened some in whose stomach I found other fish weighing from 2 to 4 pounds. It eats nearly all kinds of fish, sparing not even its own species. They spawn in April, running up into rivers to marshy and grassy places, where they deposit their ova. There is a prejudice against this fish, from the fact that it preys upon whitefish and other good food fish. The people would not object to the extermination of this species, provided the smaller lakes could be stocked with whitefish, trout, bass and carp in their stead.

Tullibee (Coregonus tullibee).-This species of fish somewhat resembles the whitefish, and is classed by scientists as belonging to the same family. They are, however, greatly inferior to whitefish as a table fish, and do not command as good a price in the market. They spawn in December, and are a prolific fish. They find a ready sale at home, and many are exported to foreign markets.

Catrisif (Silurida).-This species of fish is plentiful in Lake Winnipeg, and is also found in many of our rivers. It is considered a good fish, and thought by many to rank next to pickerel (dore). They spawn in May and June.

Gold Eye (Hyoden chrysopsis).-This is a palatable food fish, which finds a ready sale in Winnipeg and other towns for home consumption. It is plentiful in all our large lakes and most of the rivers and streams of the North-West. They spawn in April and May, and are very prolific. They are a dry and bony fish, but when smoked, their flavour is greatly improved, and they command a much bigher price.

The other species of fish under my observations are: Sheepshead, perch, buffalo fish, suckers and ling, which are generally classed as coarse fish. J may, in another report, give some particulars about them. The buffalo fish are abundant in several of our lakes, and vary in weight from 5 to 40 lbs. The ling or eel pout, unfortunately, are too plentiful in our waters. They are unfit for food, and are a great annoyance to fishermen when found in theirnets. I might here mention that turtles are frequently found in our waters. I saw one caught last summer in the Red River, opposite Winnipeg, which weighed 14 lbs.

## REPORTS OF FISHERY GUARDIANS.

I have much pleasure in stating that the several fishery guardians were attentive to their duties and attended to the enforcement of the regulations during the close season. Their supervision, however, was not confined to the close season, as they devoted considerable time in watching the operations of fishermen, ascertaining the number of men and boats employed, the quantity of nets used, and particulare as to the catch. They also assisted me in the collection of license fees from fishermen, who seldom visit Winnipeg.

## ST. LAURENT, JAKE MANITOBA.

Guardian Daniel Devlin, whose division extends from Totogan to St. Laurent, on the south shore of Lake Manitoba, and from St. Laurent to Long Point, on the east shore, reports fishing as mainly carried on during the winter season, and by people residing in the vicinity of the lake. The fishing industry in Lake Manitoba differs from that of Lake Winnipeg, inasmuch as there were no large operators, and consequently no plant used during the summer seasons. This he attributes to the difficulty of navigating the lake with boats of any considerable draft of water, owing to its shallowness. Whitefish, too, are not as plentiful as in other lakes. He states that the extension of the close season for whitefish is detrimental to the interests of native fishermen, who depend, to some extent, for sustenance during the winter upon the catch they obtain during the early part of the season. By making tests in regard
to the spawning of whitefish, and putting down nets on the 10 th, 15 th, 20th and 25 th of November, this officer found that on the 15 th of that month, whitefish had ceased spawning and left for deep water.

The following is a summary of the catch for market in this district for 1890 :-

|  | Lbs. | Value. |
| :---: | :---: | :---: |
| Whitefish | 50,000 | \$2,500 00 |
| Pickerel. | 75,000 | 2,250 00 |
| Pike | 140,000 | 2,800 00 |
| Tullibee | 8,000 | 16000 |
| Mixed fish. | 15,000 | 30000 |
|  | 288,000 | \$8,010 00 |

In addition to the above, 40,000 lbs. mixed fish, valued at $\$ 1,200$, are given as an estimate of the quantity used for home consumption. Nets, measuring 7,000 fathoms of 6 -inch mesh, extension measure, and valued at $\$ 1,400$, were used. No boats were employed, a* on account of the extension of the close season, fishing was carried on only during the winter.

## FORT ALEXANDER, LAKE WINNIPEG.

Guardian John Wood, whose division extends from the mouth of the Red River, along the east side of Lake Winnipeg to Loon Straits, states that fishing during the year was carried on principally for home consumption. A pound-net was used at Grand Marais for about a month, by the Manitoba Fish Company. This officer reports that Raymond \& Anderson, with a small sail boat and a few gill-nets, started to fish early in June at Hole River, near the Indian Reserve. The Indians having complained about this, the firm in question was urged to change their location, which they did, and proceeded to Black Island. Winter fishing opened about the 1st December, and will continue until about the 1st February. With the exception of the above mentioned pound-net, all other fishing was carried on with gill-nets by natives and settlers. The mode of fishing in winter is by cutting holes in the ice and stretching the net underneath it from hole to hole.

Whitefish spawned from eight to ten days later than usual. This officer thinks this was owing to the mild weather and prevalent south winds, which materially effected the temperature of the water. He considers the twenty days extension of close time for whitefish beneficial. The regulations regarding the close season were strictly observed by licensed fishermen. Indians, however, fished as usual, but only for their own use.

There were 18,025 fathoms of gill-nets in use in this district during the year, valued at $\$ 2,525$; also, 167 skiffs and birch-bark canoes, valued at $\$ 1,035$, used by settlers in fishing.

Subjoined is a statement of the catch of fish for the year ending 31st December, 1890 :-


Three small traders purchased on the ice $50,000 \mathrm{lbs}$. of whitefish and $80,000 \mathrm{lbs}$. of pickerel and pike, which were marketed at Selkirk.

Mr. Wood reports that Loon, Rice, Split Rock, Hole, Bad Throat, Sand, Black, Rat and Bear Rivers, flowing into Lake Winnipeg, have their sources in a large number of inland lakes, whose waters are frequented by whitefish, sturgeon, pickerel, trout and pike. Lake Debonne, especially, contains large quantities of sturgeon. It is the source of Rat River, and is situate 35 miles from the month of Bad Throat River. Mr. Wood caught a number of beautiful trout last summer in Sturgeon Sound Lake, the source of the Bad Throat River. Two of these fish weighed 27 lbs, each.

## WATER HEN RIVER, LAKE WINNIPEGOOSIS.

Guardian J. H. Adams, whose division extends from Duck Bay to Lake Danphin, on the south-west side of Lake Winnipegoosis and to Water Hen Lake and River on the east side, states that fishing was good during the past year. The close season was well observed.

The catch is given as follows :-

|  | Llo. | Valut. |
| :---: | :---: | :---: |
| Whitefish | 390,000 | \$19,500 00 |
| Pickerel | 30,000 | 90000 |
| Pike. | 20,000 | 40000 |
| Mixed fish. | 5,000 | 15000 |
| Tota | 445,000 | \$20,950 00 |

He reports $157,000 \mathrm{lbs}$. of whitefish sold to the trade at 2 cents per Ib, which were taken by teams to the Straithclair Station, on the Manitoba and North-Western Railway, and Reaburn, on the Canadian Pacific Railway, and shipped thence to eastern and southern markets.

The number of men engaged in fishing was 50 , and the number of boats and canoes 35 ; valued at from $\$ 10$ to $\$ 25$ each. There were 8,300 fathoms of gill-net used, valued at $\$ 1.500$.

The purchasers of fish in this district were: John McKenny \& Co., Adams, Ross \& Co., and one or two other small dealers.

## FAIRFORD, LAKE MANITOBA.

Guardian Wm Archer, whose division comprises Fairford and Lake St. Martin on Lake Manitoba, and Little Saskatchewan River which flows into Lake Winnipeg, reports whitefish more abundant during the months of October and November, than for years before. He estimates that the Indians caught forty thousand ( $120,000 \mathrm{tbs}$.) whitefish during the close season.

Mr. Archer gives it as his opinion that the extension of the close season from the 10 th of November until the 1st of December is quite unnecessary in this division, as the whitetish have done spawning by the 15th of November at latest; it being a rare occurrence to find any fish containing spawn later than that date. He reports fish scarce during the month of December, as they had nearly all returned to deeper water. Not more than ten thousand whitefish ( $30,000 \mathrm{lbs}$.) were caught, averaging about 3 lbs . each, and about 2,000 lbs. pickerel.

He estimates the entire catch for the year as follows:-

|  | Lbs. | Value. |
| :---: | :---: | :---: |
| Whitefish. | 150,000 | \$3,450 00 |
| Pickerel.. | 50,000 | 1,000 00 |
| Pike.. | 22,000 | 22000 |
| Suckers. | 200,000 | 1,00000 |
| Gold Eyes. | 28,000 | 14000 |
|  | 450,000 | \$6,110 |

Of the above, $3,000 \mathrm{lbs}$. of whitefish and $5,000 \mathrm{lbs}$. of pickerel were sold to traders at Fairford.

The fishermen of this division use gill-nets, worked by means of small skiffs and canoes in summer and through the ice in winter. The quantity of nets used was 7,500 fathoms, fished by three bands of Indians and half-breed fishermen living in the vicinity. Some difficulty was experienced in preventing nets being set across the channel of the Saskatchewan River and the Narrows of Lake St. Martin's, thus obstructing the free passage of fish to and from Lake Winnipeg. This necessitated several trips to Fairford and to the mouth of the Little Saskatchewan River. The close season was observed; no fish being caught by any one except Indians, who fished entirely for their own use.

Fish sold to dealers at Fairford, have to be conveyed by teams to stations on the Canadian Pacific Railway ; a distance of about 150 miles. The Indians realize about $2 \frac{1}{2}$ cents per 1 Ib . for whitefish at Fairford and Lake St. Martin. They have an abundant supply of food.

## ROCK LAKE DIVISION, SOUTHERN MANITOBA.

Guardian W. J. Cooper, who has charge of the Rock Lake Division, in Southern Manitoba, reports considerable fishing in Swan, Rock and Pelican Lakes during the past year, principally in winter. The Crofters, who have settled in the vicinity of the latter, found the fishing resources of its waters quite valuable for the maintenance of their families, who are just tiding over their first year in Mauitoba. The catch for the year is estimated as follows:-


No fish were marketed in Brandon this year from this division. A small quantity was sold at Killarney, Cartwright and Pilot Mound, in the vicinity of the lakes, but the greatest part was used by the settlers themselves. A number of people residing in this section would like to see the pike destroyed in these waters, and whitefish, bass or carp substituted in their place.

## SHOAL LAKE DIVISION.

Guardian J. A. Fraser, who has charge of this division for some distance north of Stonewall, reports very little fishing in Shoal Lake. The quantity caught was $53,600 \mathrm{lbs}$. of pike, $39,200 \mathrm{lbs}$. of which were sold to traders, and the balance used at home. He reports fish scarce at the Narrows, where they are usually caught for the trade; the water at that point being very shallow. The fishermen are all halfbreeds, residing in the locality. There were only seven men engaged fishing, using seven gill nets and seven small boats.

## BEREN'S RIVER DIVISION, LAKE WINNIPEG.

Guardian J. B. Johnson has charge of this most important division in the whole Province, covering, as it does a large portion of the lake, where the fishing companies operate in summer, and where a number of smaller fishermen and Indians fish during the winter. He reports that the summer season for whitefish opened much later than usual, owing to the ice in the lake preventing navigation. Fishing began at Beren's Island only on the 12 th of June, but although the season was short, the catch was up to the usual quantity. Fishing at Reindeer lsland was good throughout the whole season. It was also good at the Little Saskatchewan, although fish were reported scarce at the latter place towards the close of the season. The sturgeon fishery at Pigeon Bay shows a falling off. This fishing, which continued till the 12 th of September, in 1889, only lasted till the 10 th of August, in 1890.

Last year, too, there were two pound nets used, whereas this year there was only one. Sturgeon were more abundant at Blood Vein River this year than last. Pickerel fishing was better than for many years past.

Winter fishing commenced on 1st December, but was not as good as in previous years. The shortage in the winter catch of whitefish is accounted for by the long, open fall and the disturbed condition of the ice, caused by the heavy winds which prevailed at the beginning of December. The absence of snow, too, upon the ice, made some difference. Winter fishing for trade usually extends from the 1st of December to the 1st of February. This scarcity is the more remarkable from the fact that during the spawning season fish were noticed to be more numerous than during the year before.

Subjoined is a statement of the catch in this division:-

| Whitefish |  | Los. | Value. |
| :---: | :---: | :---: | :---: |
|  |  | 1,763,182 | \$88,159 10 |
| Pickerel. |  | 126,204 | 3,786 12 |
| Pike |  | 19,280 | 38560 |
| Sturgeon. |  | 129,500 | 6,475 00 |
| Mixed fish. |  | 16,630 | 33260 |
|  | Total. | 2,054,796 | \$99,138 42 |

Of this quantity, $1,514,701$ lbs. were caught by traders in summer, and 84,676 lbs. sold to small traders in winter. The remainder, 455,407 lbs., was used by Indians and others for home consumption.

## SELKIRK ISLAND.

This island, which is situated 20 miles north-west of Grand Rapids, in Lake Winnipeg, is a commercial fishing station for a few weeks in the summer, during the hot weather. Robinson \& Co. and the Selkirk Fish Company were the only firms fishing there. The Selkirk Fish Company made this island their headquarters for the whole season. They used four sail boats and 5,000 fathoms of gill nets. Their catch was as follows:-

| Whitefish. |  | $\underset{199,333}{\text { Lbs. }}$ | $\begin{aligned} & \text { Value. } \\ & \$ 9,966 \quad 65 \end{aligned}$ |
| :---: | :---: | :---: | :---: |
| Pickerel |  | 4,000 | 12000 |
| Pike. | ......... | 1,072 | 2114 |
|  | Total.. | 204,405 | \$10,107 99 |

This firm has one small freezer and ice-house on the island, with capacity for 5,000 fish.
W. Robinson \& Co., who fished during the early part of the season at Beren's Island, transferred seven of their boats and 8,000 fathoms of gill-net to Grand Rapids, and, after fishing for about five weeks, caught.-


This firm has a freezer and two ice-houses at Grand Rapids, with a capacity for 50,000 fish.

## BIG ISLAND-LAKE WINNIPEG.

Stefan Jonnson, Fishery Guardian for the Icelandic Division, on Lake Wiunipeg, reports fishing about the same as last year. This division extends from Hoosavick, near the mouth of the Red River, along the west shore of the lake to Grindstone

Point. It includes the fishing stations of Deer, Black and Big Islands. There were 109 men engaged fishing in this division during the past year, of which 30 were licensed. Most of those were settlers of the Gimli district. They had 96 small boats, valued at $\$ 910$, and 10,930 fathoms of gill-nets, worth about $\$ 1,000$, in use during the season.

The catch for the year was as follows :-


The boats used, with the exception of one boat of 5 tons, were all small skiffs, carrying only one man each. They fish only a short distance from shore and each boat has on an average 100 fathoms of nets. Four men worked the large boat during the summer and caught some $12,000 \mathrm{lbs}$. of whitefish. The rest of the whitefish were caught in winter through the ice. This officer reports having travelled all over his district during the months of October and November, and found the whitefish regulations, as to the close season, strictly observed.

All fish sold to the trade were marketed in Selkirk and Winnipeg. There were no whitetish caught this winter until the 3rd of December; the lake not having been frozen over until that date.

Of the catch enumerated above, the following quantities of the respective kinds were sold to the trade:-


The balance, $371,500 \mathrm{lbs}$., was used for home consumption.

## RED RIVER DISTRICT.

As the fishing in this district is somewhat limited, I did not deem it necessary to employ a guardian, and therefore took it under my own direct supervision. The catch consists principally of coarse fish, which are marketed in Winnipeg. The quantity caught was as follows:


Of this, $97,000 \mathrm{lbs}$. were sold to the trade and $\mathbf{4 5 , 0 0 0} \mathrm{lbs}$. used for home consumption.

## THE NARROWS-LAKE MANITOBA.

Guardian $H$. Martineau reports that he visited the fishing grounds under his charge and found that the close seasons were generally well observed. In some instances he was compelled to give permission to destitute parties to fish with one common net of about 100 feet long, but of the requisite mesh. There were no fishing boats in this division, and the fishermen use only skiffis and canoes. The only sawmili on Lake Manitoba is located at the north-east end of the lake. It was mapected during the summer, and found to be disposing of its sawdust in accordance with the law.

The number of men engaged fishing in this district is estimated at 75 . Each man fishes, on an average, about five nets, making in all 375 nets, of an average length of 50 yards each, or 56,750 feet altogether. Estimating each 50 yards of nets at $\$ 2$, would make a total value of $\$ 750$.

There were $20,000 \mathrm{lbs}$. of whitefish marketed, of an average value of 3 cents per pound--say $\$ 600$; dore, $8,000 \mathrm{lbs}$, at $2 \frac{1}{2}$ cents, $\$ 20$; and $55,000 \mathrm{lbs}$. of pike (jack fish) at 1 cent, $\$ 550$. Total value; $\$ 1,350$.

The consumption of fish is estimated at $60,000 \mathrm{lbs}$. as follows :-


Fishing for trade is carried on principally during the winter, and most of the fish exported are caught under the ice. The boats used in fishing are small skiffs and cunoes, of which there are about seventy, of a value of $\$ 8$ each; total value, $\$ 580$.

It is gratifying to note how careful the Indians are getting of not taking more fish than they actually require for their own use. This applies to the seasons when they are prohibited from doing so. It has at last dawned upon them that if they continue to catch fish as they used to do, depletion will follow. The close season for whitefish, as amended, exactly suits this locality, as observations made on the subject enable this officer to state. Dog trains are giving place to ponies. This is another reason why fish are not caught in such large numbers as in former years during the months of October and November, and hung up in thousands, solely for the purpose of feeding dogs during the winter. This officer has himself' seen a dog devour two and three whitefish at a feed, and the fish were invariably full of spawn. When these injurious habits are done away with fish, will have a much greater chance of multiplying; and so long as wise and salutary regulations are enforced, it will be impossible to deplete these waters. Had this wholesale slaaghter been allowed to continue, there could not have been fish left in three years. Even at the present time, they are so exhausted that it is difficult, for a family to secure sufficient whitefish for their own use. Suckers and doré are, however, abundant; and there is no reason why whitefish should not be the same in a few years.

The Hudson's Bay Company, the Lake Manitoba Company, John McKenny and John Monroe were the only fish-buyers this year.

## REPORT OF゙ OVERSEER F. C. GILCHRIST.

Fort Qu'Appelle, Assa., 31st December, 1890.
I beg to submit my annual report for the year ending 31st December, 1890, of the fisheries of the Qu'Appelle River, east of Pie-a-pot's Reserve and adjacent lakes. The catch, which was somewhat greater than last year, is estimated as follows:-


There were twenty-five men engaged in the fisheries with twenty boats, value, $\$ 200$; and 100 nets, value, $\$ 400$. Licenses were issued to J. Leader, sen., for 600 feet of gill-nets, D. Thorne for 100 feet and S. Trask for a seine. The total catch of fish for the Indians was about $250,000 \mathrm{lbs}$. Eight gill-nets and two seines were confiscated and destroyed durirg the close season, and two persons were fined for infractions of the law. Owing to the dams and an increased rainfall, the level of the lakes was considerably higher than last year, and I hope that next season it will have regained its old-time height.

While whitefish are holding their own, tullibees are increasing at a rapid rate. I regret to have to state that neither the Indians, nor the majority of the officials over them, seem to evince the slightest desire to do anything towards the preservation of the fisheries of our lakes. When one lake becomes depleted, or nearly so, through fishing during the close season, the Indians move on to the next, and it will be but a question of time when all of our smaller lakes will be in a condition of sterility. I have been asked by officials of the Indian Department where they might obtain whitefish fry to re-stock some of the fished-out laker. I always referred them to the Department. But I would suggest that all such applications be refused, unless the Indian Department agrees to compel the Indians to abstain from fishing during the close season. To give them the fry under any other terms would, in my opinion, be a sheer waste of money.

## CONCLUSION.

In conclusion, I might say that fishing in the North-West is as yet carried on only on a small scale, being confined principally to Lake Winnipeg, where three companies operate. With an increase of population and further settlement of the country, the fishing industry must largely increase. The great lakes to the west and north, with their clear and cold waters, are teeming with abundance of good food fish, for which a ready market will be found in the United States in a few years. The varieties of fish consist of whitefish, sturgeon, pickerel and lake trout; salmon trout, too, are said to be very plentiful near the mouth of Nelson River, at Hudson's Bay. An officer of the Smithsonian Institution stated that if there were reciprocity in fish between Canada and the United States, the trade in pickled and preserved fish would give employment to 10,000 persons in the lakes and rivers of the Canadian North-West alone, which, he says, contains the best fresh water varieties, including many species of the saimon family. In the near future, the Hudson Bay Railway will be completed to Fort Churchill. This road will pass through a portion of country in which are found many lakes, some of them large, and allsaid to contain abundance of fish of various kinds. It will also give access to the salt water fish of Hudson's Bay, which contains the choicest codfish, salmon, herring, pollock, halibut, and many other varieties. Whales, porpoises, walruses and seals are plentiful in the Bay. It will be a great opening for the fishing industry. The development of this trade would inaugurate a new era in the North-West. It is estimated that this business alone would, in a few years, almost repay the cost of building the road and make Winnipeg one of the greatest fish markets in America.

I have the honour to be, Sir, Your obedient scrvant, ALEXANDER MCQUEFN, Inspector of Fisheries for Manitoba and N.-W. Territories.

## Recapitulation.



## APPENDIX F .

# BRITISH COLUMBIA. 

ANNUAL REPORT ON THE FISHERIES OF BRITISH COLUMBIA FOR THE YEAR 1890, BY INSPECTOR THOMAS MOWAT.

New Westminster, B.C., 31st December, 1890.
Hon. Charles H. Tupper,
Minister of Marine and Fisheries, Ottawa.
Sir,-I have the honour to submit my annual report of the tisheries of this Province for the past year, exclusive of Indian consumption, with statistical returns and condensed report from the guardians. These returns show an increase, as compared with the year 1889, as follows:-


This increase is attributed to an increased catch of sturgeon, haiibut, herring, mixed fish, fur seals and fish oils.

The total capital invested in the fisheries as compared with 1889 , is as follows:-

| Capital invested, 1890 | \$1,511,279 00 |
| :---: | :---: |
| do 1889 | 1,315,272 00 |
| Increase, 1890 | \$196,007 00 |

This increase is accounted for by the erection of three new canneries, an additional number of boats, nets and seines, and 36 additional vessels of various sizes, with an increased tonnage of 535 tons; thus increasing the value in this branch alone by $\$ 75,675$.

The number of hands employed in the fisheries and fur-seal hunting, as compared with last year, was as follows:-

$$
\begin{aligned}
& \text { Season, 1890............................................................. 8,223 } \\
& \text { do 1889.............................................................. 7,789 } \\
& \text { Increase, } 1890 \ldots . . . . . . . \text {........................................ } 434
\end{aligned}
$$

This increase was due to the addition of new vessels to the sealing fleet and the building of new canneries.

## SALMON.

This, the largest commercial fishery at present in the Province, shows a slight falling off in the output of canned, fresh and salted fish, but which, I am happy to say, is not attributable to the decline of the fishery, but simply to low prices ruling in the markets. The total output this season was $19,895,992$ one pound cans, against $20,122,128$, in 1889 . Had the markets been as favourable during the early part of the season as they were in 1889 , I feel safe in saying that there would have been not less than $30,000,000 \mathrm{lbs}$. of salmon canned.

The run of fish on the Fraser River commenced nearly a month later than usual, and although very few canners had made preparations for a large pack, they entertained fears of being unable to fill their orders, as the boats during the month of July, which is usually the best month for fishing, only averaged 10 to 12 fish each per day. This continued until about the 10th of August, when the largest body of fish that is known to have ascended it for some years reached the river, raising the average catch per boat from 300 to 500 fish per day. So sudden was this enormous rush of fish that before canners had time to order their boat hands to stop fishing, the canneries were overstocked, and, in some instances, fish had to be thrown away. This large run continued until the last of August, when the canners completed their packs; and it is safe to say that quite as many fish ascended the river as in 1889 , except that the run did not last quite so long.

On the Skeena River the run was exceedingly large; canners used all the tins they had on hand, and only worked a portion of their boats, which averaged 500 to 700 fish per day. The Standard Packing Company, while packing their last 2,000 cases, kept their cannery supplied with four boats.

The Indians on the head waters of the Skeena were amply supplied with fish. and no complaints came from that source.

At River's Inlet and Alert Bay, fishing was good. All the canners in that section used up their supply of material.

At Naas River, the catch of each individual cannery was light; but the aggregate pack on the river was about the same as usual. I am under the impression that the four canneries now located at that point have a larger capacity than that a small river like the Naas is able to stand.

The comparative pack of the canneries on the Fraser River as well as on the coast is as follows :-

Ont-pound cans.
Fraser River-17 canneries ........ ....... . ................... 11,742,600
Coast-17 canneries................ ............................. 8, 153,392
Herewith is a return of all the canneries operating in this Province, with the names of owners, or part owners, location, and amount of fish packed each season since they commenced operations. The names of some of the canneries have been changed since they commenced operations.

In connection with the yield of the Fraser River, an examination of the above schedule from 1887 to 1890 , covering a period of what canners are pleased to call two poor years and two good ones, shows that the proportionate pack in any other four years, since canning operations began in this Province, fails to give similar results. What then, is the cause of such a large increase during the past four years? It is, I claim, solely attributable to artificial stocking and to better protective regulations. To prove this, I subjoin a table showing quantity of salmon fry distributed since the hatchery has been put in uperation.

Salmon fry distributed from the Fraser River hatchery :-

| 1885. | 1,800,000 |
| :---: | :---: |
| 1886 | 2,625,000 |
| 1887. | 4,414,000 |
| 1888. | 5,807,000 |
| 1889 | 4,419,500 |

The above schedule shows that the first fry were put in the Fraser River during the spring of 1885 , and as 1887 was looked to by the canners as a probable poor year, it turned out, to their great surprise, a good one. Therefore, from the experience which I have gained on this coast, as well as on the Allantic, I contend that the increase in the run of fish in 1887 is principally due to the output of fry from the hatchery in 1885. My views in this respect are borne out by Mr. Livingstone, who established and operated the Macleod River hatchery in the United States. He
affirms that a portion of the Pacific salmon will return in three years to its native streams. It is thus evident that since 1887, the constant Iincrease in the Fraser River pack is largely due to artificial fish breeding. I must therefore again urge upon the Department the necessity of establishing a hatchery with a capacity for hatching $25,000,000$ eggs, in order to maintain an industry having an annual commercial value of $\$ 1,500,000$ for the district of New Westminster alone, besides the surplus that feed one-third of the Indian population of this Province.

Ths letters published in last year's report from the various canners prove the evident success of the hatchery; but among these is one from Mr. D. J. Munn, who inclines to the belief that the "Quinnat" salmon takes longer to mature than the "Saw-quai." The Fear just passed, has clearly proved that in no other corresponding year were either "Quinnat" or "Suw-quai" so plentiful. The canners have reaped a rich harvest during the last four years. If their own statements in this respect can be relied upon, each cannery made from $\$ 15,000$ to $\$ 75,000$ per season; still, with all these advantages, they do not appear satisfied, because the regulations framed by the Department did not allow them to fish just as they wished, regardless of future results.

While trying to explain my various reports, the extent and importance of this industry, and pointing out the decline in the salmon fisheries of the Columbia, Sacramento and other large rivers in the adjoining States as the signal for action, the Minister decided, upon a request from the canners, whose views did not coincide with mine, to send some one direct from the Department to visit the Province and en quire fully into the matter. Mr. Samuel Wilmot, Superintendent of Fish Culture for the Dominion, whose report I presume will be published, was the officer chosen for such purpose. The Fraser River canners, finding that his views did not coincide with theirs, published a letter in the Victoria Colonist, under the signature of Mr. D. J. Munn, charging the Government, Mr. Wilmot and myself with inexperience and want of knowledge. In a leading article, the Colonist set forth Mr. Munn as a representative canner-he, a young man who came from Prince Edward Island about six years ago, who, I venture to say, never visited the spawning beds of the salmon in this Province, and whose knowledge of salmon in Prince Edward Island, one must admit, would be limited.

From the most interesting reports of the Fish Commissioners for the States of Oregon and Washington I glean the following information: The pack at Mr. R. D. Hume's cannery on the Rogue River was 24,000 cases. In Mr. Hume's letter, published in my report of last year, it is said that when he first commenced operations in 1877 he had great trouble in packing 3,500 cases. Since the establishment of the hatchery, the pack has increased every year.

The Columbia River pack amounted to 499,000 cases this year, an increase of 70,000 cases over that of last year. This, the Commissioners credit to artificial stocking from the Clackamas Hatchery, during the spring of 1887.

The Alaska pack amounted to 650,000 cases, a shortage of 35,000 cases, which is attributed to over-fishing, want of protection and no hatchery.

A pamphlet printed by the Fishermen's Pretective Union of Columbia River gives a full description of the fishing done and appliances used on that stream, as follows :-
"During the past twenty-four years, there were canned and put up in tins about $27,000,000$ salmon; a number so vast that the mind is hardly able to grasp its enormous magnitude. The product of these fish has been $8,904,134$ cases of tinned salmon or $427,398,440$ cans, the weight of which would be equal to 330,000 tons, and to carry the same would require 29,280 railroad freight cars or $1,48 \pm$ trains of 20 cars each ; the whole length of which would be $250 \frac{1}{2}$ miles. It is difficult to comprehend the enormous quantity here set forth.
"The total tonnage of all the materials used during the past twenty-four years (including coal and wood), has been no less than 740,000 tons; the tonnage of materials and the finished product amounted in the aggregate to the vast sum of $1,070,000$ tons.
"Such are the results produced by this industry, which the State has neglected to protect. Such is the past record of this great interest, and here naturally recurs ihe question: What will its future be ? To this we answer: that if the States of Oregon and Washington enact proper laws for the protection of the young fish; and prohibit the murderous fish-wheels from continuing their work of destruction and desolation, and also make proper provision and appropriations for one or more hatcheries, of such capacity as will insure the re-stocking of the river-say, with the means of hatching out annually, $30,000,000$ fry or small fish-then, indeed, we may venture to predict what the future will be. If these methods are adopted, it is safe to say that in less than seven years from date, the Columbia River salmon fisheries will be able to supply the world with salmon, both fresh and canned. The whole production of canned salmon of the world averages about $1,200,000$ cases per annum, all of which can be easily obtained from the Columbia if, as above said, proper legislation is enacted for the preservation of the fishery. To obtain $1,500,000$ cases of salmon, or about $73,000,000$ pounds of canned fish, we would need about $4,800,000$ salmon, all of which can be gotten from the waters of the river and estuary, subject to the conditions and legislation above described. And again, with such a large amount of fish propagated, the article will naturally be produced cheaper than today, and thus can be made a cheap and wholesome, every day article of diet, if the Legislatures of the States or Oregon and Washington, respectively, will rise equal to the occasion, and preserve to coming generations this magnificent industry. As for us and our association, we mean to do our part to arouse the now dormant opinion of the States of Oregon and Washington to a proper realization of the magnitude of the fisheries, and to insist upon proper legislative protection to the fish and the fisheries. There are no less than 10,000 persons who depend upon the fisheries for their livelihood, not to mention the vast numbers who are interested indirectly ; and why should the interests of a few monied men have more weight in the halls of legislation than the voices and interests of thousands of fishermen?
"The Government of the United States has done its share in protecting and preserving the Oregon and Washington salinon fisheries, and we confidently expect the latter States to do the same. We invoke the aid and assistance of every public spitited citizen of these two States, and believe that intelligent public opinion will indorse our attemps to create a sentiment in favor of restoring, fostering and enhancing the magnificent salmon interest of the great Pacific North West.
"The preservation of our fisheries is a subject of paramount importance. To the statesman and to the political economist there is no subject of greater moment than how to obtain a proper supply of food for the nations; and surely, an enlightened policy ought to show to our local Legislatures the need of preserving and, if possible, increasing the natural food supply. Year by year, the area available for cattle farming becomes less and less, and meat is steadily increasing in price, and consequently getting to be more of a luxury, especially in our large cities and populous States; but here is the ocean farm, with its untold millions of tons of a good and healthy article of diet, which needs no cultivating, yielding its great harvest, unaffected by droughts, summer's heat or winter's blasts.
"Surely" it is high time that protection was extented to this species of farmingi.e., in the only way such protection can be given, namely, doing away with all injurions appliances for taking the fish, and making it a felony to have young salmon in the markets, or to capture or kill the same.

[^10]which to-day exceeds $\$ 5,000,000$, and gives employment to over 15,000 persons during the canning season. But for this great industry, over $7,000,000$ pounds of salmon which have been canned and consumed by the world would have been lost to the great army of consumers the world over. Think of it! this single food-producing industry has, in less than twenty five years, added $760,000,000$ pounds, or 380,000 tons, to the world's food supply. What has been done in such a comparatively short period can be done again; and the result ought to be at least $1,000,000,000$ pounds for the next twenty-five years, providing the fish and the fisheries receive the proper legislative care and protection, as formerley out-lined in this pamplet.
"The preservation of the fisheries of our entire nation ought to demand the most earnest attention of Congress, and when the fisheries receive the legislative recognition and protection so long deferred and so much desired we shall have the Atlantic and the Pacific coasts of our country, and every estuary, white with the sails of innumerable fishing craft. Then, there will be no trouble about getting seamen to man our national vessels, and the days of our dependence upon foreign seamen will be ended."

Schedule of Salmon Canneries in British Columbia, giving Location and in Cases of 48


Names of present Owners and each Season's Pack since their Establishment, one lb. pound Cans.


Schedule of Salmon Canneries in existence in British Columbia in the Season of 1890 .


Schedule of Salmon Canneries in existence in British Columbia, \&c.-Con.

| Name of Owner. | Name of Cannery. | Where Located. |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Skeena River-Con. |  |  |  | 1889. |  |  |
| $\left.\begin{array}{l} \text { R. P. Rithet .......... } \\ \text { Jas. A. Laidlaw .... } \\ \text { John Irving. ........................... } \end{array}\right\}$ | Standard Cannery |  | 1890 | 29 | 110 | 10,600 |
| Low's Inlet. |  |  |  |  |  |  |
| $\begin{aligned} & \text { R. Cunningham \& Son .... } \\ & \text { John Rood................ }\} \end{aligned}$ | Low's Inlet Canning Co.. | Low's Inlet . . | 1890 | S. 2 | 113 | 6,000 |
| Smith's Inlet. |  |  |  |  |  |  |
| $\left.\begin{array}{l} \text { R. P. Rithet. . .... .. .... } \\ \text { Jas. A. Laidlaw . . . . . . . . } \end{array}\right\}$ | Quashella Packing Co. | Smith's Inlet . . . . | 1883 | S. 1 | 12 | $\ldots$ |
| River's Inlet. |  |  |  |  |  |  |
| British Columbia Canning Co. (Ld.) of London, Eng.. | River's Inlet Cannery | Head of River's |  |  |  |  |
| do <br> do | Victoria do | Inlet. <br> Mouth of Wannock | 1882 | 40 | 204 | 16,700 |
|  | Victoria do | River. | 1882 | 40 | 132 | 10,004) |
| A. McNeill. . . . . . . . . . . |  |  |  |  |  |  |
| W. McDowell .............. S. McDowell............. | Wannock Packing Co..... | Midway of River's Inlet. | 1884 | 30 | 185 | 9,022 |
| Najs River. |  |  |  |  |  |  |
| A. J. McLellan. | McLellan's Cannery. .. | Naas Harbour . | 1888 | 30 | 200 | 10,200 |
| British Columbia Canning Co. (Ld.) of London, Eng.. | Naas River do | do | 1881 | 34 | 193 | 5,000 |
| R. P. Rithet.. . ... . . . . |  |  |  |  |  |  |
| Jas. A. Laidlaw .......... | Cascade do | Echo Cove........ | 1889 | 30 | 67 | 4,600 |
| M. Strouse............ . . . |  |  |  |  |  |  |
| Gardner's Inlet. |  |  |  |  |  |  |
| Archibald Coats .......... H. M. Price.............. | Price's Salmon Canning and |  |  |  |  |  |
| P. Coats <br> W. Coats | Preserving Co ........ . | Gardiner's Inlet. . | 1890 | 25 | 88 | 3,721 |

halibut.
A slight increase in noticeable over the yield of last year, owing principally to the organization of a fishing company, which made several trips to the northern end of Vancouver's Island with a small steamer, generally succeeding in getting full fares, which were disposed of principally in the local markets of Vancouver and Westminster; some being shipped east of the mountains. The Victoria and Puget Sound markets were principally supplied from the Cape Flattery banks. It is expected that this fishery will develop into large proportions during the next few years.
SKIL.

The trade in this fish shows a decrease of 786 barrels. The cause of this decline is due to the unsuccessful attempts by merchants to find markets for those caught in 1889. This may seem strange; for once a purchaser has tried this fish he wants more, and with a little more push on the part of our merchants, I see no reason why
skil could not be introduced in the American markets to replace mackerel which is now largely imported from England. From recent conversation with Mr. Lundberg, I learn that the skil market is looking brighter, and there is yet a chance of a good trade being done.

## OOLACHANS.

The returns of these fish show a decline in fresh, salted and smoked, due to comparative failure in the fishery on the Fraser River, and a light run on the Naas. As steamboat traffic on the Fraser increases, the number of fish seems to diminish, and it is seldom now that the supply equals the demand. On the Naas, the wanton waste previously reported still continues, and in order to check the evil, an officer will have to be stationed at that point, about the time when the ice disappears from the river; as it is mostly through the ice that the Indians do their fishing.

SHAD.
No information reached me of any of these fish having been caught in the Fraser River, nor do I know of any being taken by seine fishermen in the vicinity of Victoria; but I presume, as in other years, scattering ones were caught.

The Fish Commissioners for the States of Washington and Oregon report about 50,000 lbs. being taken this season in the Columbia River, although no regular fishery was carried on for them. These fish were caught in the salmon traps of Baker's Bay, and are the result of fry planted there by the Fish Commissioners, a few years ago.

It is important that the Department should put a few hundred thousand shad fry in the Fraser River, as these fish are admirably adapted for these waters; and with present railway communication from Now Westminster direct to Portland, the ova or fry could be had through the courtesy of the Fish Commissioners and conveyed direct here by rail. Shad is a rapid breeder, depositing its eggs on sandy bottoms.

## SMELTS.

The catch of this fish has again doubled that of last season. This may be accounted for by the failure of the "Oolâchan" run. The largest portion of the supply taken is nsed in local markets, some being shipped to the cities of Puget Sound.

## HERRING.

The supply of this fish nearly doubled that of last year, there being a better local demand for them, and a few being shipped to the prairie towns. Very few were salted, owing to the poor quality of the fish in the southern portion of this Province.

## STURGEON.

The increase in the catoh of these fish over last season is not large. They were all caught, as usual, by salmon nets and set line. There is no regular fishery for them. Most are consumed in local markets, a few being shipped east as far as Winnipeg.

The Fish Commissioners for Columbia River state that last year, there were caught and shipped $3,660,000 \mathrm{lbs}$. of Sturgeon, $4,725 \mathrm{lbs}$. of caviar, the total value amounting to $\$ 140,595.75$. There is no reason why the same quantity of fish could not be taken from the Fraser River and its lakes.

## MARINE FURS.

The value of the marine fur products is $\$ 510,111$, being an increase of $\$ 157,661$ over the past year, due to the following causes: An advance of $\$ 1$ per skin in the price of fur seals, an increase of 11,181 skins in the catch, and an increase of 3,200 in the catch of hair seals.

I append a schedule, showing the detailed catch of the sealing fleet for the season of 1890 :-

Return showing the Number of Vessels, Boats, Canoes and Men engaged in the Marine Fur Fishery with Products and Values, for the Season of 1890 .


Return showing Fur Seals caught by Foreign Vessels and disposed of in Victoria, B.C.


It will be noticed that the names of vessels and owners are given together, with the tonnage, as in previous reports, while the number of boats and canoes is kept separate and the total values given. The value of vessels comprises the fit out with firearms, ammunition, de., when prepared for a hunting voyage.

The catch of seals has been divided into three classes, viz. :-Spring catch, Sand Point catch, and Behring Sea catch. The spring catch comprises the seals captured after the vessels have left Victoria, say 1st February, hunting as far south as Lower California; Sand Point catch includes the skins taken off the west coast of Vancouver Island, and the Behring Sea catch those killed in Behring Sea proper. It will be noticed that the two first named kinds exceeds the Behring Sea catch by 3,217 skins, and, as is usually the case, I learn from dealers that the percentage of grey pups is larger in the Sand Point catch than in that of the Behring Sea.

On comparing the schedule with that of 1889 , it will be seen that the sealing fleet was increased by six vessels; and, from present outlook, there will likely be a much larger increase during the coming season. I understand that there have already been purchased three American, a Japanese and five Nova Scotia schooners, for this trade. The names of the Nova Scotia vessels now on their way, are:"Union," "Geneva," "Maud S," "Otto" and "Annie M. Paint," besides a steamer recently fitted up for the same purpose.

I was informed that the seals in Behring Sea changed their feeding grounds last season from the south-west to the north-east of St. George and St. Paul's Islands; the large catches being made at the north east end. The cause of this change is said to be on account of sub-marine volcanic eruptions, which drove away the feed from the banks. I understand that Customs Collector Milne, of Victoria, has given a detailed report on this fishery, and there is no need of my dwelling further on it. As I am situated here, and so seldom able to visit Victoria, I find it extremely diffcult to get reliable information.

## DOG FISH.

These fish are still found in abundance. The chief purpose for which they are used is to make oil, the supply of which increased this season by 24,884 gallons over 1889. This industry is capable of large development. Not only is there an inexhaustible supply, but there is good demand for the oil

## WHALES.

No attempts have been yet made by our people to develop this industry which is capable of vast extension.

TROUT.
The demand for these fish is still on the increase-so much so, that the supply is insufficient.

## MIXED EISH.

These consist of sardines, anchovies, whitings, flounders, soles, skates and various other small fish, of which, on the whole, there was an increase, due to a larger trade by an increased population.

## SHRIMPS AND PRAWNS.

It is difficult to obtain reliable data of the yield of these fish, as they are principally caught by Italians, from whom very little, or no, information can be had.

## LOBSTERS.

Fish Commissioner Crawford, for the State of Washington, states in his report that a number of young lobsters were seen by fishermen in Port Townsend and Shoal Water Bays. Two gentlemen, who can be relied upon, reported having taken specimens at Hoquim River and Peaterson's Point. These are said to be the offspring of the lobsters planted by United States Fish Commissioners about two years ago. I hope that when the Department lobster hatchery is in working order, it will be possible to send a good supply of the young ones to this coast.

## OYSTERS.

The supply bas increased by about 500 sacks over that of 1889 . A sack contains 2 bushels. The supply is still very short of the demand. This is becoming more apparent every season, as the population increases, which causes the importation of large quantities of oysters from the Sound bed.

Fish Commissioner Crawford reports that 345 acres are under artificial cultivation in the State of Washington, with an average output of 350 sacks per week during eight weeks in the year, giving employment to about 125 persons, and worth to the State $\$ 21,888$. It is well to know what our neighbours are doing, that we may profit by their experience. The regulations adopted by the Department for the cultivation of oysters is a move in the right direction, which will be the means of restoring a number of depleted beds to a state of productiveness.

## CLAMS AND MUSSELS.

The consumption of these bivalves has increased; the supply of clams being abundant and of good quality. I see by the Oregon Commissioner's reports that a new and better variety of the eastern clam was introduced in their waters, which has thrived splendidly and is favourably accepted. When our own system of protection is in working order, it would be well to have a tew beds stocked with this variety of clams.

## PROTECTION.

The fisheries protection service on the Fraser River was much more efficient than in 1889. The steain launch rendered grood service, and I do not think there were so many who fished without a license as previously, considering the large run of fish in the river.

The Naas River was guarded by Mr. McNeish, whose report is annexed, and who states that the regulations were well enforced.

The Skeena was under charge of Mr. M. K. Morrison, whose report is also appended; but owing to the lateness of his appointment, fishing had commenced before he became fairly established. He reports that owing to the exceedingly large run of fish, the limit of boats was not exceeded.

Guardian Barkeley, Courtney River, reports that the regulations were strictlyobserved and that the lakes were carefully guarded against the use of explosives by
miners; also, that the run of salmon in Courtney and Campbell Rivers was good, and that parties intend building canneries at both places. He further states that the Indians caught a large supply of fish for their own use.

Guardian Malpass has recently been appointed to replace Guardian Good. He appears active, and reports the regulations being well enforced.

Guardian Lomas sends no report on the Cowichan, but from his private letters, I infer that a fair supply of fish ascended the Cowichan River and that a number were caught with the fly in Cowichan Lake. The reports of Guardians Green, Morrison, Mc Neish and Roxburgh are appended.

I trust that the proposed system of protection, when properly enforced, will have the effect of keeping our numerous rivers and lakes in a much better state of preservation, and enable those who are now employed in the basiness to continue it profitably, while learning something which may be of use to those who may come after them.

> I have the honour to be, Sir, Your obedient servant,
> THOS. MoWAT, Inspector of Fisheries for British Columbia.

## REPORTS OF THE DIFFERENT FISHERY GUARDIANS TO THE INSPECTOR OF FISHERIES IN BRITISH COLUMBIA.

## LOWER FRASER RIVER.

## C. F. Green, Fishery Guardian.

I beg to state that owing to the short time I was employed as Fishery Guardian for this district, I am unable to make any report, except on the "Saw-Quai" run of salmon.

When I received my appointment as guardian, on 25th July, I found the fishing in full swing, and it continued so till the latter end of August, thus enabling the canneries, in most cases, to complete their pack, although they did not pack as large a number of cases as they did the previous year, owing, I believe, to the dull state of the salmon market.

I consider that the weekly close time this year was better suited than during the previous year, as it enabled the guardians to sce that the boats started out during daylight, and the fishermen could see the flags hoisted at different points to denote when it was 6 p.m. Sunday. I think if fixed later in the evening it will be impossible to stop fishing during close time, as it will be dark so long before the time expires, and fishermen are bound to take any advantage they can. 1 may state that I always found the cannery men trying their best to carry out the fishery regulations and to assist me in enforcing them.

## rivers inlet.

## William Roxburgh, Fishery Guardian.

In accordance with instructions received, I proceeded from Westminster to Rivers Inlet, and arrived there on 11th Jnly. The fish had been running a week previous to my arrival, although not plentifully, and the canneries were all in operation.

Owing to scarcity of hands, the usual number of Indians not having come round, and Chinamen or white men not beiug obtainable, the canneries could not at any time this season fish all the boats for which they had taken out licenses, but the fish were so abundant and the run continued so iong, that they were enabled to complete their pack.

The cannery proprietors, by taking the fishermen from the boats and employing them in the canneries when the catch of fish was in excess of the canning capacity, avoided all waste of fish, and the weather keeping cool, there were none destroyed after capture.

The fish being easily obtainable, there were no attempts or instances of trespass, and the canneries, during the season, worked quite in accord with the Act and regulations.

The offal at the Viceroy Cannery, at the mouth of the O-wee-kay-no River, should be dumped into a scow and carried into deep water, as the beach is flat and the sea throws it up and leaves it there. At the other canneries it washes into deep water and is not so offensive.

SKEENA RIVER.

## M. K. Morrison, Fishery Guardian.

I am pleased to report that this season has been the best ever known on the Skeena River for salmon. Twenty fishing boats were sufficient to keep each cannery packing from 500 to 700 cases per day. Every Saturday, the canneries were filled up with salmon; all were forced to keep the boats off, both on Saturday and Sunday, after the first two weeks. The Standard Cannery put up the last 2,000 cases with only four boats fishing.

Owing to the wreck of the "Sardonyx" the regulations and forms of applications did not get to the Skeena before July, two weeks after the fishing began. Indians had been to me and gave me the license fee, asking me to get them a license as soon as I could. I sent in their applications as soon as possible.

Fishermen and cannery men are well pleased with this season's fishing.
NAAS RIVER.

## Thos. Mc Neish, Fishery Guardian.

I beg to submit the following report as Fishery Guardian on Naas River for the past season.

I arrived at Naas Harbour on 4th July. I regret to state that the details of my report are somewhat meagre, owing to my being unable to get about for the want of a boat, none having been supplied to me. Had it not been for the kindness of the cannery managers, allowing me to travel on their steamers, I would not have been able to get around in rough weather at all.

Fishing commenced on the 4th June, one month before I arrived. The season's catch was good, but more salmon would have been put up had it been possible to obtain additional help. I am of the opinion that, in view of the change in the regulations having reference to the time of applications for licenses, which have to be in before the 1st of May, there should be a man on the river by the 15 th of April, as there are a large number of Indian fishermen who cannot read the regulations, and the timely appearance of an officer would prevent any unpleasantness which might otherwise arise. I would suggest that a change be made in the weekly close time, because should low water slack be at 5 a.m. Monday morning, and the boats go out at 6 a.m., before the nets are thrown, the tide is running so strong that they have to haul up and come ashore again, and it is 5 p.m. before they again go out on the next low water. I would suggest that the weekly close time regulations be changed so as to read: "Fishing shall be discontinued from slack water nearest noon Saturday to slack water nearest $6 \mathrm{a} . \mathrm{m}$. on the following Monday." The reason I suggest this change is, that the present regulations entail considerable loss and inconvenience to the fishermen, by reason of the very short time during which fishing can be prosecuted on Mondays, because, on account of the rapid current and strong tide, it is only possible to fish high and low water slack.

Return showing the Number, Tonnage and Value of Vessels and Boats, and the Number of Men engaged in the Fisheries, Quantity and Value of Fishing Materials, Kinds and Quantities of Fish, \&c., in the Province of British Columbia, for the Year 1890.


Return showing the Number, Tonnage and Value of Vessels and Boats, \&c.-Province of British Columbia—Continued.


Yield and Value of the Fisheries of the Province of British Columbia for for the Year 1890.


Number and Value of Vessels, Boats, Nets and Trawls, engaged in the Fisheries, of British Columbia, during the Season of 1890.


## APPENDIX G.

## ONTARIO.

## SYNOPSES OF FISHERY OVERSEERS' REPORTS IN THE PROVINCE OF ONTARIO FOR THE YEAR 1890.

## LAKE SUPERIOR DIVISION.

Overseer W. C. Dobie, who has charge of that part of Lake Superior extending from Pigeon River to the Slate Islands, reports that the fishing season opened on the 10th May and lasted till the end of December. Although the catch did not quite come up to that of 1889 it exceeds that of 1888, and may be said to have been succesful, considering the stormy weather experienced during the month of September, whereby several nets were lost. Pound-net fishing seems to be gaining in favour, and the number of applications for 1891 will undoubtedly exceed those of last season. Mr. Dobie leans towards that mode of fishing, claiming that it is less injurious than gill-net fishing. Pound-nets are usually set nearer shore, and capture only the fish which would not be caught at all were it not for them. In stormy weather, before the fishermen can raise their gill-nets, large numbers of dead fish are found therein, which have to be thrown away, fouling the fishing grounds. There can be no such waste of fish in pound-nets, as they retain fish alive for weeks till taken up. The close season was well observed. The value of fish caught in this division is given at $\$ 121,374$.

Overseer Joseph Wilson's division comprises the lower portion of Lake Superior, from the Slate Islands extending to Collin's Inlet, in Georgian Bay. Salmon trout were as abundant as usual, but whitefish yielded less in Lake Superior than in the Lake Huron portion of his district. Sturgeon are declining. No improvement can be hoped for so long as these fish are allowed to be caught during the spawning season, and Mr. Wilson urges the adoption of a close time. Fishermen experienced considerable loss of fishing material during the heavy gales which prevailed on Lake Superior in the fall. The close season was well observed by the licensed fishermen, but Indians and half-breeds, it is suspected, carry on illegal night fishing between Algoma Mills and Bruce Mines, and run their fish to Detour.

Guardians Cameron, Gauthier and Strain performed their duties during the close season to the satisfaction of the Overseer.

It is much to be regretted that nothing has been done by the Provincial Government for the protection of speckled trout in the rivers on the north shore of Lake Superior. Several of those streams were netted and poached during the past season, and large quantities of fine trout were exported to United States markets. The most efficient remedy would be for the Dominion Government to prohibit the exportation of these fish.

A guardian was employed to watch a couple of rivers in the vicinity of Sault Ste. Marie till they were frozen over, and this had a good effect to check netting at night.

The total value of the fisheries was:-In the Lake Superior portion, $\$ 29,339$; in Georgian Bay portion, $\$ 32,202-m a k i n g$ a total of $\$ 61,541$.

## MANITOULIN ISLAND DIVISION.

Overseer John Marks, of St. Joseph's Tsland, and Alex. Brinkman, of Manitowanning, have charge of the fisheries around this island. The former states the fish
were as abundant as before. There were less boats and tugs employed in the tishery last season from Duck Islands.

Overseer A. Brinkman sent no report.
The total value of the fisheries in this districts amounts to $\$ 293,475$.
GEORGIAN BAY DIVISION.
Overseer F. G. M. Fraser, who has charge of that portion of Georgian Bay extending from Collin's Inlet to Point Marks, reports an increased catch of fish all round. This he attributes to a more vigorous prosecution of the fishing industry. He apprehends the Georgian Bay waters will not be able to stand the ancual drain now put upon them. His division alone shows that nearly half a million tathoms of gills-nets were in use last season; each boat averaging over 6,000 tathoms. Gangs of fishermen, with fyke-nets, brought from the United States, carry on extensive illegal fishing. They are protected by fish dealers, who are mostly agents for American firms. Some seizures were made, but it is hard to locate the nets and seize them with this class of poachers. The injurious habit of throwing offal of fish overboard is still indulged in, and must prove disastrous to the whitefish feeding grounds. The recent fishery regulation making the close season for salmon trout from 15th October to the end of November is deemed a wise and needed measure; but there will be a great deal of trouble in enforcing it, unless the close season for whitefish is made the same. The total value of the fisheries in this division amounts to over $\$ 300,000$.

Overseer John Donaldson, of Collingwood, who has charge of that part of Georgian Bay from Point Marks to Point Boucher, made no report.

Overseer G. S. Miller, whose division comprises that part of Georgian Bay extending from Point Boucher to Colpoy's Bay, returns an increased cateh of fish, especially in whitefish and salmon trout. Five tugs and thirty-seven boats, manned by over one hundred fishermen, were engaged fishing. The total value of the yield of this division foots up to $\$ 98,733$.

Overseer John Shackelton whose division extends from Colpoy's Bay to Cape Hurd, made no report. The Department has lately been advised of his death.

## LAKE HURON DIVISION.

Overseer R. H. Murray, who has charge of that part of Lake Huron extending from Cape Hurd to Southampton, made no report.

Overseer Hugh McFayden attends to the Saugeen River. He states that owing to cold weather in the early part of the summer, anglers had poor sport, but that they did better later on. Speckled trout did not seem so abundant as usual. Some parties felt inclined to use nets, and had to be closely watched.

Overseer H. W. Ball has charge of that portion of Lake Huron extending from Southampton to Goderich. He reports an increased catch in almost every locality, except at Kincardine, where there was one tug less than last year employed. Much illegal fishing is undoubtedly carried on in this district, either withont licenses or by means of undersized nets. Illegally-caught fish are also reported to be shipped during the close season as frozen fish. Were regulations enacted compelling shippers to produce certificates of inspection of fish from anthorized officers, it would greatly tend to prevent these illegal practices.

The dam at Maitland Falls, which was carried away, is being replaced by a new one, which bars only half the river, thus giving the fish every tacility to ascend.

The total value of the yield of the fisheries of this division amounts to $\$ 52,331$, an increase of 25 per cent. over 1889.

Overseer H. B. Quarry, of Parkhill, attends to that portion of the coast of Lake Huron extending from Goderich to Blue Point. He reports fishermen as being very reluctant in furnishing bim with statements of their catch. Fish, certainly, were more abundant than during the last few years. Were the close season for pickerel to end by the 1st May, it would be more advantageous to the fishermen, as these fish appear to have done spawning by that time. The total yield of the fisheries of this division is valued at $\$ 26,700$.
$8 a-13$

Overseer J. C. Pollock's division extends from Blue Point, on Lake Huron, to Baby's Point, on River St. Clair. He reports a scarcity of fish. Some fishermen refused to take out licenses, seeing others fishing without success. Some people ascribe this decline to the heavy traffic done on the river, which drives the fish to deeper water, while others claim it is due to trap-net fising at both ends of the division. The total eateh only amounts to $\$ 7,600$.

LAKE AND RIVER ST. CLAIR DIVISION.
Overseep C. W. Raymond attends to the upper part of Lake St. Clair. He reports a fair catch of bass, as compared with other years. The balance of the catch is mostly composed of coarse fish. As the ice remains long it Mitchell's Bay it allows of tery little fishing before the close season; hence the small yield. No infractions of the fishory laws are reported. An American from Detroit came over to set night-lines in Canadian waters, but left on being ordered to do so.

Overseer A. Quenneville, who has charge of the lower part of Lake St. Clair and of the North Thames River, also reports a small catch. This, he attributes to the fact that seiners cannot use their seines before the close season begins.

## THAMES RIV゙ER DIVISION.

Overseer T. McQueen, whose division extends from the mouth of the Thames River to Lewisville, says, that nineteen out of the twenty-four fishing grounds in his division were in operation last season, employing nearly one hundred men. The principal fish caught are pickerel, pike and coarse fish. The yield ran short of previous years. This is attributed to the floating ice and sunken logs, as well as to a less rigorous prosecution of the fishery. The Overseer is of the opinion that a change took place in the periodical runs of fish, and that the large runs occurred during the close season, which was well observed. The law regarding sawdust is better complied with. Some of the fishermen deserve credit for making strenuous efforts to improve their grounds by removing sunken logs and debris.

Overseer John Crotty atteuds to that portion of the Thames extending from Lewisville to Wardsville. He also reports a shortage in the catch, caused by ice jams and by the floating logs, which destroyed several nets and prevented others from setting. There are no fish-ways in his division. The close season was strictly observed.

Overseer P. McCann, who has charge of the upper portion of the 'Thames River, reports a fair catch, principally of trout, whitefish, herring and pike. Several rumours of spearing were afloat, but the Overseer was unable to secure sufficient evidence to convict. Farmers do not like to lodge complaints against their neighbours. In some piaces, the river runs very wild, being almost perpendicular, and it is impossible to catch or follow the poachers. Two of the thirteen fish-ways in this district will need repairs in the spring; the others are in good order. The present form of fish-way works satisfactorily and meets the approval of anglers.

## DETROIT RIVER DIVISION.

Overseer Joseph Boismier, who has charge of the Detroit River, reports an improvement in the pickerel tishery. Whitefish were fairly abundant, and there is reason to believe that the catch was larger than reported. Herring are steadily declining, and something must be done to give them better protection. Sturgeon and perch, being also marketable fish, should be protected. It is stated that millions of young fish are destroyed by parties seining for minnows in the shallow bays of Detroit river. The total value of the fisheries of this division only amounts to $\$ 11,200$, being a shortage of over 40 per cent., as compared with 1889.

## LAKE ERIE DIVISION.

Overseer David Girardin's division comprises the waters around Pelee Island. His returns show a decline of 50 per cent. in the catch of herring, owing to the strong gales which prevailed during the best run of these fish. Whitefish show about the same as during the previous year. There is a considerable increase in the
yield of pickerel and sturgeon. The total value of fish caught in this division is given at $\$ 40,000$. a decrease of over 33 per cent. from last year.

Overseer Wm. Prosser's division extends from the mouth of Detroit River to the Kent County line. His returns show an increase in every kind of fish, except in herring, where there is a decline of 50 per cent. This decrease alone explains the deficiency in the total value of this season's catch $(\$ 80,000)$, at the same percentage, as compared with the previous year.

Overscer John McMickael has charge of the frontage of the counties of Kent and Elgin. He reports the stormy weather washing the clay banks and rendering the waters so muddy that the finer grades of fish kept outside. The season was therefore late in beginning; but the yield proved, however, an average one. The Kent division shows an increase. The close seasons are reported to have been well observed. The total value of the fisheries of the former division foots up to $\$ 148,500$, and the latter to $\$ 100,400$.

Overseer David Sharp, who attends to the Norfolk division, reports a large decrease in the yield of all kinds of fish, owing to unfavourable weather and strong winds which kept the fish off shore. Some protection should be given to sturgeon, which is becoming the most valuable fish of Lake Erie. There were 15,000 lbs., more of this fish caught last year, in this division, than of whitetish. Its value is constantly increasing. One party was convicted of violating the bass close season, and fined $\$ 20$. The total value of the fisheries of this division is given at $\$ 35,400$, a decrease of 28 per cent. from 1889.

Overseer C. W. Evans, of Cayuga, has charge of part of the Grand River from North Cayuga to Caledonia. He reports this stream specially adapted for the breeding of large black bass and pickerel, both of which show unmistakable signs of increase. A close watch was kept on poachers using nets and light jack spears, and these illegal practices, were to a certain extent, checked. Some residents complain of the regulation which probibits netting and spearing for their own use; but as good strings of fish can, at any time be, caught with hook and line, the Overseer considers that they have little reason to grumble. Several nets and spears were confiscated and some of the offenders prosecuted. The fish-way at Dunville was inspected and found efficient, but the overscer thinks it is not properly located. Two mill owners were summoned before a magistrate, and compelled to desist from throwing sawdust into the stream.
lake ontario divisions
Overseer Fred. Kerr supervises the Hamilton division, which extends from Moulton Bay; on Lake Erie, to Burlington Beach, on Lake Ontario, including Niagara River. He reports the shore fishing for herring in Lake Ontario poor, owing to continued adverse easterly winds, until the fish had gone to deep water, where some good catches were made at distances of two to four miles outside. At Port Maitland, on Lake Erie, enormous hanls of 30 harrels per lift were made of splendid-sized herring. Ciscoes are surely decreasing, the catch being barely half that of former years. In some localities it proved a complete fiilure. Several theories are advocated by fishermen for this sceming disappearance; bat Mr. Kerr attributes it solely to steady overfishing, and strongly urges the adoption of a close season. Whitefish appeared at Burlington Beach in June and July, but continuous winds prevented the fishermen from going out. The usual quantity of whitefish and salmon trout was, nowever, taken. Sturgeon were not seen at Niagara, but reported abundant at Ridgeway, where they were caught of very large size and brought remunerative prices. Coarse fish were abundant. Perch is now finding its way on the markets at fair prices. Some of these fish weigh as high as 3 pounds, and, to a certain extent, replace ciscoes during the summer months.

In the Lake Erie portion of Mr. Kerr's division fishing generally was better than on Lake Ontario. Angling in Grand River was reported good, fine strings of bass and pickerel being caught throughout the season. All the sawmills of this district were visited, and the owners notified to comply strictly with the law regarding sawdust. Two mill owners were fined for non-compliance with the law. Mill ownere at $8 a-13 \frac{1}{2}$

York and Caledonia, on the Grand River, were served with the requisite notices to build fish-ways. Several gill-nets, illegally used in Burlington Bay, were seized and destroyed. With these exceptions, no other violations of the fishery laws ocurred. The total value of the fisheries in the Lake Ontario portion amounts to $\$ 48,584$, and in Lake Erie to $\$ 16,321$-a total of $\$ 64,905$.

Overseer Wm. Sargent's division extends from Burlington Beach to Port Credit, on Lake Ontario. The catch of ciscoes and herrings was nearly equal to that of previous years. Although there is no visible decline in the yield of these fish, this officor urges the adoption of a close season, especially for ciscoes, and recommends the months of July and August as the proper time. Fishermen being too crowded in this division, some went to Frenchman's Bay, but met with poor luck, owing to their being unacquainted with the fishing Jocalities. On a visit to this bay, to enquire into the cause of fishermen losing so many nets by strong undercurrents, it was ascertained that the bottom would have been all right, had they gone further out in the bay; say from seven to ten miles. The yield of tieh in this division is valued at $\$ 50,000$, a slight decrease from last year's returns.

Overseer Wm. Helliwell's division comprises that part of Lake Ontario tronting on the County of York. Great difficulty is experienced in obtaining reliable data of the fishermen's catch, and this should be made one of the conditions to entitle one to obtain a renewal of their license. The yield fell off a little, owing to a couple of the principal fishermen not pursuing their calling, as formerly. Those who devoted all their time and attention to the fishing business did well. Herring seems the staple fish of this division; its catch is given at $121,000 \mathrm{lbs}$. The total value of a! the fisheries nearly reaches $\$ 10,000$.

Overseer Charles Gilchrist has charge of that part of the coast of Lake Ontario fronting on the County of Northumberland, including Rice Lake. He reports a further decrease in the yield of whitefish and salmon trout, the catch of the latter fish not exceeding 600 lbs. The principal fish now caught are ciscoes, which are here deemed an inferior tish.

Rice Lake kept up to its usual standard. Large numbers of maskinonge were caught by sportsmen as well as by Indians, and every one admits that the stock is yearly increasing. Over one hundred Indians were constantly engaged fishing for yellow bass and maskinonge. They make a good thing of it by peddling these fish and bartering them for farm produce. Very few foreigners visited Rice Lake during the season, but those who came admitted that they never betore had such luck. A party of three Americans caught 119 maskinonge and a large number of bass in six days.

The total value of fish caught at Rice Lake was $\$ 13,800$, and for the whole division $\$ 18,308$.

Overseer Nelson Simmons, of Meyersburg, who attends to the Trent River, reports a better catch of fish than usnal, especially in maskinonge and bass. The close seasons were well observed. There is only one tish-way in working order on this stream. The old ladder at Chisholm's Rapids is completely gone, and Messrs. Miller d Co. have failed to place a new one in their dam. Pickerel cannot improve so long as these dams remain unprovided with fish-passes. The river has been well kept clear of sawdust and rubbish of any kind. The total value of the fisheries in this district is given at $\$ 11,136$.

Overseer Geo. B. McDermot, whose division comprises the shore of Lake Ontario, from Oshawa to Ashbridge's Bay, as well as Lake and River Scugog, reports that very little fishing was done at Pickering Harbour, only a few licenses being granted. There are, however, signs of an active season for 1891, several fishermen from Bronté intending to fish in these waters, with a better class of boats and superior gear. This may stimulate local fishermen to improve their mode of fishing. The yield of the fisheries in this division reaches $\$ 10,000$.

Bass and maskinonge are steadily improving in Lake Scugog. The catch exceeded that of previous year, and the bass were the largest ever seen in these waters, and of a delicious fiavour. The shores of this beantiful lake were strewn with camps of tourists, enjoying fine sport. This brings quite a revenue to settlers,
who are thus enabled to dispose of their farm produce at fair prices. During the close season, the spawning beds were swarming with breeding fish. Several poachers were caught at work and promptly fined, which had a telling effect upon others. The people generally begin to realize the beneticial effects of protection, and are lond in their praise of the Department's action in the matter. The total value of the fish caught at Lake Sugog is estimated at \$25,740.

PRINCE EDWARD AND BAY QUINTE DIVISION.
Overseer W. P. Clarke, of Belleville, who was appointed to replace Orerseer Wilkins, reports an average catch. The returns show that 78,400 pounds of whitefish were taken in fifteen days. Mr. Clarke thinks that the catch of bass is understated by fishermen. Fishing for pickerel through the ice wan better than for the past twenty years. There are no fish-ways in this district. The close season for whitefish was well observed. The mill owners are complying with the law respecting sawdust and mill rubbish. The fisheries of this district are valued at $\$ 27,000$.

Overseer Jos. Redmond, whose division comprises the waters of Lake Ontario around the County of Prince Edward, reports a slight improvement in the yield of fish over that of last year. No violations of the law occarred, and the fishery regulations were well observed The total value of the fisheries of this division is given at $\$ \geq 8,840$.

## LENNOX, ADDINGTON AND FRONTENAC DIVISIONS.

Overseer $A$. D. Sills, who has charge of the fisheries of the County of Lennox, reports a decline in the yield of his division, owing to a smaller number of fishermen being engaged in this pursuit; and others, considering the license foe too high for coarse fish. refused to fish at all. The close seasons werestrictly observed. The entire catch of this district is valued at $\$ 5,700$.

Overseer R. R. Finkle, whose division comprises that part of Lake Ontario fronting on the Town-hip of Erne town, including Amherst Island, returns a much lighter catch than usual; but prices were better. The close season is reported to have been well observed, and no violations of the law came to this officer's notice. The value of the fisheries of this division only comes to $\$ 12,600$, a decrease of 40 per cent., as compared with the year 1889.

Overseer George Lake, who has charge of the lower portion of the inland waters of the County of Frontenac, states that fishing was not so actively pursued as usual. Herring are getting abundant in those waters, and settlers catch a good many for their own use. This Overseer recommends the issue of net licenses to residents for this kind of fish unly. A fish-way is needed at the foot of Bob's Lake.

Overseer Robert Gilbert, who has charge of some eighteen lakes in the upper portion of the County of Frontenac, reports an average catch. Trout Lake, which was re-stocked some years ago, shows signs of improvement. Complaints of spearing by sportsmen during the hunting season proved groundless upon investigation. There are no fish-ways in this division, but one is recommended at the junction of Lower and Upper Trout Lakes, and as the mill was burnt last summer, this is the proper time for having it placed in the dam.

Overseer $H$. R. Purcell, who has charge of the lakes in the County of Addington, reports very little netting in his division. Black bass are on the increase in the Napanee waters. He recommends that several lakes in the vicinity of the Napanee and Kingston Railways be re-stocked with Oswego bass and pickerel. The small yield of fish in this division is not due 10 a acurcity of fish, but to abundance of other work. Very little sawdust now goes into the streams. The close seasons are well observed.

## wolfe island and kingston division.

Overseer Thomas Merritt, who has charge of the lake shore frontage of the County of Frontenac, reports a slight decease in the season's operation. This is ascribed to a less vigorous prosecution of the spring fisheries, prices being then low and fishermen finding more remunerative employment elsewhere. The summer catch by anglers and trollers has never been better for many years past. Fly-tishing for bass in the inland lakes was remarkably good. Mr. Merritt suggests that foreign
sportsmen be required to report at the Custom house or to the local Fishery Overseer, in order that their equipment be inspected, as a protection against illegal fishing appliances.

Overseer Peter Kiel, who has charge of the fishing grounds around Wolfe Island, reports that fish were as abundant as before, but that the decreased yicld is to be attributed to a less vigorous prosecution of the fishery. All the coarse fish taken in this division are shipped to United States markets. The Kingston markets are supplied from the upper lakes, at reasonable prices. The close seasons are well observed.

## ROCKPORT, BROCKVILLE AND CORNWALL DIVISIONS.

Overseers Wallace, Hunt, Poole, McGarity and Mooney have charge of the divisions which extend from Gananoque to Glengarry. With the exception of hoop-bets fished in the vicinity of Rockport, no netting is allowed in these waters. Anglers and pleasure seekers give employment to numerous boatmen. Fishing seems to be improving, as the returns show an incerease of 50 per cent. in the catch of bass orer that of the previous season, and over 200,000 [bs of pike. The total value of the fisheries is reckoned at $\$ 27,564$, an increase of over $\$ 10,000$.

PRESCOTT, RUSSELI AND CARLETUN COUNTIES DIVISION.
Overscers P. St. Pierre, of Point Fortune, O. Miron, of Alfred, and W. Boucher, of South March, have charge of the Ottawa River fronting on the above-named counties. The fisheries of these divisions are unimportant, coarse fish only being caught, and the total yield valued at $\$ 5,400$.

## LAKE NIPISSING DIVISION.

Overneer $J$. S. Richardson reports a falling off in the catch, not through a lack of fish, but owing to the fact that settlers being unprepared to keep fish during the sunmer weather, only begin to fish late in September, when they can safely ship. The principal kinds of fish in these waters are pickerel and pike. Over 700 tourists visited the now famous summer resort at Manitou Island. Nearly 200 Indians are settled on the banks of this beautiful lake, chiefly living on fish. Mr. Richardson recommends the granting of licenses to tish for sturgeon with large-meshed nets, so that io other kinds of tish can be caugbt. The only fish-way in this division is that at the foot of Turtle Lake, which was built last summer.

## PARRY SOUND AND MUSKOKA DIVISIONS.

Overseer G. R. Steele, of Lorimer Lake, states that complaints still occur regarding the want of fish-ways on some streams in his division. One party was detected fishing in Staley's Creek during the close season, and fined. Three mill owners were also prosecuted for violation of the Sawdust Act. In one case the offender was fined; the other cases are still pending. Mr. Steele favours the issue of licenses to settlers for net-fishing for domestic purposes only.

Overseer William Lockhart, of Denville, has charge of the inland waters of several townships in Muskoka and Parry Sound. He also recommends the granting of net licenses to residents during the open season. The close seasons in this division were fairly obserced.

Overseer Henry W. Gill, of Ufford, who attends to Lakes Rosseau and Muskoka, reports tish abundant. Angling was good. A bad habit prevails among tourists of killing young tish, too small for food, simply for the purpose of boasting of having killed so many fish during such a time. Bass fishing seems to be the principal attraction of the numerous sportsmen who visit those beautiful waters. Mr. (iill also urges the issue of herring-net licenses to settlers, as these fish cannot be caught otherwise.

Oversear J. G. Rumsey, of Huntsville, reports that all fishing in his division is carried on by anglers or for local consumption. Tourists were scarce last season. The necessity of a fish-pass at Burk's Falls, on the upper waters of Maganettawan River, is much felt, as this is the best speckled trout stream in that district. The southern branch of the Muskoka and its tributaries are well stocked with game fish :
but the same cannot be said of the north branch, which should receive some fry from the Government hatcheries. The salmon trout fry placed in these waters two years ago is reported to be thriving. Considerable trouble was experienced with poachers spearing on the spawning grounds. It is a difficult thing to contend against this evil, neighbours being reluctant to inform on one another; and the lawbreakers being masked and disguised it becomes impossible to identify them. This officer's endeavours to track these reckless individuals thus utterly failed. No trouble is experienced with millowners; most ot them have built burners to consume all the rubbish from their mills.

## LAKE SIMCOE AND COUCHICHING DIVISIONS.

Overseer L. S. Sanders, who has charge of the west side of Lake Simcoe, reports that the heavy fines which were imposed during the season of 1889 had a telling effect, no violations of the law being discovered this season. Angling was good. Black bass appeared abundant, but for some reason or another it would not take the troll.

Overseer Wm. Hastings' division comprises the south and eastern sides of Lake Simcoe. He reports the close season as having been fairly well observed. Angiing was poor. He issued 45 spearing permits.

Overseer Wm. McDermot, who attends to the inland waters of the Connty of Simcoe, reports a marked improvement in the catch of speckled trout and pike; bass and maskinonge about the same as last year. Owing to heavy freshets, severai fish-ways were either damaged or entirely carried away. They were, however, repaired as soon as circumstances would permit. The law relative to sawdust was not very well complied with, and this officer was compelled to proceed and convict several parties. The close seasons were well observed, and poaching has almost disappeared from these waters.

Overseer $F$. Webber has charge of the northern part of Lake Simeoe, of Lake Couchiching, the Severn River and its tributaries. He reports an increase in all kinds of fish, especially in maskinongé, whitefish and speckled trout. The improvement in the yield of maskinonge is ascribed to the stoppage of spearing during the close-season, that of whitefish to artificial re-stocking, and of speckled tront to the absence of sawdust or other rubbish from the streams. The Rama Indians gave some trouble ; but since the attention of the agent has been called to their lawless acts they seem more inclined to obey the laws. Two mill owners were prosecuted for allowing sawdust to escape into the Severn River, but a conviction could not be obtained, for want of sufficient evidence. Lots of anglers from the States visited the Severn River, one party numbering ninety persons.

## VICTORIA COUNTY UIVISION.

Overseer $J . R$. Graham, who has charge of the inland waters of the above-named county, reports maskinongé and bass increasing. The close season has been well observed; only a single complaint was laid before him, but as no direct proof could be made the matter was allowed to drop. The fish-way at Balsover dam is in good repair. All the owners of saw mills visited by this Overseer seem well disposed to carry ont the law.

## 1PETERBOROUGII COUNTY DIVISION.

Overseer $G$. W. Fitzgerald, of Lakefield, who has been appointed to replace exOverseer Cochrane, whose services were dispensed with, states it is impossible to give any accurate estimate of the fish caught in the numerous lakes under his charge, known as the Peterborough division. It must be quite large, for, adding tourists to settlers, and a considerable Indian population (living mostly by fishing), he estimates the number of persons fishing at different seasons of the year to fully 2,000. He says that much illegal fishing has been carried on in the past, but he hopes with one assistant to be able to cope with it in the future. In some lakes, the fish are abundant, and seem to be increasing, while others show signs of decreasing, owing, no doabt, to past illegalities.

Return of the Number and Value of Vessels, Boats and Fishing Materials, the in the Province of Ontario,


Number of Men employed, dc., with the Kinds and Quantities and Values of Fish for the Year 1890.


Retcrn of the Number and Value of Vessels, Boats


Lake Huron Divixion.

and Fishing Material, de.-Ontario-Continued.

Kinds of Fish.


## Return of the Number and Value of Vessels, Boats


and Fishing Materials, \&c.-Ontario-Continued.


and Fishing Materials, de.-Ontario-Continued.

Kisise of Fish.


Return of the Number and Value of Vessels, Boats

and Fishing Materials, de.-Ontario-Continued.
ini: Materiais.

$8 a-14$

Recapitulation of the Number and Value of Vessels, Boats and Fishing Materials, the Number of Men employed, \&e., with the Kinds and Quantities of Fish, in the Province of Ontario, for the Year 1890.


Recapitulation of the Number and Value of Vessels, Boats and Fishing Materials, \&c.-Province of Ontario-Concluded.


## RECAPITULATION

Of the Yield and Value of the Fisheries in the Province of Ontario, during the Year 1890.

| Kinds of Fsh. |  | Qrantity. | Pricer. | Value. |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | 8 cts. | $s$ cts. |
| Whitefish | 13rls. | 4,067 | 1000 | 40,670 00 |
| do | Lles. | 6,782,299 | 008 | 542,583 36 |
| Trout | do | 5,074,650 | 010 | 507,465 00 |
| do | Brls. | 3,959 | 1000 | 39,590 00 |
| Herring, salted | do | 6,425 | 400 | 25,70000 |
| do freslı. | Lbs. | $8,435,950$ | 005 | 421,79750 |
| Eels... | . do | 125,235 | 006 ! | 7,514 10 |
| Sturgeon. | - do | 1,132,970 | 006 | 67,978 20 |
| Maskinongé | . do | 651,406 | 006 | 39,084 36 |
| Bass. | . do | 778,795 | 006 | 46,727 70 |
| Pickerel.. | do | 2,216,520 | 006 | 132,991 20 |
| Pike. | . do | 637,420 | 005 | 31,87100 |
| Coarse fish | do | 2,5056,515 | 003 | 76,695 45 |
| Home consumption, not included in the above . | . do | 965,650 | 003 | 28,969 50 |
| Total for 1890 |  |  |  | 2,009,637 37 |
| do 1889 |  | , $\cdot$, | ....... | 1,963,122 80 |
| Increase.. |  |  |  | +6,514 57 |

Statement showing the Number and Value of Vessels, Tugs and Boats, \&c., in Ontario, during the Year 1890.


PART II.

## REPORT

# FISH-BREEDING OPERATIONS 

IN THE

## DOMINION OF CANADA

1890. 
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PRINTED BY ORDER OF PARLIAMENT.
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OTTAWA:
PRINTED BY BROWN CHAMBERLIN, PRINTER TO THE QUEEN'S MOST EXCELLENT MAJESTY.
1891.

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superintendent's report on fish-breeding operations, 1890.

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## REPORT

$-\mathrm{Or}-$

MIR. SAMUEL WILMOT,

Superintendent of Fish Culture for the Dominion of Canada,

FOR THE YEAR 1890.

The Honourable<br>Charles H. Tupper, Minister of Marine and Fisheries, Ottawa.

Sir,-The following report on the condition of, and transactions connected with, fish-breeding operations in Canada during the year 1890, inclusive of other subjects relative thereto, is herewith submitted. The report will include the following matter, namely:-

1. A general statement of the gross output of artificially bred fry from the several fish hatcheries in Canada during the past year, in which will be given the particular numbers, description and species of fry, amounting in the whole to a grand total of $90,213,000$ young fish, distributed in many of the waters of Canada.
2. Tabulated statements are also given particularising the numbers and species of young fish and eyed eggs, which were distributed from, and received at, each of the twelve fish hatcheries in the several Provinces of the Dominion during the past season.
3. A schedule will also be found in which the individual quantities are given of the different kinds of fish eggs that were collected and placed in the hatching trougho, and automatic incubators in each of the hatcheries in the several Provinces during the past season of 1890, amounting in the gross to $144,613,000$ ova of the superior kinds of fresh and salt water fishes of Canada.
4. Another general statement is given which shows the gross numbers of fry of all kinds which have been bred and turned out of the several individual hatcheries into the waters of Canada since the first inception of the science of artificial fish culture as a governmental work in 1868, making a grand exhihit of $799,757,900$ young fish of many species, comprised almost wholly of the higher grades of commercial fish indigenous to Canadian waters.
5. A summary is given of the particular transactions at each of the individual hatcheries which have been in operation during the past year, describing briefly the amount of work performed at each, in relation to the output of try, the capture of parent fish, the collecting of ova, and the present condition of these establishments, and their wants, together with other remarks of a general character connected with these institutions.

## LOBSTER BREEDING.

6. In view of the commencement of the enterprise of breeding lobsters by the artificial methods in Canada during the coming season of 1891, particulars are given relating to a prospecting trip to the newly established lobster and cod hatchery at Dildo Island, in Newfoundland, and of the selection of a site for the erection of a similar establishment on the Northumberland Strait in Nova Scotia; both subjects are
embodied in this report, and views are contained in them setting forth the great necessity that exists for establishing more stringent regulations for the protection of the lobster, and for the prevention of the too general destruction of berried, undersized and immature lobsters, now so largely practised by the lobster fishermen and lobster packers throughout the Maritime Provinces, where this valuable crustacean is at the present time so avariciously sought after. In these papers will also be found other matters relating to the successes attending the artificial breeding of the lobster in Newfoundland and in the United States.

## SALMON FISHERIES.

7. The subject of the salmon fisheries and of salmon nets is discussed in a memorandum which was submitted to the Department; it refers more particularly to the system which prevails in the Bay des Chaleurs in the Provinces of Quebec and New Brunswick; and a description is given of the inequality which existe regarding the modes of fishing by fishermen on either side of the bay, and of the relative positions in which the netters and the anglers stand towards each other, with reference to the general maintenance or depletion of the salmon fisheries generally.

## FISH LADDERS.

8. Fish ladders or fish passes are also referred to in this report, in which is shown the necessity that exists for the Department to adopt the best and present most practically approved fish way which shall be built in mill dams, or where other artificial and natural barriers exist, in order to allow fish to pass up freely to their natural breeding grounds or rivers, and other waters; and where these barriers now prevent the ascent of these fish, thereby causing the present rapid extermination of fish life in many parts of the country.

## SALMON CULTURE.

9. A few extracts from some of the reports of officers in charge of hatcheries are given of the successes attending the transferring of the fry of the Restigouche salmon into waters of the Miramichi River, with a view to acclimatising and introducing the larger Restigouche salmon into the Miramichi, which latter river produces a smaller description of the salmon family. The experiment has been successful.

An interesting account is also given of the successful stocking of the Hudson River, in the United States, with salmon, in which this valuable fish has not been known to inhabit for the past century.

An article on the successful results of planting artificially bred whitefish try in Lake Erie is also appended.

## appendices.

10. In the Appendices to this report will be found the reports of the several officers in charge of the individual hatcheries in operation in the Dominion, in which the more minute details of all work connected with each establishment are fully given.

## annex to this report.

11. In the annex to this report will be found certain correspondence relating to the proposed improvement of the whitefish industry in Lake Ontario, by the Commissioners of the State of New York; and also further correspondence between Marshal Macdonald, United States Commissioner of Fisheries, and Honourable Levi P. Morton, Vice-President of the United States, with the report of the United States' Congress, for the erection of a United States' Salmon and Whitefish Hatching Station on Lake Ontario," which will prove one of the most important stations of the United States Commission of Fish and Fisheries.

An article on the results of fish culture, from Forest and Stream, by W. N. Byers, of Columbus, Ohio, in which he defends artificial fish culture against the attacks made upon it by others.

A very instructive paper is also annexed taken from the Edinburgh Scotsman on Aquaculture, by George Malcolm, Invergarry, showing the progress of fish culture, its present condition and results in various countries of the world.

## 1.-GENERAL STATEMENT OF THE OUTPUT OF FRY, AND OF THE COLLECTION OF FISH EGGS AT THE SEVERAL IIATCHERLES IN 1890.

The gross output of fry of all kinds from the hatcheries in Canada during 1890 was $90,213,000$, as follows:-

| Atlantic salmon (Salmo Salar) | 9,861,000 |
| :---: | :---: |
| Pacific salmon, Suckeye (Oncorhyncus nerka). | 6,730,000 |
| Salmon trout, Great Lakes (Naymacush) | 8,721,000 |
| Brook trout, rivers and streams (Fontinalis).. | 376,000 |
| Whitefish, Lake Region (Coregoni) | 42,525,000 |
| Pickerel, doré (Luciopercha). | 22,000,000 |
| Total | 90.213,000 |

2.--The following table gives a statement of the numbers of the young fish and semi-hatched eggs that were distributed from each of the hatcheries during 1890. The name of each hatchery in each of the Provinces is shown on the schedule, opposite which is given the gross number of fry, and the species which were put out from each nursery, together with the quantities of eyed-eggs sent from, and received at, some of the hatcheries.

The particular lakes, rivers and other waters in which the fry were planted, will be found minutely described in the reports of the several officers in charge of each of the establishments, in the appendices hereto attached.
Schedule showing the Number of Fry and Eyed-eggs Distributed from the Individual Hatcheries in 1890.

|  | Hatchery. | $\begin{aligned} & \text { Fry Put } \\ & \text { Out. } \end{aligned}$ | Eyed-egg: sent to other Hatcherits. | Eyed-egg: Received from other Hatcheries. | Domiption of Fixh. |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | Fraser River, B.C. | 15,640,000 |  |  | Sahuen, stal |
| 2 | Sydney, C.B., N.S | 1,953,000 |  |  | do |
| 3 | Bedford, N.S... | 1,480,000 |  |  | do |
|  | do do | 370,000 |  | 500,400 | Salmon trout. |
|  | do | $2,000,000$ |  | $\begin{array}{r} 15,000 \\ 2,000,000 \end{array}$ | speekled tront. <br> Whitatish. |
| $\pm$ | Dunk River, P.F.I | Not in | peration |  |  |
| - | St. Johm River, N.B | 482,000 |  | 500,000 | Saluem, seil. |
|  | do do | 1,000,000 |  | 1,500,000 | Salmon trout. |
|  | - do | 10,000 |  | 15,000 | Speckled tront. |
|  | Miramichi, N.B. | 1,022,000 |  | 2,00,00 | Saluon, |
| 7 | Restigonche, Que | 2,396,000 | 22,000 |  | do |
| 8 | Gaspé, Que. .. | 806,000 |  |  | cos |
| $!$ | Tadonssac, Que... | 1,700,000 |  |  | ro |
| 10 | Magog, (que. | 1,600,000 |  | 2,000,000 | Sithen tront. |
| 11 | $\frac{\text { do }}{\text { den }}$ | 1,275,000 | S200000 | 2,000,000 | Whitetish. |
|  | - do | $2,500,000$ | -,ou,0 | 3,000,000 | Whitefish. |
|  | - do | 286,000 | 105,000 |  | Speekled trout |
| 12 | Sandwich, Ont.. | $\begin{aligned} & 30,000,000 \\ & 20,000000 \end{aligned}$ | 15,040,000 |  | Whitefish. Pickerel, deré |
| 13 | Ottawa, Ont. | 112,000 |  | 175,000 | Salmon, sea. |
|  | do | 1,051,000 |  | 1,500,000 | Salnom trout. |
|  | do | 170,000 |  | 6, 7,000 | Speekled trunt. |
|  | do | 4,500,000 |  | 6,000,000 | Whitefish. |
|  | Total | $90,213,000$ | $21,270,000$ | 21,270,000 |  |

## 3.-FISH EGGS COLLECTED AND PLACED IN THE HATCHERIES IN 1890.

The following table will show the numbers and descriptions of fish ova collected and put in the troughs and incubators of the individual hatcheries throughout the Dominion in 1890. The Magog, St. John River and Ottawa Hatcheries are supplied at the proper season of the year with their quota of impregnated eggs from the Newcastle and Sandwich nurseries in Ontario; and in the case of salmon ova for the St. John River Hatchery, from the Restigouche establishment in Quebec. The total number of eggs collected, as shown below, amounted to $144,613,000$.

*These hatcheries will obtain their supplies of semi-hatched egges from Neweastle and Sandwich during Janary or Felruary next.

## 4.-GRAND TOTAL OF YOUNG FISH OF ALL KINDS PUT OUT OF THE SEVERAL CANADIAN FISH HATCHERIES FROM THE ORIGIN OF THE INDUSTRY UP TO THE PRESENT TIME, 1890.

The following schedule shows the gross output of fry of all kinds, from each hatchery in each Province, the name of the hatchery, the Province where located, the year in which they were each established exhibiting a total number of fry of all species amounting to $795,757,700:-$

Statement showing the Places where, and the Years in which the several Fish Hatcheries have been erected ; also the number of Fry distributed from each Establishment, annually, since they were built.


The particular descriptions of Fry above enumerated were as follows :-
Selmonidae-Atlantic and Pacitic salmon, salmon trout of the (ireat Lakes, and speckled tront of the streaus. . . . . . . . 201,767,000
do Whitefish (Coreqomus) of the Great Lake region. . . . . . . . . . . . . . . . . . . . .... .................. 377,75 . 000
Percida--Pickerel, or Doré (Lucioperet) and Black Bass 216,215,900

> Grand Total of all kinds.

$$
\text { . } 795,757,900
$$

Note. - In addition to the above written $73,134,000$ fry distributed from the Parent Establishonent at Neweastle, there has been transerred from this institution to the Fastern Province Hatcheries $34,200,000$ of semi-hatched ova. Grand total, $107,334,000$.

In like mamer the Sandwich Nursery has transferred 5o,500,000 of eyed eggs to other hateheries, exchusive of the $541,000,000$ of fry put out.

## 5.-SUMMARY OF TRANSACTIONS OF EACII OF THE HATCHERIES IN THE DOMINION DURING THE SEASON OF 1890.

1.-FRASER RIVER HATCHERY, BRITISH COLUMBIA.

The crop of young salmon of the suck-eye family put out of the Fraser River Hatchery during 1890, was larger than formerly, amounting in the whole to $6,640,000$. They were planted in some of the most important lakes and rivers of British Columbia, where reasonable means of transportation was at hand for safely performing the work. The distribution throughout was satisfactory and safely accomplished.

The capture of parent salmon during the past autumn was considerably less than formerly. The operations were commenced somewhat later in the season, when freshets set in swelling the streams and bringing down debris of ali kinds, breaking open the pens or reservoirs containing the parent salmon and allowing them to escape; the consequence was only $3,861,000$ eggs were collected; about one-third of the quantity obtained in 1889. These were placed in the hatchery in very fair condition, and are doing well at the present time.

Certain repairs were required to put the hatchery and water supply in good working condition. This has been done, but it is suggested that further improvements should not be of an extensive character in view of the contemplated erection of a more commodious and convenient hatchery on Morris Creek, some distance up the Harrison River, where the parent salmon can be easily captured earlier in the season and kept alongside in a safely constructed reservoir until required for spawning purposes; thus insuring a certainty of procuring full supplies of eggs, and avoiding the doubts and uncertainties which has hitherto prevailed in collecting eggs in the open river by netting later on in the seavon. It is confidently expected that by the building of a hatchery at Morris Creek with the reservoir attached, ample accommodation will be had for putting down $20,000,000$ to $25,000,000$ of eggs annually.

The present hatchery from the good work it has already done, with its small accommodation, for improving the Fraser River fisheries from the general report of the salmon canners and the public generally, warrants the early construction of a larger and more commodious establishment at Morris Creek.

## 2.-SYDNEY HATCHERY, CAPE BRETON, PROVINCE OF NOVA SCOTId.

There were hatched and distributed from this hatchery in $1890,1,953,000$ young salmon of the salar species. They were put in some twenty of the more important rivers and brooks in the several counties of Cape Breton. On account of the lateness of the application for fry for Mabou River, last season, none were put there; this river will receive due consideration another year.

The collection of eggs last autumn was fairly satisfactory; several rivers were netted, and 437 parent salmon were caught, 342 of these were females, and gave $1,218,000$ eggs. The heavy rains which prevailed enlarged the rivers and made the capture of salmon less successful, otherwise a larger crop of eggs would have been secured. The eggs to all appearances are doing well, and a large crop of fry may be expected.

The hatchery is in good repairs, having undergone a general overhanling by putting down new floors, sills, dc., which had become much decayed. The only requirement now will be painting, when the establishment may be quite complete for the next ten years.

Satisfactory reports are given of an evident increase of salmon in the streams where fry have been planted, from the Sydney Hatchery, in past years. It is suggested that fry of the land locked salmon should be put in certain lakes near Margaree, as at present these waters are useless for the want of some fish in them.

## 3.-BEDFORD HATCHERY, PROVINCE OF NOV A SCOTIA.

Unqualified success is reported to have taken place with the hatching and distributing of fry from this hatchery during 1890. The difficulties experienced in hatching salmon trout fry in furmer years were overome, and the yield proved most satisfactory.

About 500,000 of the salmon trout eggs, and $2,000,000$ of whitetish ova, were obtained from the Ontario hatcheries, and placed in the Bedford nursery in good condition.

The fry from these eggs were planted in various lakes in several of the counties of Nova Scotia, amounting in the gross to about $2,370,000$. In addition to these fresh water fishes, there were also put out from this hatchery 900,000 of the sea salmon, making a grand total distributed of $3,850,000$ fry.

Six subsidiary batcheries have been ostablished in the more distant counties from the head extablishment at Bedford, where they have proved to be most satisfactory for helping in the general work of fish culture in Nova Scotia. Semi-hatched eggs are transterred to these small provisory hatcheries from the larger one, at certain times, and there hatched; whereas fry could not bo sent to these localities by reason of their remoteness, and the impossibility of carrying fry to them at the season in which the young fish require to be put out. These subsidiary hatcheries proving to be of such service, it is in contemplation to build others in other counties in Nova Scotia, where the benefits from artificial fish culture are anxionsly sought for. It is contended that whilst the benefits already realized from fish culture are very satisfactory, yet the work bas been carried out on too limited a scale to give such general effect to artificial culture as the exigency demands.

The usual success did not attend the collection of eggs the past season, difficulties of varions kinds interfered in the capture of the requisite number of parent salmon. Heavy freshets carried the fish beyond reach in the Musquodoboit Riverthe usual place of dependence for procuring eggs. Wallace River was then resorted to, where a number of salmon were netted and impounded, awaiting the spawning time. A work of vandalism was done by certain of the inhabitants, by which the reservoir for keeping the salmon in was destroyed, and the mother fish killed and carried away, thus cansing the loss of 54 parent fish laden with some 500,000 ripe fruitful eggs. This act of these miscreants has lowered the usual supply of ova for the Bedford Hatchery this season. These poachers remain as yet undiscovered. From the above misfortunes only 400,000 ergs were laid down, barely one-fifth of the previous year's supply. Timely preparations were made by which a largely increased supply of water was brought into the hatchery, anticipatory of enlarged operations during 1890-91, which will not now be realized from the wanton destruction of the parent fish as related. It is proposed to supplement this season's reduced supply of salmon eggs, by transferring numbers of salmon-trout and whitefish eggs from the Newcastle and Sandwich Hatcheries in Ontario to Bedford.

Some minor repairs are required in the way of mending and painting the roof, and strengthening a portion of the foundation dividing the hatchery from the dwelling part of the establishment.

## 4.-DUNK RIVER HATCHERY, PROVINCE OF PRINCE EDWARD ISLAND.

This hatchery has not been running since 1888. Arrangements are being made by which the whole establishment will be put in order for fish cultural purposes for the coming season of 1891 .

## 5.-ST. JOHN RIVER HATCHERY, PROVINCE OF NEW BRUNSWICK.

This hatchery has been supplied with semi-hatched cggs from the Restigouche, Newcastle and Sandwich nurseries for the past three years. The eggs of the "salmo salar" are obtained from the Restigonche Hatchery, and eggs of the salmontrout and whitetish are supplied from the two latter hatcheries in Ontario. Prepa-
rations are being made to secure supplies of parent fish from the St. John Harbour fishermen, and impound the salmon in some convenient reservoir, until the spawning time, when the eggs will be gathered and conveyed to the St. John nursery for hatching. By this means, it is contemplated, full supplies of ova will be obtained without trespassing upon the stock deposited in the several hatcheries in other parts of the Dominion. About $4,000,000$ of eyed-eggs of the salmon, salmon trout, and whitefish were transferred in this way to the St. John Hatchery during 1890. These were duly hatched and distributed, where applied for, in many of the lakes and rivers of New Brunswick. The work throughout was performed most successfully. A considerable amount of repairing has been performed on the batchery during the past year, which will place the establishment in a first-class condition for work for some years to come.

The officer in charge reports the taking of salmon trout and whitefish in some of the waters where fry were planted from this hatchery in former years and in waters, too, which these fish were not formerly known to inhabit. Evidenceso which are to hand from several reliable persons and fishermen.

## 6.-MIRAMICHI HATCHERY, PROVINCE OF NEW BRUNSWICK.

The work at this institution resulted very satisfactorily, from the fact of no less than 1,022,000 of the young of the Atlantic salmon having been turned out from it into the principal tributaries of the Miramichi River. The experiment of planting some of the fry of the Restigouche salmon, which had shown such satisfactory results in the capture of adult fish of that family from previous years' plantings, was ronewed during the past year, by a further transfer of about 40,000 Restigouche fry to the waters of the North-West Miramichi River.

Difficulties attended the collection of the usual supplies of egge here during the past autumn. Although the parent salmon were very plentiful in the river, yet the extreme freshets which prevailed last season prevented the possibility of capturing the necessary stock of salmon to fill the hatchery with its accustomed quantity of eggs. It was only possible to net 195 fish, of which 111 were females, which gave 810,000 eggs. This number was much below that of 1889.

It is proposed to overcome this difficulty of capturing parent salmon during the heavy autumn freshets, by making preparations to catch them from the earlier runs and impound them till required, in like manner as at some of the other hatcheries where the system has been worked out with the utmost satisfaction.

During the past scason certain necessary repairs have been made to the buildings, dams and other appliances, which will place this institution in proper working condition for many years to come.

Appended to the main report will be found many certificates from the most reliable sources to show the undoubted benefits which have resulted from the putting out of young salmon from this hatchery during former years.

## 7.-RESTIGOUCHE HATCHERY, PROVINCE OF QUEBEC.

The output of salmon fry from this hatehery was considerably in excess of any previous year, the number reached $2,396,000$. They were planted largely in the Main Restigouche River, and also in many of its tributaries, and in other rivers elsewhere as follows:-

The Kedgwick, Upsalquitch, Metapedia, Caraquet, Jacquet, Nipisiquit, Middle and Miramichi. In addition to this number of young salmon, there were also transferred to the St. John River Hatchery 500,000 semi-hatched ova, thus making a grand total of $2,869,000$ salmon fry and eyed eggs put out of the Restigouche Hatchery in 1890.

The quantity of eggs procured the past season of 1890 was far below that of 1889, caused by the first and largest run of salmon having passed up river during the prevalence of an extraordinary high freshet, which prevented the setting or working of the nets in the river. Only 307 fish were secured, 175 of these were females, which gave $1,800,000$, a trifle over half obtained in 1889.

The Departmental net hitherto set at the Mission Point Station has not done as well as was expected; it is theretore proposed to remove from this station further up the river to Pitt's Creek nearer to the reservoir, where a trial was made late in the season with a certain amount of success.

The several nets in use will require repairing, and a new net will also be required for next season. The reservoir will require strengthening with new timbers, cross-ties, stakes, and wire netting, at a probable cost of $\$ 200$; certain other repairs will also be required to the hatchery, such as painting the roof, plastering the ceilings to give additional warmth, more distributing cans and other matters costing about $\$ 200$. The estuary and coast salmon fisheries were not quite up to the average, by reason of the unprecedented freshets from the river, which carried away and otherwise damaged these nets. Fly fishing, however, up river after the subsidence of the floods was never known to be better. The pools and river generally were unusually full of fish. From the improvement of angling on the river of late years property has risen to almost fabulous prices, caused by the prevailing opinion of those well acquainted with the subject, from the protection given for the natural spawning of the salmon, and the very liberal annual planting of young fry from the Restigouche Hatchery.

## 8.-GASPÉ HATCHERY, PROVINCE OF QUEBEC.

The number of fry bred at this hatchery in the season of 1890 was $806,000$. They were planted in the St. John, York and Dartmouth Rivers, all emptying into the Gaspe Bay, near to where the hatchery is located. The planting was performed satisfactorily during June and July.

The Departmental nets for netting parent fish were kept down from 4th June till 1st September. The total number of salmon caught and purchased was 83, of these 50 were females and gave 620,000 eggs. These were supplemented by a further number of 400,000 collected from salmon taken in the York River later in the fall, making a total of $1,020,000$.

The hatchery is reported to be in first-class condition, excepting painting on the outside which will cost about $\$ 30$. Considerable damage was done to the trapnets and reservoirs, from the great freshet which appears to have prevailed generally throughout the Provinces. These repairs will require early attention at the coming spring.

Net fishing and angling are reported to have been satisfactory. There were a large number of nets set in the tidal waters, and they had a successful year. They make a heavy drain upon the rivers. With this improved catch the conclusion is that the work of protection and propagation is conferring benefits to those engaged in the salmon industry.

## 9.-TADOUSSAC HATCHERY, PROVINCE OF QUEBEC.

One million seven hundred thousand salmon fry were put out of this hatchery last year in the several tributaries of the Saguenay River and in some small lakes which discharge into the St. Lawrence. A steam tug was employed to convey the fry to the Upper Saguenay. They were all put out under the personal oversight of the officer in charge of the hatchery.

The Departmental nets were put out in May; the first fish were caught on the 27 th, and, up to the 3rd July, 980 salmon were caught, when the nets were taken up by instructions. If the nets had been kept down the rest of the season the probabilities are that this number might have been nearly doubled, as about the beginning and during the month of July the salmon principally pass up river. The Sunday close time was kept, giving only 33 days' fishing, in which an average daily catch of 30 salmon was made. This catch is almost unprecedented. Some days the catch ran thus: 71, 81, 93, 102, the highest being 111. Of the 980 captured only 325 were kept for hatching purposes; the remaining 655 were set at liberty without any
injury. Of the number kept 185 were females, from which an average of about 10,000 egge each were gathered, making a total of $1,879,000$ ova laid down in the hatchery and completing the work of spawning on the 15 th November.

The increase in the catch of salmon in that immediate district is truly phenomenal. With exactly the same number of nets set by fishermen the increase has been very great from 1886 to 1890 . In 1886, 14,790 lbs. were taken; in $1890,61,000 \mathrm{lbs}$. were caught, and this does not cover the actual quantities, as the fishermen invariably give in smaller returns in order to prevent, as they think, an increase in their license fees. The accounts from the anglers and guardians of the St. Margaret River, especially, are most gratifying as to the immense number of salmon seen in it; they report seeing and counting 100 salmon in passing through a single pool. The guardians on the other rivers also give similar pleasing accounts of the great numbers of fish seen by them. Even as far up as the River Shipshaw, at the upper waters of the Saguenay, salmon were reported as plentiful. Large schools of small sized salmon, about 25 inches long, were seen passing up and down the Saguenay, in the neighbourhood of the wharf near the hatchery. About 100 of these on the 18th November came into the reservoir at the batchery and mixed with some of the parent salmon which had not yet left the pond. The evidence from all quarters was most satisfactory.

Extensive repairs are necessary to make the present old dilapidated hatchery suitable to carry on the work in the future. Decay has set in throughout in the foundations of the building, which rest largely upon slabs built up from the refuse which collected when the building was originally run as a saw mill.

The proposition made by the officer in charge regarding the hatchery is entitled to the favourable consideration of the Department, namely, to dispense with any further expenditure upon the old building at Tadoussac and put up a new one at or near Chicoutimi on the Shipshaw River, where all desirable conveniences are to be had, both for hatching and distributing purposes, and where the results would be more beneficially and economically experienced than is the case at the present site at Tadoussac.

## 10.-MAGOG HATCHERI, PROVINCE OF QUEBLC.

This hatchery is supplied with its quota of eggs from the Newcastle and Sandwich establishments in Ontario. From the semi-hatched ova obtained in this way, some $3,900,000$ fry of the whitefish and salmon trout were hatched and put out of the Magog Hatchery into the lakes in the Counties of Megantic, Stanstead, Brome and Sherbrooke.

Reports from fishermen and others living along the lakes go to show that an increase in the catch of salmon tront and whitefish is apparent. The increase in the salmon trout is slower on account of the extensive poaching. carried on in the large areas which the present too limited number of guardians have to oversee. Some small repairs and some additional apparatus will be required for the hatchery.

## 11.-NEWCASTLE HATCHERY, PROVINCE OF ONTARIO.

The work in this primary institution for artificial fish culture in Canada was quite successful during the past year. There were transferred from this hatchery to the Lower Province nurseries $5,500,000$ semi-hatched eggs of the salmon trout, speckled trout and whitefish species. There were also distributed in numerous lakes, rivers and streams in Ontario 7,841,000 fry of the salmon trout, speckled trout and whitetish, making a grand total of $13,441,000 \mathrm{fry}$ and cyed-eggs put out of the Newcastle establishment, all of which are reported to have been distributed in good condition. The several waters in which they are planted are particularly described in the Newcastle report in the appendix.

Certain repairs were made which will make the hatchery efficient for work for a length of time; the outside of the building, however, requires re-painting, as many years have passed since it was first painted. This should be done in the coming
spring to prevent further outside wear by the weather. The several ponds connected with the hatchery, and the dams, race-ways and other appliances for conducting the water supply to the buildings, are in safe condition.

The work of collecting supplies of ova at Wiarton for Newcastle, as well as the hatcheries in the Lower Provinces, resulted most successfully; some difficulty was experienced in procuring assistance for setting the pound-nets, as few experts at this class of work are to be found. It is expected that one of the regular employees of the hatchery from the experience gained will be able to perform this work another season.

The quantity of ova collected at Wiarton the past season was very large and was satisfactorily obtained; upwards of $11,000,000$ were collected between the 1st and 23 rd November; all of them were safely transported by railway under the immediate charge of an expert, and deposited in the hatching troughs at the Newcastle establishment, where it is reported they are progressing very favourably. The diary connected with the work at Wiarton will be found attached to Mr. C. Wilmot's report in the appendices.

The usual quantities of eyed eggs will be transferred from Newcastle to the hatcheries of the Maritime Provinces at the proper time for their safe transport.

## 12.-SANDWICH HATCHLRY, PROVINCE OF ONTARIO.

From the quantity of whitefish ova deposited in this hatchery in the fall of 1889, $15,000,000$ of them in a semi-hatched state, were transferred to other hatcheries in the east, and $30,000,000$ produced fry, which were liberally planted in the waters of Lakes Huron, Erie, Ontario and St. Clair, and in the Detroit River. They were put out in good condition, and will no doubt further add to the benefits which have already been experienced by similar deposits of fry in these waters during former years.

In addition to the above described whitetish product from this hatchery, there were also hatched and distributed from it $22,000,000$ of pickerel (dore) fry; these were also planted in well adapted waters for their after growth. The total of whitefish and pickerel put out of the Sandwich nursery during the season of 1890 amounted to $67,000,000$. Improvements which were made during the past summer, will give accommodation for putting down upwards of $100,000,000$ of whitefish ova during the breeding season of these fish in the autumn, exclusive of such numbers of the pickerel eggs as may be obtained during their spawning time in the spring of the year. The improvements include the general overhauling of the hatching room, by which its whole area has been utilised for hatching purposes; and specially in the setting up of 600 automatic incubators in place of 350 formerly worked; together with other necessary appliances to facilitate more extended hatching capacity in the establishment generally. These improvements were completed in time for last autumn's work, and have been found to answer the purpose admirably.

The quantities of eggs collected and put in the hatchery during 1890, were as follows :-Whitefish eggs, $90,000,000$ in the month of November last; and of pickerel, in April last, $32,000,000$. The product of the pickerel eggs have already been referred to, as being put out last spring; whilst the $90,000,000$ of whitefish eggs whose period of incubation extends through the winter months, cannot be accounted for till the spring of 1891.

The method of procuring whitefish eggs last fall was more satisfactorily performed, and resulted in obtaining about one-third more in number than in 1889. The quantities being in $1888,40,000,000$; in $1889,70,000,000$, and in $1890,90,000,000$. This satisfactory result was brought about by the Department taking full control of the whitefish fisheries on the Detroit River during the "close season" of the month of November, and enforcing the close time as against all fishermen; and by carrying on the work under the management of the officer in chage of the hatchery. This system should be continued in the fature, but upon even a more exclusive plan than in 1890 , by which the " close season" shall be inviolably kept by all-and the Department to exercise its own right of capturing sufficient supplies of parent fish, by its own officers, with the necessary plant of nets, and other material requisite to fully perform the work.

Herring which were a short time ago very abundant in the Detroit waters, are showing evident signs of decrease, and the officer at. Sandwich suggests the propriety of applying the artificial methods of propagation to sustain if possible this declining fish product of that section of the country. The decline of the sturgeon fishery is also being seriously felt and similar means might also be instituted by which this fish might not become too rapidly depleted, as the present appearances would seem to indicate.

## 13.-OTTAWA HATCHERY, PROVINCE OF ONTARIO.

The work of artificial fish culture in the city of Ottawa was only practically commenced during the past year, by the hatching and distributing of several millions of fish of various species.

This institution was established at the seat of Government with the view of giving more particular insight into the enterprise of propagating fish by artificial means, and exemplifying to the Canadian public visiting Ottawa, the feasibility of this work, as an important factor for stocking lakes, rivers and other waters, with particular kinds of fish, which had either become greatly reduced from their own original source, or in which they were not hitherto known.

This nursery and Fishery Exhibit connected with it, has become an acknowledged educator not only for the general public, but specially for the citizens of Ottawa and the inhabitants of the surrrounding districts, who had not hitherto opportunity of visiting and personally witnessing the practical working of an institution of this kind; the attraction and popularity of which is fully shown by the register book, in which the names of no less than 22,800 persons are recorded as visitors to this hatchery during the first year in which it has been in operation.

The system adopted here is to obtain the requisite supplies of fish oggs in the semi-hatched state, from the Newcastle and Sandwich nurseries. The ova procured are of the species of fish best adapted for the waters in the surrounding counties, and when the fry are hatched out, they are distributed throughout the lakes and streams which may be considered best adapted for them, or where the requests of pablic bodies, or individuals, may have been made to get them.

The establishment is fitted up on a much less extensive scale than at the other hatcheries, by reason of the space in the lower flat of the fishery exhibition building being somewhat limited. The arrangements are for hatching salmon, trout, speckied trout and whitefish; the appliances for hatching ova are of the latest, and most approved descriptions. There are also a number of aquaria with glass sides in this hatchery put up with the view to exhibit living fish of various kinds and sizes. Thus showing in the establishment the ova with the rudimentary form of the fry inside whilst hatching, and the after growth of the young fish in the aquaria up to certain after stages in its life.

The fish put out of this Ottawa Hatchery during the first year of its operations were as follows :-

| Salmon try, sea salmon. | 112,000 |
| :---: | :---: |
| Salmon trout fry. | 1,051,000 |
| Speckled tront fry | 70,000 |
| Whitefish fry.. | 4,500,000 |
| Total | 5,733,000 |

These were distributed in several lakes and streams in the counties in the Ottawa valley.

There are several improvements and additional fixtures yet to be made in this institution to bring it up to the standard it should occupy as a complete representation of fish cultural work at the seat of Government of Canada.

Arrangements are in progress by wbich supplies of eggs of various kinds of fish will in due time be transferred from Newcastle and elsewhere to fully stock the Ottawa Hatchery for another season's work.

## 6.-LOBSTERS.

## Special report by Mr. Wilmot.

## LOBSTERS AND 'THEIR ARTIFICIAL PROPAGATION,

Connected with this subject will be found an account of a visit to Newfoundland, with the view to obtain practical knowledge regarding the methods of carrying on artificial lobster hatching by the Government of that country, under the direct management of Adolpe Neilsen, an expert in this work, formerly of Norway.

There will also be found herewith particulars relating to another report on the selection of a site for the erection of an establishment for the artificial breeding of lohsters in Canada.

As the result of these two reports, it may be here mentioned that the views submitted, and the site as selected at Bayview, on the Northumberland Strait, near the barbour of Pictou, in Nova Scotia, having been sanctioned by the Government, all necessary preparations are now being made to enter upon the work of lobster breeding next season, during the months of June, July, or during such periods as may be found most advantageous to carry on the enterprise.

The ground has been purchased and the contracts have been let for the erection of the building and the construction of a pier alongside, as well as the putting in of the requisite machinery. The breeding apparatus is being provided for also, and unless from some unforeseen causes, the whole establishment will be in readiness for actual work by the middle of May next.

In connection with this primary nursery for rearing this valuable crustacean at Bay View, it is also in contemplation to introduce amongst the lobster fishermen and canning companies a description of floating incubator, which has been used in Newfoundland during the past season with the most satisfactory results. This floating incubator is simply and cheaply made, and from the accounts given of it by Mr. Neilsen it can be readily worked in almost any sheltered bay or inlet along the coast by any ordinary intelligent fisherman, or other person who may feel desirous of aiding either in a private or public way in the cultivation of the lobster. Mr. Neilsen, at my request, is about sending on one of these incubators as a sample, from which a number may be constructed, with a view to distributing some of them amongst such fishermen and canners as may be disposed to work them, or to aid in resuscitating the lobster industry, which, from over-fishing, is now making such rapid strides towards depletion. In these reports will also be found matter relating to the lobster family which may be considered of interest as showing the vast amount of destruction going on by the present modes adopted in the killing of immature, undersized and berried lobsters.

## DIJDO ISLAND FISH HATCHERY, NEWFOUNDLAND.

Official instructions were given to me to proceed to Newfoundland, with the view to obtain information regarding the artificial breeding of lobsters, where this industry has been carried on under the patronage and support of the Government of that colony by M.r. Adolph Neilsen, an expert in the science of artificial fish culture, whose practical application to the subject in Norway had made him prominent there in cod and lobster propagation.

The evidently declining state of the codfish in and around the coasts and bays of Newfoundland induced the Government of that Island to enter upon the work of resuscitating these fisheries by introducing the artificial methods of propagation, which, it appears, had been practised with much success in Norway, and where the breeding of lobsters also had been carried on with satisfactory results ; and hence it was that the services of Mr . Neilsen were obtained to introduce cod and lobster breeding into the waters of Newfoundland.

From the last year's published reports of the Fishery Commission of that Island. it would appear that this work had been most satisfactory, and from the knowledge
$8 a-2^{*}$
already gained in the matter it was confidently expected that many millions of the young of the cod and the lobster families would be turned out of the Trinity Bay hatchery in future years.

To obtain an insight into the working of this industry from an ocular and practical standpoint, and with a view to its utilization in Canada, was the object of my mission to Dildo Island, on Trinity Bay, where the hatchery is erected, a distance of 100 miles from the city of St. Johns.

Leaving Ottawa on the 5th of June, and taking the most direct route, St. Johns, Nfld., was reached on the 11th, thence to Trinity Bay, arriving at Dildo Island on the 12 th June, and remaining there till the 16th. During this stay every facility was given me by Mr. Neilsen to inspect, note and watch the operations going on in collecting codfish eggs, and the modus operandi of hatching them. Lobster hatching had not yet commenced; extreme cold weather had somewhat delayed the collection of these eggs, but the delivery of some 700 lobsters at a canning factory near by gave me ample evidence of the particulars relating to the methods pursued for obtaing the ova and of placing them on the apparatus used for hatching them.

Full particulars were also taken by me of the class of building, and of the several appliances connected with it; notes were also taken of all matters which might be found useful for the carrying out of a similar work in Canada, and from what I saw and learned it may be confidently concluded that no serious difficulties can arise to prevent the artificial breeding of lobsters to almost any extent, in any of our maritime Provinces, if judicious locations are chosen and proper care given to prosecute the work.

The great object at starting the undertaking should be to select a suitable point, somewhere on the coast, where the sea water will be strongly saline, free from sedimentary matter, and of low temperature, and, if possible, in the immediate vicinity to places where lobsters are numerously taken to supply canning factories, thus affording the necessary means for securing full supplies of eggs, either from the lobster trappers or from the factories, where usually large numbers of these fish are daily brought in for canning purposes.

Such a location being chosen (and there are no doubt, many of them on the long extent of our coasts), the necessary buildings and applicances should be put up, with the view to permanency; and whilst it may not be contemplated to enter upon the work to the fullest extent required at once, nevertheless the buildings, applicances and all surroundings should be calculated upon such a scale as to afford the facilities for turning out annually lobster fry by the hundreds of millions, in order that the artificial propagation may in a certain degree be somewhat in keeping with the natural production. With this combination, to be strongly reinforced annually by enlarged artificial propagation, with rigid enforcement of proper close seasons for natural breeding, and preventing the killing of immature fish, the recuperation and healthy sustentation of the lobster industries of the country would be happily experienced by those engaged in the lobster trade, as well as by the country at large. But with the present reckless and unlimited seale in the destruction of the millions upon millions of fruitful eggs, with the embryo lobsters just ready to drop from the bodies of the parent fish, and the equally wanton and unwise destruction of the young, undersized lobster, comprising, perhaps, one-third of the total of all going into the fictories-too young to reproduce their species-must, in a short time, prove fatal, and eventually exterminate the whole lobster industry of Canada.

## description of the buildings and apparatus.

A brief description of the buildings and applicances generally, connected with the cod and lobster hatchery at the Dildo Island establishment, is horewith given :

The main building is a frame and wooden structure, 75 feet long by 45 feet in width, and two stories in height ; the lower flat is principally devoted to breeding purposes, the whole of the floor area being taken up with tanks containing salt water, and hatching apparatus of many kinds adapted for cod and lobster hatching. Glass incubators, as are used in Norway and in the United States, are exclu-
sively operated here for hatching the codfish egge; whilst the apparatus for lobster hatching consists of many contrivances. The certainty as to which of them is best is not yet fully determined by the Newfoundland Superintendent.

The "Wilmot Automatic Glass Incubator," now in general use in Canada and other countries for hatching the egge of the Coregoni family, had not been applied to the Dildo hatchery. Mr. Neilsen was, however, of the impression that this jar would be well adapted for the lobster eggs, and he expressed a wish to make a trial of them, if possible, the present season. I therefore, on my return through Halifax, instructed the officer in charge of the Bedford hatcbery to forward half a dozen of these jars to Mr. Neilsen, who will make full trial of them and acquaint me of the result. I am of opinion the "Wilmot Jar" can be made to answer the purpose well. This opinion is corrobated by Col. MacDonald, Chief of the United States Fish Commissioners, who, in previous correspondence, has informed me that, having used these jars, he found them suitable for hatching the lobster eggs.

A portion of the lower flat is partitioned off from the hatching room for the engine room, boiler, pumping apparatus, \&c., which draws the salt water through wooden pipes some 320 feet from 5 fathoms depth of water in the little cove formed by projecting rocky points in Trinity Bay. The sea water, which is very pure and cold, is forced through this pipe into a large tub or reservoir on the second floor of the building, from which it is run off through a series of wooden pipes and taps into numerous small incubating tanks, in which the glass jars containing the eggs are placed. Three of these tanks are placed steplike, one after the other; and the water is syphoned from one into the other, by which means a continuous upward and downward flow of water is kept up through and amongst the eggs in the glass jars during the whole period of batching the cod eggs.

The motive power to carry on this work consists of a steam boiler of sufficient capacity to work an 8 -horse power "Blake Duplex Pump," capable of supplying 200 gallons per minute if required.

The upper flat of the building is divided off into rooms, such as office, bed rooms, dining room and kitchen, \&c. All the employes, some ten in number, are lodged and boarded on the premises. The fresh water for the boiler and for domestic purposes is obtained from a small spring well sunk in rear of the house.

Fronting the hatchery, which is within a few feet of the edge of the cove beach, a short pier or wharf is built out a short distance, making a safe shelter and landing. place for the steam launch and other crafts connected with the work of the establishment. A part of this pier is so constructed as to form safe pens or reservoirs for keeping parents codfish, which may be brought in and found to be unripe to deliver their eggs at once.

A small steam launch is attached as an indispensable requisite in the working of this establishment for collecting codfish and lobster eggs from the fishing stations and canning factories, which are situate at various points here and there along the shores of Trinity Bay. The launch is also specially advantageous for the distribution of fry throughout Trinity Bay and elsewhere, where their transport is required.

An estimate of the cost of the Dildo hatchery, as furnished by the Superintendent in round figures, viz:-

> Cost of building complete........................................ $\$ 2,500$
> Cost of boiler, engine and pump................................... 1,600
> Cost of machinery, incubators and other apparatus, includ-
> ing steam launch
> Total
> $\$ 7,500$

## Maintenance.

$$
60 \text { tons coal for engine and launch at } \$ 4 \ldots \ldots \ldots . . . . . . . . . . . . .
$$

3 men as engineers-2 in hatchery, 1 in launch-at $\$ 1.50$
$=\$ 135$ per month for 6 months............................. 810
3 men in hatchery at $\$ 1=\$ 90$ for 6 months ............... 540
4 men collecting fish eggs, at $\$ 120$ for 6 months............ 720

Total ........................ ..... .................... \$2,382
The hatchery is supposed to be run from about 1st May till 1st November.
From the above cost of the Dildo hatchery, the following computation is made as to the probable cost of the construction and maintenance of a lobster hatchery, to be built in any of the maritime Provinces of Canada, thus:-

## Say:

$$
\text { Cost of building (a summer one)............................. } \$ 1,500
$$

Boiler, engine and pumps 1,000
Machinery, incubators, apparatus................. ........ 1,000
Steam launch, dc., \&c............................................ 1,500
Total...... ...... ................. .................... $\$ 5.000$
Note.-The boiler, engine and pump at the Sandwich hatchery cost $\$ 770$.
Maintenance.
Say:
60 tons coal, engines and launch, at $\$ 4 \ldots . .$. .......... $\$ 240$
3 men, engineers- 2 in hatchery, 1 in launch-at $\$ 1.50$ per diem $=\$ 135$ per month, say 3 months.


$$
\text { Incidentals for engine and launch........................... } 315
$$

Total ..... $\$ 1,500$

At the Dildo hatchery six months are occupied in collecting and hatching cod and lobster eggs, the codfish taking up an eariier period than lobster. The period given for lobster breeding in Canada would be three months-say, June, July and August-therefore largely reducing the maintenance for an establishment in Canada as compared with cod and lobster breeding at Dildo.

The result of the within described inspection of the Dildo establishment for breeding codfish and lobsters and from experiments made in Norway and other countries in Europe, and also in the United States, is, that lobster breeding by the artificial method is not a difficult undertaking, and its application might be held to be more favourable and attend with better results in the maritime Provinces of Canada than in the countries above mentioned, from the fact that greater facilities are at hand in Canada for procuring the necessary supplies of the parent lobster, by which almost any quantity of their eggs could be secured, thus giving a goodly supply of seed, which, if properly husbanded and the crop well cared for afterwards by judicious legislation, would undoubtedly give to Canada a superiority over all other countries in the commercial traffic connected with the lobsters industry.

## SELECTION OF A SITE FOR LOBSTER HATCHERY IN CANADA.

In connection with my inspection and report relative to the Dildo cod and lobster hatchery in Newfoundland, I desire also to report upon the selection of a site made by me for a lobster hatchery near the Cariboo Islands, on the Northumberland Straits, in the Province of Nova Scotia.

After visiting the Dildo establishment in Newfoundland and returning to Halifax I considered it advisable to examine certain points of the shore of the Newfoundland Strait, in the vicinity of Cariboo Islands, where suveral lobster factories were located and where it had been represented to the Department that these islands near Pictou harbour gave promise of furdishing all the necessary conveniences for the establishment of a lobster hatchery. Leaving Halifax on the 23rd of June, I reached Pictou the same day, and learned that lobster fishing was being largely carried on along that coast, and that within a distance of some 20 miles there were then a dozen or more factories in full operation. Upon further enquiry I found out the names of the proprictors of most of them and their particular location, as follows :-

Lecation.

1. Burnham \& Morrell, Bayview factory...................... Mainland
2. Hamblin \& Sons, Cariboo do ..............Cariboo Island
3. do .................. ................. .....Tony River
4. Burnham \& Morrell, Cape John............................. Cape John
5. do McDonald's Cove............McDonald's Cove
6. Hogg's factory...............................................Pictou Island
7. do do ............................................ do
8. McClures factory........................................ do

These were all situated in front of, and westward of Pictou harbour. There are also several other factories, some distance to the eastward of Pictou. These latter I did not visit, nor did I obtain any parliculars regarding them except that, a pretty large amount of canning was done at each of them.

With this number of factories so near at hand, I concluded that an abundant supply of lobster eggs might be readily secured, in the event of a lobster hatchery being located somewhere in their neighbourhood, and where the requisites of shelter and purity of water were at hand, also, for the satisfactory working of such an establishment.

## PROSPECTING FOR A SITE FOR THE HATCHERY.

Occasion was therefore taken to closely prospect the coast line from Pictou harbour westward to Cape John, some twenty-five miles, and also the shores of the Cariboo Islands to find, if possible, a convenient site for locating a hatchery. This was satisfactorily accomplished in selecting a well adapted spot, almost immediately alongside the Bayview factory, on the mainland, opposite to Little Cariboo Island-a place almost completely sheltered from any winds or storms which might prevail in the Strait outside.

Here the water is constantly in motion, and highly aerated, from the rapid running of the tides through the narrow passage (which separates Little Cariboo Island from the Mainland) into Cariboo Harbour, which extends westward many miles. This site, so well protected, is shown in red on the small tracing of the harbour and islands hereto appended. The conveniences of this spot are certainly most favorable, not only by reason of the sea water regularly flowing through the narrow inlet immediately in front, but also from the depth of water of some 4 and 5 fathoms within 100 feet of the shore, thus requiring only a short length of piping to draw the cold sea water into the building, which could be placed within 100 feet of the Bay, view lobster factory, where certain supplies of eggs could always be depended upon. This site, furthermore, possesses the advantage of being centrally situated for the other factories westward, and for the 3 large factories on Pictou Island, only 6 miles out in the Strait. A hatchery here would, therefore, have no less than 8 large canning establishments to procure egge from, and not counting the factories which are situated to the eastward of Pictou harbour. Another great advantage would be its closeness to the town of Pictou, only 4 miles distant, where ready means are at hand for procuring building material, and where engine and boiler making is carried on, having easy approach by railway and affording facilities for getting supplies of all kinds. Comprising all these advantages, this proposed site is a most desirable one to commence the enterprise of artificial lobster hatching in Canada.

In conversation with Mr. Neilsen, of the Dildo hatchery, Newfoundland, he was strong in the advocacy of pure, cold, strongly saline water for hatching cod and lobster eggs, and that the hatchery should by all means be as near as possible to lobster factories, to warrant full supplies of eggs; and that it should be in a sheltered place from the winds, so that the action of the storms would not stir up and roil the water, and cause sedimentary matter to be conveyed through the suction pipes into the hatching apparatus to foul the egge.

A site at Cariboo harbour will possess these requisites and many more which the Dildo hatchery, from its remoteness from the inhabited parts, has not or cannot have. The temperature of the water, however, at Dildo, was $44^{\circ}$, whilst at Cariboo it was $58^{\circ}$; but as some ten days had elapsed between the trials at the two places, and hot weatber had intervened, no doubt this difference in temperature would be greatly modified. I do not, however, think this would materially affect the case of batching, as the natural habitat of the lobster at either places would adapt itseif to the surroundings actually required for its propagation. Under all the circumstances, I feel safe in reiterating my former opinion, that the site at Lakeview is well adapted for artificial lobster hatching.

## EGGS FOR THE HATCHERY-HOW OB'TAINABLE.

Whilst the Lakeview site possesses the many advantages above related, I considered it advisable also to find out particulars regarding how the necessary supplies of eggs could be procured for it, if the hatchery were placed there. The result of this investigation gave evidence that almost unlimited quantities of lobster eggs could be secured from the several canning factories near by if satisfactory arrangements were entered into with the several proprietors owning them. Astonishing results were also brought out as to the wholesale destruction which was going on almost daily with the lobster by the method pursued at the several canning establishments which I visited, and from which I have formed my data for the calculations given below; and although only eight of (no doubt) the most extensive and best managed factories on the coast are included, I have no doubt that each factory throughout the several maritime Provinces is pursuing precisely the same course which, if allowed to continue, must sooner or later exterminate the lobster industry of the country.

To obtain knowledge for myself personally, as well as for your Department (if deemed worthy of consideration), I closely noted matters when visiting some of the lobster factories above named, with the view to learn particulars relating to the industry, and to make myself acquainted with the nature of the lobster, as to its re-productive powers, when mature or immature, its fecundity, and other characteristics of its nature, from which I could form an intelligent and reasonable conclusion regarding the natural and artificial production of them, and of the times and modes by which proper legiflation might be framed for the present and future protection and maintenance of the lobster wealth of the country, which is now so rapidly declining.

## REMARKS AFTER VISITING THE CANNING FACTORIES.

I found the proprietors and employés in every instance most willing to give me every information, and placing no restriction whatever in the way of preventing me from witnessing their operations, or from handling the lobsters in the various stages which they pass through in the work of being handled cooked and canned for the markets. The information almost volunteered to me by the canners regarding the large daily catch, and pack of lobsters at the individual factories which I visited, as well as those which I could not readily reach, was to me somewhat surprising. It must be understood that, as a general rule, the packer buys the lobster from the trapper by weight, not by count-the price being 50 cents for the 100 lbs , which the trapper gets upon delivery at the pier or landing connected with the factory. The account of the daily receipts given me by the several proprietors was
as follows, which covers the general daily average from the beginning of the season, about the 10th or 12th May, till the close of the season on 15 th July :-

| Proprietor. | Location. | No. of Lbss. Daily. |
| :---: | :---: | :---: |
| 1. Morrell \& Burnham. | . Bayview. | 10,000 |
| 2. Hamblin \& Sons. | . Big Caribon. | 14,000 |
| $3 . \mathrm{do}$ | .Tony River. | 10,000 |
| 4. Burnham \& Morrel!. | McDonald Cov | 12,000 |
| 5. do | Cape John. | 15,000 |
| 6. Hogg's factory... | Picton Island | 12,000 |
| 7. do | do | 12,000 |
| 8. McClures factory. | do | 16,000 |
| Total., |  | 101,000 |

These figures were given in round numbers by the proprietors. In one or two instances they were taken from their books.

In order to ascertain the number of lobsters comprised in these $101,000 \mathrm{lbs}$., it will be necessary to add about one-fourth to cover the great quantity of small sized ones, which are so numerously taken. This, then, would give a daily catch brought to these eight factories of 125,000 lobsters, say from 15 th May to 15 th July, which, if multiplied by the time, 60 days, would give a total of $7,500,000$ taken during this part of the season.

It will now be necessary to make further search into this subject, in order to fully comprehend its destructive bearings upon lobster life and the industry connected with it. To do this properly this daily catch of 125,000 lobsters must be analyzed:

1. What proportion of this number would probably come under the term of " berried lobsters," or those taken contrary to the law? After the 15th or 20th of June large numbers of the lobsters are found heavily laden with almost matured eggs, in many instances ready to drop the embryos from their bodies.
2. What proportion of the 125,000 will be found to come under the legal standard of $9 \frac{1}{2}$ inches, and may be called immature, that is, not possessing the requisite functions of nature to enable them to reproduce their species? My observations and examinations of several hundred specimens led me to conclude that a very small proportion indeed under 9 inches are "berried" or able to propagate their young; and that very few, if any, under 8 inches have their organs of development sufficiently matured to enable them to be "berried" or reproduce their kind.

Now, taking these vicws regarding "berried" and "undersized or immature" lobsters to be corlect in the main, or even approximately so, the following figures will assuredly show the immense destruction that is continually taking place thronghont the whole country illegally, and otherwise, in connection with the lobster business:

| Thus, in this case, say the daily catch | 125,000 |
| :---: | :---: |
| Deduct $\frac{1}{4}$ immature and undersize is... | 31,250 |
| Balance to be called full size | 93,750 |
| One-half of these may be called females | 46,875 |
| Take off $\frac{1}{4}$ as unfit for breeding. | 11,718 |
| Leaving of females . ......................... | 35,157 |
| Scientists give an average of $* 20,000$ each femalc... | $\underline{20,000}$ |
| Total eggs from females. | 703,140,000 |

[^11]This $703,140,000$ would be the daily loss of lobster egge occasioned by the taking of "berried females" contrary to law, if it went on during the whole season of two months. But it must be borne in mind that whilst the whole season covers two months, the real time in which the "berried female" is principally taken commences about the latter half of the season, say 15 th or 20 th June, and continues till 15th July.

Now, if the daily products of fruit-bearing eggs is $703,140,000$, and the actual time in which they are largely found on the female is from 20 th June to 15 th July in the open fishing season, 25 days are actually employed by the fishermen in catching "berried" or illegal lobsters-(to say that all "berried" fish are put back into the sea, and that they are not used in the factories, would be simply a distortion of the truth).

The product of this loss at these eight factories alone would be the multiplication of $703,140,000$ by 25 days, giving a total of upwards of secenteen billions five hundred and seventy-eight millions ( $17,578,500,000$ ) of lobster eggs and fry, which the present Departmental regulation contemplates saving by not permitting "berried" females to be taken. Yet the regulation is not enforced by the officers; it is violated, and is bringing about speedy extermination of the lobster industry.

It is by such an application of the subject, and by such calculations in relation to it that the immense loss can be comprehended that is now going on in connection with the lobster business of the country; and when it is found that so much destruction is caused by the operations of the within-mentioned eight factories on a part only of the Strait of Northumberland, what must it be with all the other canneries, some 500 in number, along the whole extent of the coasts of the maritime Provinces, where, no doubt. the same ruinous course is being pursued at each of them. The result must soon be to utterly destruy the industry and exterminate the lobster from our shores, and this calamity is already being too truly experienced on many parts of the coast.

From the within related facts, it is fairly shown that in connection with the carrying on of eight lobster factories no less than an average of $1,875,000$ immature, undersized lobsters are illegally killed during the two months, and at the lowest calculation some $17,578,500,000$ matured lobster eggs, with embryos in them. are cast into the boiling vats of the canneries, all in violation of the law, too. It, therefore, becomes necessary that this wanton destruction of these valuable crustaceans should be stayed, before it is too late to prevent their final extermination.

To give some particulars in proof of the statement that lobsters under 9 or $8 \frac{1}{3}$ inches are immature and incapable of reproducing their species, I may state that I opened many of these undersized lobsters at three of the factories, and found no rudimentary signs of fecundity inside or outside of their bodies; while in the largersized lobster, eggs were invariably found either inside the body or on the swimmerets, under the tail outside. This circumstance convinced me of the wisdom of the regulation which establishes the legal length at $9 \frac{1}{2}$ inches (which, in reality. should be $10 \frac{1}{2}$ or 11 inches). It also impressed upon me the great necessity that existed for your Department in enforcing the $9 \frac{1}{2}$-inch regulation to the very letter, and preventing the vast number of undersized, immature tish from being caught in the traps, and daily canned in the factories.

As further evidence of the unfertility of lobsters under $8 \frac{1}{2}$ inches, I requested the general agent of one of the large packing companies to send me a box that would hold about 50 lobsters of different sizes under 9 inches, to be forwarded to Ottawa, C.O.D., with the view that I might more closely examine them, to discover whether they bore eggs within or outside their bodies. These were very promptly and kindly sent on, as requested. They were boiled before leaving the factory, in order that they would arrive in Ottawa in good condition. Nearly all of them did. I opened all these lobsters personally, and thoroughly examined them, with the result as shown in the notes taken of each and described in the paper herewith attached. The examination of some of these lobsters was witnessed by other persons also. Some whole specimens and parts of others were put in alcohol for obser-
vation in the Museum. It was found in these specimens that no perceptible signs of fertility were to be discovered in any of the lobsters under $8 \frac{1}{2}$ inches in length. On one or two samples that measured plump $8 \frac{1}{2}$ inches some eggs were found on the outside of the body.

The following are the particulars relating to an examination made with the lot of lobsters received from the Bayview factory, Cariboo Islands, N.S.:-

*It must be considered somewhat exceptional to find any considerable number of $8 \frac{1}{2}$ inch lobsters bearing eggs-or, at least, such was the result of a pretty general examination made of a large number of lobsters received at the canning factories
referred to. It is possible, however, that in closely overhauling many thousand a few "berried" $8 \frac{1}{2}$-inch lobsters might be found, and this may have been the case with those sent to Ottawa for examination.

Since the above described examinations were made I have received information from Prof. Adolphe Neilsen, the Norwegian expert in lobster and cod batching now employed by the Newfound land Government to manage this industry, and who has been so eminently successful in hatching and turning out upwards of four hundred millions of young lobsters during the past seasonin the Newfoundland waters by the artificial methods. He thus writes: "As it may be of use to you, I will give you the number of eggs I have found on the lobsters here in Newfoundland, after the most careful count. Thus:-

| A 11-in | lo |  |  | 22,154 | eggs. |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 111 | do | do |  | 22,600 | do |
| 12 | do | do |  | 23,080 | do |
| $12 \frac{1}{1}$ | do | do |  | 23,260 | do |
| $12 \frac{1}{2}$ | do | do |  | 23,680 | do |
| 13 | do | do |  | 24,100 |  |
| 14 | do | do |  | 25,000 |  |

The inference to be drawn from Mr. Neilson's practical knowledge of the lobsterfamily is, that he cannot, or that he does not obtain matured eggs from lobsters under 11 inches. It may be possible that some eggs may be got from lobsters under that size, but he does not consider it worthy of mention in his correspondence. He furthermore says: "'Berried' lobsters were seldom found under 8 inches, and more frequently over than under 10 inches."

In my examination of the lobsters their size was considered, and close measurements made as illustrated in the above sketch. From the squares shown of the body size of the several lobsters examined a somewhat proper conclusion may be drawn for regulating the width between the bars or slats of the lobster traps, so that in adopting any regulations regarding legal lobster traps a space shall be left suffciently wide to allow small-sized lobsters to pass through, and thus prevent the unlimited killing of under-sized and immature fish.

## CONCLUSION.

If in the work of nature it was ordained that this wonderful fecundity of the lobster family was requisite to keep up the balance of nature in the general line of marine animals; and if in the wisdom of the Legislature of this country judicious laws have been enacted intended to protect and reasonably sustain this balance of nature, yet give a fair and legitimate supply of this much desired crustacean for man's use and traffic, why should the laws of nature and of the country be allowed to be overridden, and be made of no effect, to gratify the selfish desires of a few persons, for their own immediate aggrandisement, and who also advance special pleas and give erroneous statements regarding the nature and habits of the lobster, with the view simply to obtain more extended privileges for carrying on the work of ruination to the lobster industries of the country?

Surely the sad experience which other countries have already realized by allowing the unrestricted killing of this valuable crustacean should give timely warning to Canada, and cause her to put forth her energies to preserve and maintain in her waters the lobster wealth which she now so largely possesses over almost any other country.

The remedy and means are already to hand, which, if strictly enforced, would yet preserve the lobster industry, and maintain it in a large degree, both for the present and the future:

By a determined enforcement of a properly selected close time;
By the absolute prevention of the killing of under-sized and immature lobsters;
By placing all lobster trappers and packers under license surveillance, with such regulations as will effectually stop the present wicked and destructive methods
carried on in connection with the lobster business, and by supplementing their natural production by entering upon an extensive plan of artificial propagation.

If these means were enforced by parliamentary enactements, and not by Orders in Council, the present constant importuning of the Department would be prevented by interested individuals, companies and representatives from localities, all of whom are constantly pressing for changes to be made in the close season and regulations regarding lobsters from their own local and selfish standpoints, irrespective of the general requirements of the public at large for the preservation and maintenance of the lobster wealth of the country.

Appended hereto will be found a plan of that portion of the Strait where the site for a hatchery has been selected, on which are also shown the locations of the presnt lobster factories which are within reasonable limits for securing supplies of lobster eggs for the contemplated batchery. The names of the proprietors of the factories, with the daily catch of lobsters at each, are also shown.

## IRREGULARITIES CONNECTED WITH THE CANADIAN LOBSTER TRADE.

There is an unjust and discriminating system allowed to be carried on in favour of the foreign packer as against the Canadian packer and the trade interests of the Dominion.

Some of the lobster packing companies carrying on the canning business in the Maritime Provinces are only temporary residents, being actual residents and citizens of the United States, where they also carry on the lobster-packing business quite extensively. These American companies have been in existence in various parts of the United States for many years, and have established themselves in the lobster industry under well-known "trade marks," represented by brilliantly-got-up labels affixed to each package put up by them, thus conspicuously advertising their goods, and the country in which they are produced, to the general consumer througbout almost every part of the globe where this edible crustacean is eaten.

Finding by over-fishing, and the destructive methods adopted in killing the lobster, which has been pormitted by the authorities in the United States, the lobster crop has almost come to an end, these companies have, therefore, in many cases established themselves in the lobster packing business at many important points all along the coasts of the Provinces of Nova Scotia, New Brunswick and Prince Edward Island, where they have found the lobster crop to be far more abundant than in their own country. There they carry on an evidently Canadian industry from the product of Canadian waters, this might not be considered of such an objectionable cbaracter if deception, or, in fact, fraud, were not practised, by misrepresenting this actual lobster wealth of the Canadian waters, by advertising it to the world by their "trade marks" and labels as the product of the waters of the United States.

But a still more iniquitous system is also practised, when all the superior qualities of the lobster packages are labelled as the product of American waters, and the inferior qualities are labelled as the product of Canadian waters, whilst all a:c canned in the same factory and all are caught in Canadian waters.

This evidently irregular and discriminating proceeding in favour of the American lobster packers carrying on the canning business in Canada should be stopped, as being not only injurious to the resident Canadian packer, but also damaging to the commercial interest of the Dominion, in allowing a fraudulent advertisement of an extensive article of trade to go forth to the world at large as the growth and product of the United States, when in reality it is wholly Canadian. I hereto append to my report the following extracts regarding lobster culture in Newfound. land and in the United States.

## SUCCESSFUL OPERATIONS IN LOBSTER AND COD HATCHERY, NEWFOUNDLAND.

## Mr. Neilsex:s Report.

At a meeting of the Executive Committee of the Fisheries Commission on the 24th instant, Mr. Neilsen presented his report on lobster hatching for the present season. From this it appeared that at Dildo hatchery, fifteen millions of lobsters had been hatched and planted. Returns received from nine of the
hatching stations showed that three hundred ayd sixty-five millions of lobsters had been hatched and set free in the waters. These stations were distributed around Fortune, Placentia, Conception, Trinity and Bonavista Bays. At each station thirty-six floating incubators were employed. The eggs were obtained at the different lobster factories, and would otherwise have been destroyed. The female lobster, as is well known, carries her eggs in a fertilized state under her tail. Before the lobsters are thrown into the boilers these eggs are carefully removed by the men in charge of the incubators and brought to life; and the young have the same chance of surviving as if produced by the natural process and liberated in the waters. There is thus a clear gain of what would otherwise have been devoted to destruction.

Three stations in Green Bay, each having thirty-six incubators, are yet to be heard from. Should they have been as successful as the others it will be found that they have hatched $116.000,000$. The result of the whole, in that case, would be, this season, that $480,000,000$ of young lobsters bave been hatched and planted in the waters of our bays, to sustain this great and valuable fishery. Who will deny after this that the Fisheries Commission is doing a good work?

This is not all. The fishermen around Dildo and in the various arms of Trinity Bay report having seen lately enormous numbers of tom-cods of a much smaller size than they had ever seen before-in fact, not so much as half the usual size. The reports come from various quarters and from a considerable number of fishermen. Mr. Neilsen has verified the reports, and seen the young cod himself, which he considers are beyond doubt the product of his hatchery, the young cod fry which he planted in the early part of the summer having reached this stage of growth. They are present in enormous numbers. This news is of the highest importance, as it gives abundant promise of success in the present effort to re-stock our exhausted waters. It corroborates the experience of the American Fisheries Commission, who have succeeded, in three years, in creating an abundance of codfish, off a portion of the coast of Massachusetts, where till recently there were none, by artificial propagation. Cod-hatching is now proved to be a great success.

## COD AND LOBSTER HATCHING:

> (From Cape Anne "Adrertiser," U. S.)

The fish hatchery on Ten Pound Island is in full tide of successful operation, all but three or four boxes being full. Some seven millions baby col have recently been liberated, and there are now twenty-six million eggs in the boxes. The Commission's agents go out in shore boats to secure fresh eggs, pressing the spawn and milt from whatever ripe fish are taken, and keeping it in proper condition until they come in. Any imnediate overplus of spawn will probably be taken to Wood's Holl.

The hatching of codfish, haddock, \&c., first attempted in this country at Gloucester, during the visit of the U. S. Fish Commission here in the summer of 1878, has passed beyond the experimental stage to that of demonstrated success. Large quantitirs of codfish have been hatched at Gloucester and Wood:s Holl, and the benefit has already been seen in the fishing grounds off Cape Anm and at Nantucket Shoals. Last summer and fall many young codfish were taken in the traps and weirs, and the school of fish now being caught off shore are of a size and character to indicate that they are the result of this artificial hatchery.

The restocking of the shore grounds is proving a bonanza to the local fishermen. It is reported that the schooner "Dixie," up to Saturday, had stocked $\$ 3,000$ in seven weeks, her crew sharing $\$ 344$. Schooner "Lottie S. Haskins" took 4,000 lbs. on her first set in Ipswich Bay. The little sloop "Mensenger" stocked $\$ 40$ the first day's fishing ; and the schooner "William H. Cross," with improvised lines, reeently took 5,000 lbs. in one day's hand-line fishing in Ipswich Bay.

The artificial propagation of deep-sea fish has been carried on successfully in Norway for some years, and a hatching station has recently been established at Dildo, Newfoundland, under the charge of a Norwegian expert, where excellent success has been met with in hatching codfish and lobsters, especially the latter.

In the summer of 1885 an interesting experiment was conducted at the Norwegian hatchery at Flodevig by Carl Rognenid, Commissioner. A basin filled with sea water was provided, about $140 \times 66$ feet, and 16 feet in depth, having a capacity of about 88,000 cubic feet. In this several kinds of sea-plants were placed, and on the 3rd of May half a million young cod, hatched a week previously, were placed in the tank. The fish at this time were one-fifth of an inch in length.

Their increase in size was carefully marked from week to week, the greatest growth being obtained between 6th June, when they were withim a minute fraction of four-fifths of an inch in length, and they began to eat the food furnished them twice a day, and 12th July, when they were 2.17 inches in length; 12th August their length was 270 ; 12th September it was 3.35 and 12 th October it was $4 \% 3$ inches. These figures give the average length of the fish taken for measurement, the largest one examined at the latter date being $6 \cdot 18$ inches long.


## 7.-SALMON FISHERIES OF THE BAY DES CHALEURS.

Memorandum submitted to the Honourable the Minister of Marine and Fisheries by Mr. Wilmot, Superintendent of Fish Culture, regarding the correspondence of certain prominent persons, and the Petition of the Fishermen of the County of Bonaventure, relative to the Salmon Fisheries of the Bay des Chaleurs, together with remarks on the Salmon Fisheries generally and their modes of capture, with the several kinds of nets now employed; also sketches of the various descriptions of Pound, Trap and Stake Nets in use in many of the Coast and Estuary fisheries in the Dominion.
The complaints of the petitions on the Quebec side of the Bay des Chaleurs are:-
(1.) That their compliance with the Sunday close time is injurious to them by reason of the fishermen on the New Brunswick side of the bay being allowed to fish unmolested through this close time.
(2.) That the annual open period for netting salmon is too short, and should be enlarged.
(3.) Because they are compelled to lift and tie up their nets from Saturday night till Monday morning, whilst the New Brunswick fishermen are permitted to keep their nets down and to fish them at this time.
(4.) That the decrease of the salmon fishery by nets is brought about by the abuse of fly tishing up the river.

These complaints were referred to Inspecting Officer Wakeham, of that division, who reported adversely to these petitioners' views, and Mr. Wilmot fully endorses that report, and now in addition enters more largely into the general subject of the salmon fisheries of the Bay des Chaleurs by saying that:-
(1.) The complaint of the petitioners that, "their compliance with the Sunday close time is injurious to them," is no doubt correct, when they see their brother fishermen on the opposite side of the bay are permitted to fish during this close time, and in violation of the regulation forbidding it. To obviate a continuance of this complaint by the Quebec fishermen they should either be allowed to fish during the weekly close time, or that your Department should enforce it against all, indiscriminately, by strictly enforcing the weekly close time against all fishermen alike. But to allow the weekly close-time to be wholly set aside would mean absolute ruination to the salmon fisheries of the Bay des Chaleurs and its tributary streams within a sooner or later period of time.
(2.) The request of the petitioners for a change in the regulations for lengthening the annual fishery season, is simply to obtain for themselves more extended facilities for capturing more fish, whilst it would also add very greatly towards bringing about the destruction of Salmon fisheries by giving additional help to the ruinous effects from the non-observance of the weekly close time.
(3.) With regard to the complaint "of nets being injured from tying up for the Sunday close time,"-this is but an excuse to gain a point. This was never thought of in former years, when all fishermen tied up their nets alike, but since the introduction of the trap-net, which is somewhat more difficult to tie up, a pretext is made by the Quebec fishermen that keeping the Sunday close time so injures their nets that they should be allowed the same privilege as the one usurped by the New Brunswick netters, who, in violation of the law, keep their nets down during the weekly close time. The not only absurd, but selfish statement made, that "the salmon which escape the nets by keeping the Sunday close time are caught further up on Monday," goes to show the true inwardness of these lower netters, who, in fact, say: "We want all the salmon, you upper netters and river fishermen shan't have any if we can help it." Not only do they have the first chances of taking the incoming salmon, but so avaricious are they that they perition for a privilege which means, "no salmon shall pass us to benefit our brother fishermen above, nor reach the spawning grounds to the river for breeding purposes."
(4.) The petitioners allude to the "decrease of salmon being brought about by the abuse of the right of fly-fishing in the Restigouche River." Captain Wakeham meets this fallacious statement pretty clearly; but to his statements should be added others bearing more conclusively, in contradiction of prejudiced ideas entertained by these netters in the tidal waters, whose dependence upon maintaining their catch of salmon for the future rests largely upon the protection given to the rivers by the fly fishermen. The net fisherman, from the nature of bis calling, is in no way whatever the protector; he is the destroyer of the salmon. The ambition and calling of the tidal fisherman is to invent and apply the most destructive engines possible, for intercepting, capturing and killing the incoming runs of salmon on their migrations from the sea, on the coast line, to their native rivers, to produce their young; and if it were not for restrictive regulations as to times and modes of fishing, these netters would so bar the passage of salmon to their rivers, by extending their nets out in the bay, and across the estuaries of rivers, as to wholly forbid the possibility of sufficient numbers reaching the spawning grounds to keep up their species. The whole legislation in Canada, in Britain, and throughout the whole world, so to speak, has been to make laws to keep within bounds the avarice of the net fisherman from exterminating these migratory fish, whose nature it is to travel together in "runs" or "schools" within certain short periods of the year to their spawning grounds. In England and in Scotland, after centuries of experience, the netter has been so restricted in the use of the destructive engines which were formerly in use there that at the present time many of the more important rivers continue to uphold almost their original standard of fish,--thus actually benefiting the tidal fishermen, the rivers proprietors, and all concerned.

The policy has been that, while the netter is allowed to take a fair proportion of the salmon for commercial purposes sufficient numbers should by allowed to pass by to benefit the upper proprietors of rivers for angling, and yet leave a sufficient supply of parent fish to breed, and keep up the standard of the river. This has all been achieved by establishing a proper annual close time, and a weekly close time for tidal fisheries, and the use of such description of nets as shall not be too destructive in their operations, and the fixing, also, of a proper close time in rivers to regulate angling. This course has also been adopted for the preservation of the salmon fisheries in the Baie des Chaleurs and its rivers; but the regulations, by reason of expediency and the inefficiency of fishery overseers, have been permitted to be so encroached upon as to become almost useless, and also brought about the outcry so frequently advanced (whether correct or not) that the salmon fisheries are being rapidly exhausted.

It must also be borne in mind that the tidal salmon fisherman is destructive, not protective in his calling, as before stated. He renders no support whatever, pecuniary or otherwise, for guardianship of the rivers and other nurseries which produce for him the supplies of salmon which come to his nets to enrich him. It is the upper proprietors of the rivers, and the anglers who lease them at high rentals, who bear the whole burden of guarding the rivers against the invasion of the poachers, and who are compelled to protect the parent salmon and the spawning beds. The result of which is, that the netter gets the lion's share-and what is this share? If the record of the anglers' catch of salmon on the Restigouche River and its tributaries is taken and placed in comparison with the catch of the netters below in the estuary and coast it will show that, whilst the netter gets some 95 or 96 per cent. of the salmon caught on their migration to their spawning grounds, the angler takes but 4 or 5 per cent. It will be quite whithin bounds when it is said that the cost of every salmon to the ordinary angler will amount to $\$ 1$ per lb., whilst the cost per lb . to the netter will not exceed $1 \frac{1}{2}$ cents per lb .

In fact, by an illustration herewith given from the best known records of the catches of the netters and anglers, this widely comparasive difference will be shown. It will be necessary to take the only now present available data for this exhibit from the departmental chart of the Baie des Chaleurs salmon fisheries, referred to in the calculations made relative to this whole subject. By this map the
netter will be placed in a better position than the angler, from the fact that not more than one-half the salmon were then taken with the fly, as of later years; but the gross average of the fly catch of the later years will be placed in comparison with the netter's catch. And this exhibit will only show the operations of the netters on the New Brunswick side of the bay, and of the angler on the Restigouche River, it being correctly held that the Restigouche River is the principal breeding river to supply the tidal fisheries on the New Brunswick side. The records, which do not fairly give the netters' full catch, show that on the New Brunswick side, in the counties of Restigouche and Gloucester, there were taken by nets all told $801,555 \mathrm{lbs}$. of salmon. Allow for the weight of each salmon 20 lbs ., and 40,076 will be the number. There are 179 stations for netters, thus giving 224 salmon on an average to each netter.

These salmon will be estimated at $\$ 2$ apiece; each netter would thus get $\$ 448$.
To offset this, the cost must be considered with his average rate of license fee added. There were 29,137 fathoms of net recorded, which, at 3c. per fathom, would give $\$ 874.11$. This sum divided by 179 netters would give the average fee to each of $\$ 4.88$. Then, say two months fishing nets at $\$ 50, \$ 100$. Without first costs of nets the expenditure would be $\$ 104.88$. Deduct this cost of expenditure from the $\$ 448$, and the balance to profit is $\$ 344$. Each fish of 20 lbs , will cost the netter about $46 \frac{1}{2} \mathrm{c}$., or $2 \frac{1}{3}$ cts. per lb., and he realizes a profit per fish of $\$ 1.53 \frac{1}{2}$, or, on his whole average catch for the season, a profit of $\$ 344$.

The position of the angler is thus: Say a fair average number of days for his fishing to be 20, and the cost per diem for Indians, canoes, tents, scowing, provisions and accommodation cannot be estimated at less than $\$ 10$ per diem.

> The 20 days, angling would amount to........................ $\$ 200 \quad 00$ His privilege or license to fish for the season on any of the Restigouche waters will not be less than.......... $200 \quad 00$ Average railway fare to and from his residence in New York, Ontario or other parts................................. 5000

Total
45000
The angler's catch may be nil, but to give a fair allowance, say one fish a day, or 20 salmon for his 20 days, as shown above, will cost him each $\$ 22.50$. He gets nothing for his salmon, as they are invariably consumed or given away; he therefore makes no profit whatever on his catch, like the netter, butexpends $\$ 22.50$ on each fish taken, or $\$ 1.12 \frac{1}{2}$ per lb., all of which is spent amongst the settlers and others for provisions, labour, \&c.

The cost of the original outfit of the netter and the angler is about thus: Ordinary price of net, $\$ 100$; ordinary outfit for angler not less than $\$ 150$, and in many instances reaching double and quadruple this sum.

Now, taking an extra catch of salmon by angler's on the Restigouche, and it has never exceeded $2,000 \mathrm{fish}$, but in a great majority of cases very much less, and place the results by a comparison between the outlay or cost of 2,000 salmon as between anglers and netters thus:-

In addition, the angling proprietor or lessee of angling privileges will bave to pay his quota of the cost of guarding the river, for which the tidal fishermen pays nothing whatever on this score.

The undersigned feeling quite assured of the deep interest which many prominent individuals and the public also now take, and have always taken in endeavouring to uphold the salmon fisheries of the Baie des Chaleurs, and of the several rivers which
empty into it, considers that any suggestions coming as they have from persons having a practical knowledge and long experience on this subject should receive from your Department of Fisheries due consideration.

Frequent reference is made to the want of uniformity and inability to obtain correct returns. This is, no doubt, the case, as it is well known by those practically acquainted with the fisheries on the Baie des Chaleurs that the returns made to the Department are imperfect, and do not give anything like a true and correct account of the numbers of salmon anually taken in the nets operated in the estuaries of the several rivers and along the shores of the bay. These imperfect returns are caused by the desire on the part of the fishermen to withhold the true catch made by them, fearing that it might affect their interests with regard to the value to be put upon their licenses in after years. This no doubt would be the natural feeling of the fishermen; and to carry this out the overseers are often hoodwinked by the fishermen, and consequently these overseers simply take the ipse dixit of the fishermen, without taking further interest, as they should, by frequent examinations of the nets, and seeing the fish actually taken from time to time. This would require a live active men whose sole duty should be to daily inspect these salmon stations during the short time of ten or twolvo weeks when the fishery is carried on in its fullest extent. A personal knowledge of this matter, when inspecting portions of the bay, in connection with the specialty of fish breeding, has given evidence of the prevalence of this want of thorough oversight of the large salmon fisheries in the neighbourhood of Dalhousie, and elsewhere.

Attention is also drawn to the present unfairness and want of discrimination which exists regarding the location of fishing stations, the length of nets, and the rate of license fees paid. This must appear obvious to even the commonest observer from a glance at the fishery stations on the departmental plans of 1878 (and it is more apparent at the present time), which shows the location and length of erery net set, and their catch, and it will so elucidate the whole matter as to carry conviction with it, as to this inequality of the existing mode of licensing the salmon stations, especially in the bay below Dalhousie, on the New Brunswick side. To explain :-

The license fee on the New Brunswick side is 3 cents per fathom of net. Now take as an example the multitude of nets set in Eel Bay at Dalhousie, and commence at station No. 71 where the first net is placed for intercepting the shore wise course of salmon, after passing Heron Jsland, in their migration from the sea coast, and follow from No. 71, round the curves of this bay to station No. 43, and you find every available space allowed by law taken up with 27 nets, entered at 200 fatboms each. (Query-With this want of proper inspection, are these nets kept within correct limits or lengths?) and the present unfairness, and want of discrimination of a license fee of 3 conts per fathom are most apparent:



Here it will be seen that one net, No. 44 , took 520 per cent. more fish than the 16 nets each,- 71 to 56 -did, and yet each paid the same fee, viz., $\$ 6$.

Now, if the same system existed on the New Brunswick side as on the Quebee side of the bay, viz., 40 cents for every 200 lbs . of the catch, the average fee payable by the 16 nets referred to would have been $\$ 6.40$ each, and No. 44 , at the same rate (with 17,000 lbs.) would have been $\$ 34$. This, I should say, was conclusive evidence of the unfairness of the present system-unfair towards the fishermen themselves on the New Brunswick side, and more so towards the fishermen on the Quebec side. Taking the aggregate catch of these 27 nets of 200 fathoms each as operated on the limits of Eel Bay, on the New Brunswick side, the gross amount of fees paid by them to your Department was $\$ 174$; whereas, if these same nets had fished on the Quebec side the amount of fees payable by them would amount to $\$ 328$.

With regard to this evident unfairness and want of discrimination with fishing stations and license fees, it may be asked how it is that certain nets, or that one net, can possibly take such greater numbers of salmon when located almost (so to speak) alongside so many other nets in Eel Bay? It is somewhat easy to explain, when the migratory habit of the salmon is known, and their instinctive nature for following the coast line until they reach their native rivers, which they ascend for spawning purposes. The larger proportion of salmon belonging to the Restigouche River would naturally strike Eel Bay, on their direct line from their seaward journey, passing by Heron Island. This bay being the first coast line struck by them, as the numerous nets set there would indicate, they commence their coast, or shore, course onward. Nos. 70 and 71 nets show the larger catch of these fish at the lower end of the bay. The fish being driven outward somewhat by these first nets, they pass along with a somewhat uniform catch, till a smaller bay, at the mouth of Eel River, is reached, when they instinctively turn inshore again, striking nets Nos. 51, 52, 53, 54, where the catch runs up from an average in the 17 nets below of some $3,000 \mathrm{lbs}$. to 41,000 lbs. (in these 4 nets), or an average of over $10,000 \mathrm{Ibs}$. each. From this point they pass on with the accamulations of others coming in direct from their seaward line, giving an increased eatch in the six nets above (Nos, 50, 49, 48, 47, 46 and 45) of nearly three times the catch of the 17 first-mentioned nets below, or $8,700 \mathrm{lbs}$., as compared with $3,000 \mathrm{lbs}$. cach. From this point the salmon strike directly outward to get round the point at the head of the bay, when net No. 44 takes 17,000 lbs., and the next, No. 43 , takes only $1,140 \mathrm{lbs}$.

Thus, it appears that the nets located at either end of this Eel Bay, although using the same number of fathoms as all others, get certainly the lion's share of the salmon and pay no more license fee. This appears very unequal and unfair, and these nets, or the owners of them, at these naturally better-located stations, have no greater legal right to the fishery than their neighbours; custom and occupation has, it appears, made these occupants of the better stations think they can hold them as of their exclusive right. Riparian rights do not prevail in the tidal waters, $8 a-3^{*}$
and consequently their occupation of the fishery is only permissive from the Government, which they acknowledge by paying the annual license fee for fishing these stations. Then why should one man, merely by the peculiarity of his fishing station, be compelled to pay $\$ 6$ as a license fee for catching $3,000 \mathrm{lbs}$. of salmon, whilst another, with the same length of net, and paying the same fee of $\$ 6$, takes $17,000 \mathrm{lbs}$. of salmon? The remedy lies in the necessity that exists for abolishing the small fee of 3 cents per fathom, and placing a uniform charge of a certain amount upon every fish, or 100 lbs. of fish, taken by each net. In this way the taxation would be not only justly applied, but equitably proportioned amongst all the fishermen, whether his station were a good or a bad one, or his net long or short.

In connection with this subject of license fees, the following views are suggested for your consideration, which, if carried out, would no doubt in the end benefit the fishermen themselves, in more fairly equalizing the profits accruing from their somewhat laborious calling, and the expenditure connected with their individual fishing stations, and also produce an income to the Department from the catch of fish to sufficiently pay a live overseer, whose time should be wholly devoted to seeing that the fisheries regulations were thoroughly enforced, and thus establish faith in the minds of the public of the determination of your Department to maintain for the present time, and for the future, the salmon wealth so largely obtainable from the waters of the Baie des Chaleurs, and the rivers tributary to it.

Taking the same data for figures and quantities of salmon referred to previously, and confining these remarks to the same 27 salmon stations at Eel Bay, which, whilst it may be only a section of Baie des Chaleurs, will nevertheless be a proper criterion to draw a correct conclusion for operating all the fisheries in that large salmon-producing area (the Baie des Chaleurs)-and even elsewhere and in other Provinces. These 27 nets gave a return of $164,056 \mathrm{lbs}$. At present the netters on the Quebec side pay 40 cents per 200 lbs.--this, after all, is a very trifling fee, and is not found fault with. I would suggest a uniform fee of 50 cents on every 200 lbs . of salmon $-\frac{1}{4}$ cent per lb . of fish. At this rate the 27 nets with their $164,000 \mathrm{lbs}$. of salmon would give an income from the license fund of $\$ 410$. This income, trivial as it is, from this large catch of salmon (and so considered by the fishermen themselves, if equitably exacted from them) is derived from only 27 stands of nets, out of 230 stations in Baie des Chaleurs, and taking in only 7 miles, out of 156 miles of the shores of that bay, as laid down in the fishing chart, describing salmon stations. From every standpoint a license fee based upon the quantity of fish taken is preferable, and more equitable in the interests of all parties concerned.
(3.) Reference is also made to the "necessity for enforcing the law regarding Sunday close time for nets." This regulation is of such vital importance for the better maintenance of the salmon fisheries on the tidal waters, by allowing certain portions of the "runs of salmon" to pass up to their native rivers unmolested from Saturday night at 6 o'clock till Monday morning at 6 o'clock, that it should be strictly enforced in the Baie des Chaleurs and elsewhere, in all tidal waters where salmon fisheries are carried on. It is a law which has existed upon the statute books of Canada since Confederation, and of the several Provinces previous to that time; and has always been held to be, not only in Canada, but in the countries of the old world, as one of the most importart aids for giving opportunities for salmon to reach their native river for reproductive purposes. Do away with this Sunday or weekly close time, and allow the fisbermen to carry on their avaricious desires for keeping their nets set from the opening to the close of the fishing season, and the flood gate of destruction is wholly opened up to expedite the extermination of the salmon wealth of the country.

This weekly close time is and always has been a permanent record upon the statutes of almost every civilized country in the world, in the waters of which the noble salmon are indigenous. The salmon, being migratory, make their journeys to their native rivers in large bodies, or "runs," as they are called, within certain limited periods of time. In some cases a longer or shorter period is taken. In the Baie des Chaleurs the time will be included in about six or eight weeks; and should these
nets be kept down during the whole of this time they would become barriers (or fixed engines completely) to the upward passage of salmon along the coasts, and shores, on their migration to the rivers to uphold their species.

To show the destructive nature of some of the nets used, sketches are herewith giving of those in general use on both sides of the Baie des Cbaleurs. Some of them are such complete engines of destruction and set in such direct opposition to the requirements of the law and regulations as to demand their confiscation, and infliction of the severest penalties upon the parties who use them. The statutes read, sub-sec. 7, sec. 14, Fisheries Act. "No one shall use a bag-net, trap-net or fish pound for capturing salmon." Now, in opposition the nets used for capturing salmon on the New Brunswick, side of the Bay are the most complete and wicked invention of a trap-net that could be devised for the capture of salmon. The statute furthermore says: "No one shall fish for, catch or kill salmon in tidal waters from 6 o'clock in the afternoon of Saturday till 6 o'clock in the forenoon of every Monday."

Now, not only are these illegal and wickedly destructive trap-nets set and in general use on the New Brunswick side of the bay, but they are kept there as fixed engines during the whole of the fishing season, and not taken up during the weekly close time from Saturday night till Monday morning. Thus, these fishermen are actually usurping a privilege from your Department which is hastening the end of the sal mon wealth of that bay and the rivers emptying into it, and enriching themselves by wrongdoing, as against their brother fishermen on the other side of the bay who carry out your fishery regulations, and in addition creating strife and dissatisfaction with other fishermen who, through their representatives in Parliament, are importuning your Department for permission for the same privileges which the others are tacitly permitted to enjoy as of their own right.

Appended will be found plans of several descriptions of nets in use for captu:ing fish in tidal waters, and it would appear that hardly two persons agree upon what a trap-net is. From what I can learn, the nets used on the New Brunswick side of Baie des Chaleurs, shown in figures Nos. 31 and $3^{2}$, are the wickedest of traps for killing salmon. My definition, is that any fixed net so set as to lead fish through one or more apertures into a pen or pound attached thereto, from which they cannot escape, is a veritable "trap-net."

Even the hang nets herein given would be interpreted in England as "fixed engines." I quote from the report of the Fishery Board of Scotland for 1888, thus: "As to the destructive effects of hang nets on river fisheries, the English inspectors point out in their fourteenth annual report that they, in a few years, reduced the annual yield of salmon in the Tyne from 129, 100 to 21,746 , after which a by-law was passed restricting the area of their operations, since which time the Tyne fisheries have very greatly improved."

Mr. Berrington, the Cbief Inspector of Fisheries for England, in his report to the English Board of Trade, says:-
"The mode of fishing in the sea for salmon is exclusively by hang-nets. This description of net is capable of intercepting a far larger proportion of incoming fish than would be taken by draft-nets, and in this district its efficiency is habitually still further increased by the illegal practice of anchoring the shore end. On my arrival at Whitby I saw two nets anchored off the pier, extending several hundred yards seaward. On the following evening I saw four nets used in this manner, and acting as a complete barrier to the passage of fish. I drew the attention of the conservators to this illegality."
" It would be undesirable to alienate the upper proprictors, who have the control of the spawning grounds; and considering the exertions they have made, it would be unfair to reduce their opportunities of taking fish after the nets are removed."

The mode of fishing in the public water or tide-way of the Trent is by beamnets. They are fished from a smack, but are stationary when at work, and are placed so as to face either the flow or the ebb of the tide. The length of the beam is from

20 to 22 feet; the mesh of the purse is very small. $\quad * \quad * \quad * \quad$ The complaints against the beam-nets are that they tike salmon illegally and destroy large quantities of immature fish. These nets cannot fail to take salmon

The law respecting the use of small-meshed nets in salmon fisheries is one which deserves consideration. $\quad * \quad * \quad * \quad$ In the case of beam-nets, they are in fact fixed engines and cannot on that account lawfully be used for the capture of salmon. * * With regard to the complaint that the beam-nets (as fixed engines) destroy large quantities of immature fish, it is necessarily true.

*     *         * The salmon tishermen complain serionsly of the number of salmon taken by them, and of the injury they do to the young of salmon if used in the spring months.

The concensus of opinion by most authorities on the preservation of the salmon fisheries in Britain and other countries in the old world has been that, "fixed engines," as stationary nets, were so destructive to the salmon fisheries generally, and that they so barred the passage of these fish to their native rivers for breeding purposes, that these "fixed engines," as they are styled, have been almost whoily abolished: and it is said that from this cause, is mainly to be attributed the present continued supplies of the salmon in most rivers of Britain.

A single instance is here given of a river which has been fished for centuriesthe Tay, in Scotland. The rentals of the salmon fisheries connected with it have during the past six years given an average annual income of $\$ 101,825$. The country through which this river runs, from its source down to the sea, is densely inhabited, and its estuary and coast line connected with it is crowded with shipping and traffic of all,kinds to an enormous extent. Manufacturing industries of varions kinds are located almost throughout the whole extent of the river, yet it is found that salmon are taken in such abundance in its waters as to produce the annual wealth above mentioned, giving employment from these salmon fisheries to many people, and adding luxury and pleasure to anglers and others of the general community. This river Tay, I am informed, is actually insignificant, when compared with the Restigouche, its estuary, and the farnous Baie des Chaleurs connected with it. The Restigouche, with its numerous tributary rivers, may be said to be in their primeval state, almost down to the tide-way. Not a mill or manufactory is built upon the river; its waters are not contaminated with pollutions of any kind and its purity and capacity as the home of the salmon is the same as when it first fell from the hand of nature. It has always held widespread notoriety as one of the greatest salmon-producing rivers since the first settlement of Canada; and why should it be allowed now to become reduced in its capacities for keeping up a great standard of fish wealth, somewhat in comparison with the river Tay, above referred to? And so it might, if the improvidence and avarice of the netters were stayed, and they were compelled to adhere to the fishery regulations, as to the use of proper desciptions of nets and the due observance of the weekly close time.

In a reference to the close seasons for net fishing, and angling on the river Tay, a much greater latitude is given by the Scottish laws than in Canada.

The annual close time for netting on the Tay is from 27th August to 10th February; on the Baie des Chaleurs, 15th August to Ist March. For angling. on the Tay, from 31st October to 10th February ; on the Restigouche, from 15th Angust to 1st February. From this it will appear that the fishery authorities in Scotland do not consider that angling for salmon is as injurious as the use of netting by fixed engines. The Tay anglers are permitted to take salmon up to the 31st October, which gives a period of two months and a-half longer than is allowed anglers on the Restigouche or other Canadian rivers.

The general law for close times for salmon in England is from the 1st of September to the 1st of February for nets, and for angling from 2nd November to 1st February. In many rivers the season commences later. Thus, throughout England, salmon angling is permitted two months later than in Canada.

The undersigned, after a careful consideration of all the bearings relative to the question of the maintenance of the salmon fisheries of the Baie des Chaleurs, and after a relation of the various points from which his conclusions are drawn, recommends the following:-

1. That the description of salmon net to be used along the coast, and in all of the tidal waters of sind bay, should be similar to the one marked No. 1 of the plans hereto attached, known as the wing-net, or hook-net. It has no trap, nor bottom attached to it ; it was the net universally used in all of the waters of the bay previous to 1878 , and is the net now used on the Quebec side of the bay, in the counties of Gaspé and Bonaventure. The lifting it is easily performed to comply with the weekly close time, and should now be as satisfactory and remunerative to the fishermen of the present time as previous to 1878 , and especially so when the netters on the Quebec side of the bay use it, and would be satisfied to still use it if the netters on the New Brunswick side were compelled to do the same. But if ole portion of the bay is fished with an illegal net, which is more destructive and better adapted to entrap the salmon, all other fishermen naturally desire to partake of this privilege, illegal though it may be.
2. Restrictions should be made, even regarding the above-named net No. 1, as to its length, for one station with 100 fathoms may be so favourably situated (but ruinously so, on the upward passage of salmon) as to capture more fish-in some instances two, three or four times the number that a 200 -fathom net set just alongside will take.

The meshes of all salmon nets in the Baie des Chaleurs and the estuary fish-ways should be a like size for leaders, wings and hooks, namely, $6 \frac{1}{2}$ inches. The meshes of nets now in use are almost invariably 7 inches. In licensing the nets, the length of net in fathoms should include the length of the leader, as well as all hooks or wings that may be connected with the working of the net.
3. The salmon stations for nets should be so located as not to interfere too destructively with the incoming "runs" of salmon when rounding certain points, now well known to fishermen and others. The length of each net licensed should be established from the adaptability of the station for capturing salmon.
4. The close season for salmon, by netting, to be as laid down in the consolidated regulations of 1889 , and that the weekly close time, from Saturday until the following Monday, be strictly enforced everywhere alike.
5. That the fee of 3 cents per fathom on salmon nets be abolished, and that in lieu thereof a tax of $\frac{1}{4}$ of a cent per pound of fish, or 25 cents per 100 pounds, be exacted in all cases on the catch of salmon in the Baie des Chaleurs, and in all other salmon fisheries by nets in the Atlantic Provinces.

Wing-Net or Hook Net, none other used hrior to 1878 in Bay des Chaleurs.- and the only legal one now in use in Quebec Side in Gas/ue, and Bonaventure, can be casily lifted to comply with Weefery close time by tieing un-


NOI.
Float, Wing.Hook or Gill.Net-old Style.



No2.

















FISH-LADDERS.

## THEIR NECESSITY FOR THE MAINTENANCE OF FISH LIFE WHERE MILL-DAMS AND OTHER IMPASSABLE BARRIERS EXIST.

This fish-ladder question is one of vital importance for the maintenance of fish life in the rivers streams and other waters of Canada on which natural barriers exist, or where artificial barriers have been built, which shut off the passages of fish to their breeding grounds to the waters above, and in addition to this prevention for the upward migration of fish, these dams invariably form deep holes or basins just below them, in which the fish collect in large numbers, waiting, as it were, for some opportunity to ascend the difficulty before them. Here they become the easy prey for the fisherman and poacher, who, regardless of the fact of these fish being penned there, mercilessly slaughter them in every conceivable way.

It is not an uncommon occurrence to see at the foot of the dam or other barrier, at the running times of fish (which means the time their instinct leads them onward to their spawning grounds), scores of men and boys with every kind of engine of destruction-nets, spears, hooks, traps and even guns-catching and killing these ripe, pregnant fish, with the fruitful eggs flowing from their bodies, besmearing the boats and banks of the stream. If it were not for these impassable barriers stopping the fish they would pass on, and not become impounded in these pools or pens, and opportunity would be given them to scatter their eggs here and there all along throughout the streams and other waters above, where nature had directed them to go.

Whilst there are many natural barriers to be found shutting off the ascent of fish, there are also innumerable artificial ones, which have been permitted to be built by man, such as mill-dams, sluices, \&c. Many of these are placed directly across the streams, and these are the principal causes which have brought about the great destruction of fish life which is now so sadly experienced throughout the country, and which so frequently calls forth the attention of the Fisheries Department by applications to erect fish-passes and other contrivances by which the remnant of the fish in many streams may be enabled to surmount these barriers and reach their spawning grounds to keep up their species.

Great ingenuity has been shown by inventing various kinds of appliances to give facilities to the fish by which they could surmount these natural and artificial barriers. In some cases the old original zig-zag fish-ladder in use for the past century stands supreme in many parts of the world, and has rendered great service both for introducing and maintaining fish life where it has been properly put up.

Besides the old ladder just referred to, later designs have been invented in Canada. One, known as Rogers' ladder, has been put in operation on some streams, and conflicting accounts are given regarding its proper working; and later Hockin's fish-pass has been patented, and whilst its simplicity of build and apparent utility bids fair to supersede all others, it has, nevertheless, not had sufficient trial to warrant perfection in its practical working to give authority to the Department to adopt it as the governmental fish-ladder which shall be applied to all places where such an improvement is required to advance the fisheries' interests throughout the country.

Artificial barriers, such as dams, may in the great majority of cases be found suitable to have built in or attached to them passes of the latter kinds, such as Roger's and Hockin's; but where natural barriers, such as waterfalls over rocky ledges, \&c., these ladders can not, as a rule, be applied, without great expense in blasting out a locality for the pass. In such cases the old zig-zag pass will still hold its place of superiority. If, perhaps, by some modification of the Roger's and Hockin's ladders they could be somewhat satisfactorilly applied below the barrier; but the main object of excellence over all others now claimed by these patentees is, that their location is in the pond above the dam, or other barrier to surmount.

In view of the great necessity that exist for establishing some one perfect fishIadder by the Department, which shall in all cases be erected wherever fish are prevented from passing up the river and other streams to spawn, by reason of mill-
dams or other obstructions. the undersigned would suggest that the Department should cause one of Hockin's fish-passes to be erected on some river, or other stream which the more important kinds of fish are known (or have been known) to pass up to breed, and at the head or outlet of such pass build a large cage, or trap, into which all fish ascending the ladder niust enter, and become impounded until liberated-such pen and ladder to be placed under the special guardianship of some competent and trustworthy person during the period in which fish are on their migration. In this way; if the ladder shall prove its utility and efficiency for carrying fish over the dam, the fish so passing through the ladder must also enter the cage or pen at its head.

In this way the question will be practically solved regarding the efficiency of the pass, and in this way the Department could come to a satisfactory conclusion that the money granted for erecting fish-passes over dams, \&c., was properly spent; and that facilities were at hand by which many rivers and streams now almost barren of fish, in which they were formerly plentiful, could be made again reproductive.

The undersigned has been instructed on several occasions to visit and inspect certain fish-ladders in different parts of the country, and in every case has found them to be perfectly useless, either from unsuitability of location or want of proper construction, the consequence of which has been that these passes, which cost considerable sums of money to help sustain the fisheries of the locality, acted the reverse way, by giving greater facilities to persons to kill the fish at the entrance of these passes, and by squandering the money in the construction of them-thus showing the necessity that exists for adopting the most perfect fish-ladder now known, and compelling the owners of mill-dams to put in these passes, under the requirements of the Fisheries Act, sec. 13. This want of a duly authorised fishladder, and the delay in having an efficient one put in every mill dam or slide or other obstruction in all of the streams of the country, is telling most severely against the keeping up of fish life by the natural as well as the artiticial methods of reproduction.

In connection with these remarks on the fish-ladder subject, I beg to append the following as being quite pertinent:-

## HOCKIN'S NFW FISH-WAY.

One of the problems which has oceupied attention for some time has been that of reconciling the use of the water power of the country with the fisheries interest. Mill-dams across a river are no doubt a necessity, but at the same time if anadromous fish-that is, fish which live in the salt water but spawn in the fresh water-cannot have access to their spawning grounds, in a very short time they become extinct in the rivel, and the coast fisheries in the country are thereby materially affected, for to quote the late Professor Baird, the eninent ichthyologist :
"It is well known that while anadromous fish were present on the rivers there was an ample supply of cod, haddock, halibut, hake and various other species close into the shore, for the reason that these fish feed upon and therefore follow anadromous fish as they come upon our shores for the purpose of ascending the rivers. And again, when the fish have spawned in the rivers and lakes and, the young fish reached a certain stage of development, they descend the rivers in immense numbers and are fed upou by deep-sea fish."

There can be no reasonable question that the great decrease in numbers of anadromons fish has been cansed in large part by human agencies-(mill-dams, sawdust in rivers, destruction of the tish while in the rivers to spawn)-and that to this fact it is owing that year by year the location of deep-sea fish it is found further and further from the shore."

It will be seen, therefore, that any contrivance which would enable the water 1 ower of the country to be used, and at the same time afford free access of fish to their spawning grounds, mast greatly add to the wealth of the country. Efforts in this direction have been made, with some degree of success, by means of an inclined plane to enable a fish to get over a dam. The most elaborate of these structures is that of the United States Commissioner of Fisheries, Marshall McDonald. This, however, cost a large sum to build. The Rogers' fish-pass, which has been used by the Department of Fisheries for some years, is constructed on this principle, and there are several others. We give a cut of a recent invention by Robert Hockin, ex-M.P.P., of Pictou, Inspector of Fisheries for eastern Nova Scotia, which has been patented in Canada and the United States, and application has been made for a patent in Great Britain and the continent, the simplicity and apparent practicability of which will probably lead to its supplanting all other systems. It is constructed of a series of successive compartments, formed by longitudinal side walls and subdivided transversely by partitions-(y) forming compartments ( $h$ ) and provided with a floor ( $j$ ). Che partitions $(g)$ have each and aperture ( $k$ ) near or at the bottom, and preferably in line with one another, and with a like aperture $(j)$ in the dam $(a)$, so that all the water fed to the compartments will pass through the aperture in the dam into the first compartment and thence into the several compartments successively. The water from natural causes diminishing step by step in each of the compartments, and finally flowing out of the last com-
partment into the river below, under a head of 18 inches or 2 feet, and therefore with a velocity so reduced that fish can easily contend against it, swim into the comparment, and thence through the several compartments into the dam above. A fisn-way built on this principle 28 feet long will overcome a head of water which wonld reguire a pass 80 or 90 feet, built on the incline plane principle, while the great lengtis of the latter and the fact of its being near the surface renders it very liable to be destroyed by ice. A Hockin pass built inside of a dam, from the bottom upwards, does not present any hold for the ice. Again, incline plane passes, being fed from the surface, are liable to be choked with floating debris, and are subject to frequent changes in the height of water in the dam, requiring attention to open gates to suit the height. The Hockin pass being fed from under the surface is not liable to be choked, and is always supplied with a sufficient quantity of water. As a matter of fact, it has been found that the quantity of water vented by this fish-way is so little that its loss is not felt by the mill-owner. The Department of Fisheries have caused several of these fish-ways to be built, the one in Cumminger's dam, Melrose, Guysboro, being the first or experimental pass. The fishery officer in charge, Thomas McKeen, says: "I regard this as a perfect fishway, almost equal to the natural stream." One has been put in the dam at Tidnish, Cumberland County, known as Doyle's. The owner of the dam says the fish-way is a great success and has met with general approval. We have examined an excellent working model, and were struck with the simplicity and apparent efficiency of the invention. It may be explained that the cut is only for the purpose of illustrating the principle. Fish-ways are set within the dam with the outlet into the river below.

Note.-Plates of Hockin's tish-way will be found at pape 16 of part I of the supplement to the report of the Department of Fisheries.

## 9.-RESULTS FROM ARTIFICIAL FISH CULTURE.

## (From Officer Sheasgreen's Report, with evidences of successes of Salmon Culture from the Miramichi River Hatchery.)

In order to show that this institution is regarded as a benefit by all the fish dealers, and by the greater part of the net fishermen themselves, who were at one time the most sceptical, I will submit the following opinion expressed by these men:

John Betts, Esq., a fish dealer and shipper at Derby, South-West Miramichi, who owns and controls several sets of nets on that branch of the river, says:-
"I am a firm believer in the method of breeding fish by artificial means. I have now been in the salmon fishery business for quite a number of years, and I maintain, through my experience, that artificial breeding for the past eight years has been the means of sustaining the life in our fishing industry on the Miramichi. It is my belief that the theory which some adsance, viz., that the different runs of fish which enter our river belong to diffrent species is sheer nonsense. It is certain that we have different runs of fish during the autumn, but all belong to the one species, for where is the person who can state that ever a bright salmon was met with during the spawning season. The catch of fish on this river during the past three or four seasons does not show the slightest signs of decreasing, which, considering the enormous strain that is year by year put upon our waters, speaks very favourably for artificial breeding, as any sane man who is acquainted with the habits of parent salmon when depositing their ova cannot maintain that it is by natural means only the enormous demand is year after year supplied."

The Honourable Michael Adams, one of our best fly-fishermen, says: "Salmon were plentiful this season. If it were not for the benefits derived from the fish hatchery the salmon would now be nearly exterminated in our streams."

Jared Tozer, Esq., of the firm of Tozer \& McDonald, fish dealers, says: "If it were not for the large numbers of fry that are yearly planted in our rivers from the hatchery the supply of fish would now be nearly exhausted. The catch of salmon by our nets this past season was good."

John McColm, another fisherman and dealer of North Esk on the North-West Miramichi, says: "Without the assistance received from the successful working of' the salmon hatchery which the Government has placed upon our river salmon fishing would have been a total failure long before this time, instead of which we find that this industry is as remunerative as it was twenty years ago. At that time not one-fourth the nets and traps were in use as at the present day, still, the average number of fish taken by each net is greater, althougth the lower part of the river and bay is literally blocked with netting. Artificial breeding is the only means of supplying the demand that is made upon these rivers every season."

John Fergus, fly-fisherman, says: "Artificial breeding of salmon is a great benefit towards keeping up the supply of this important fish."

Park Gillis, a tide-head fisherman, says: "Artificial fish hatching is beyond any doubt the means of keeping up the supply. The catch of salmon in this vicinity is good each scason; and when it is considered how the river is obstructed with nets along the lower parts, one would think it almost impossible for fish to reach this point at all. This shows that they must be plentiful in the river."

Many more opinions similiar to the above could be here inserted but as they all agree in saying artificial hatching is a benefit, and that salmon are plentiful, it is useless to do so. It will be noticed that John Bells, Esq., comments upon the theory advanced by some concerning the different "runs" of fish. He therein contradicts the statemente of some persons, who cannot deny but that a large number of fry are annually turned out from this hatchery, but who still circulate these statements simply to injure the reputation of the institution among the unthinking fishermen. However. in a very short time all these misleading theories must fall to the ground, as the good results are too evident to be denied by any fair-minded man. The animosity andill-feeling which extended against establishments of this kind when first instituted have gradually worn away, until at the present time, only the dissenting voices of a few old sceptics, who will never be converted to any modern idea, are to be heard; but the great majority of the fishermen, fish-dealers and others interested in the fishing business are in farour of the artificial work, plainly seeing that it is impossible for the natural means to keep up the supply with the demands now made upon it.

In order to show what a large number of salmon are taken in this river during one season, let us take Mr. Jared Tozer's nets for example-the north four sets in this vicinity, from which he has taken over 1,000 salmon. This number of nets occupy about two miles of the river. It shows an average of 250 fish to each net. It must be borve in mind that these are short river sets. What an enormous quantity of fish must be taken in the lower 30 miles of the river and bay, where the nets are twice and sometimes nearly three times as long and where nearly double the number of fish will be taken from each net; and still after all this destruction the fish are very plentiful in the upper parts of the river, where fly fishing was also unequalled during the past season. This certainly shows that salmon are abundant in these waters, and points most conclusively to the fact that artificial breeding is the remedy which has restored the almost depleted state of the waters of this river, in which they were a few years ago, and should place the great benefits which are already derived from this institution beyond doubt in the minds of thinking men.
"St. John, N.B., 10th December, 1890.
successful results of transplanting Restigouche salmon fry into the Nipisiquit and miramichi rivers:
"Alexander Mowat, Esq.,
"Officer in charge Restigouche Hatchery, "Campbellton, N.B.
"Dear Sir,-In reply to your favor of the 8th inst., enquiring ' If you have received any benefit from the planting of Restigouche fry in your river for the past number of years?' I have to state, that since the planting of Restigouche fry in the Nepisiquit River, in 1883, I have on several occasions observed that a very considerable number of the grilse were undoubtedly of the Restigouche kind, and distinct from the native Nepisiquit grilse; and I have, as a consequence, expected them to be followed in due season by a large number of salmon of the Restigouche type. In this expectation I have been disappointed, having only observed a small number of the salmon that were not of the true Nepisiquit type. I attribute the cause of the absence of a fair return to the Nepisiquit of full grown salmon from the planting of the Restigouche fry, to the fact that the fish, being large, are impounded in the traps, pounds and bag-nets so extensively used down the coast; while some of the smalier Nepisiquit salmon get through the nets and come on to the river. When a Restigouche salmon bound for the Nepisiquit gets there it is early in the season,
before the salmon beach nets are set or when they are disordered by rough weather.
"This year, early in the season, $I$, and my friend fishing with me, killed six large Restigouche salmon at the Paveneau Falls of the Nepisiquit, but saw none later on.

I may here mention that except as provided in 1883, I have always been opposed to the manner in which the fry have been planted, for lack of proper facilities for wide distribution of the contents of each can of the young fish in well chosen parts, of the river, instead of being dumped from the contents of the cans ' $e n$ masse,' cart load after cart load, where the highway chanced to come near the river.
"I am assured that the gentleman riparian owners, and lessees of the fly fishing of the Nepisiquit River, will fully contribute towards the cost of any well defined and practical plan for the receptiou, detention and feeding of the young fry through the first season, until they can better take care of themselves.

> "Your’s truly,

(From Officer Alexander Mowat's Report.)<br>Camp Adams, Newcastle, N.B., Main North-West, 2nd July, 1890.

My Dear Mr. Mowat,-Thanks. Your young salmon fry arrived in fine condition and were carefully placed in pools. We are experiencing the results this season. Already we have captured seven of your fish 17-18 lbs., and yesterday one by Mr. Brown, of Colorado, 23 lbs.- the largest fish yet caught at Camp Adams. This person was more than rejoiced, and carries him home as a trophy of victory. I wonder how long it would have taken to convince certain sceptics that we could solve this problem in so short a time. Our catch since 19th, June to date, 33 salmon, 32 trout. Touching the latter, we only count tront weighing over 3 lbs.

Your most respectfully,
M. ADAMS.
the succesful stocking of the hudson river with "salmo salar," where they HAVE NOT BEEN KNOWN FOR THE PAST CENTURY.

## The " Forest and Stream."

"Salmon in the Hudson River had been noted by scores this season. A fish-way have been put into the the dam, and the fish are going over that obstruction in large numbers. The stocking of the Hudson with salmon may now be regarded as an established fact, or at least as a enterprise for which success can with excellent reason be promised. There are other dams, and falls yet to be provided for with fish-ways, and now that the above results are shown it would be only folly to postpone the task. The Hudson as a salmon rever is destined to be famous."

## From "Fishing and Shooting."

"The idea of stocking the Hudson River with salmon originated with Mr. Fred Mather, who made the suggestion to the late Prof. Baird, who was then United States Fish Commissioner, and the first eggs were hatched and fry planted in 1882. The State made an appropriation for building fish'ways with dams at Mechanicsville and Fort Miller, and these fish-ways are being built. The following is related with regard to salmon in the Hudson in July, 1890 :-
"The gates of the Hudson River Power and Pulp Company were opened to drain down the water, so that it would not flow over the dam during the progress of putting in a fish-way in the 16 -foot stone dam across the Hudson River, and over one hundred salmon were counted in the shoal water thus created ar its base as they retreated back into greater depths. They were from 1 to 3 feet in length, and
probably averaged from 5 to 8 pounds in weight. The largest salmon caught here this season by angling measured $30 \frac{1}{2}$ inches, and weighed 22 lbs .7 ozs . The fish-way is now under construction; when completed it will allow the salmon to pass the river to the shoals and tributaries they seek for spawning purposes. $* * *$ These fish are all the results from the placing of salmon fry on the Hudson, commenced eight years ago by Col. Fred. Mather, from the United States Hatchery, Cold Springs; L. I., at the request of N. Cheney, Esq., angling editor of Shooting and Fishing Journal.

## RESULTS OF ARTIFICIAL WHITE FISH CULTURE.

(From the Report of the State Commissioners of Fisherics for Pennsylvanio, U.S.A.)


#### Abstract

The people realize that fish propagation is no longer an experiment. Hundreds of depleted trout streams now restored to good condition and filled with fish attest the suceess of restocking.

The increase in the catch of shad in the two great rivers of the commonwealth, the Susquhanna and Delaware, bears witness to the beneficial results of the artificial propagation of this delicious fish, and indicates a future plentiful supply that will cheapen its price to ail.

Nor must we forget the wonderful increase in the catch of white fish in Lake Erie, where as late as the year 1885, the supply was so nearly exhausted that the fishermen most largely engaged hesitated to embark in an enterprise that promised but scant and profitless returns. This result is directly traceable to the great plants of fry in that Lake by the hatcheries of Pennsylvania and those of the neighbouring States bordering on the lake.

The yield of white fish in Lake Erie during the past season has been greater than the yield of any season for the past twenty years, and larger than the combined catch of all the other great lakes, and brought to our city of Erie alone a return of over three hundred thousand dollars.

Fourteen million six hundred thousand ( $14,600,000$ ) white fish fry, and all distributed in good condition, from two to six miles from the shore in Lake Erie. The white fish hatcheries established by the States of Michigan, Ohio and Pennsylvania, with that of the United States Commission, have effected a revolution in the fishing industries of this lake. It will be noticed that the catch of whitefish was very largely in excess of the catch of 1886, which only amounted to 61,500 pounds, as stated in the last biemial report of the Commission. The catch of 1888 amounted to $2,200,000$ pounds.

Note.-By Mr. Wilmot--It may be here stated that the year in which, the $14,600,000$ fry were put out from the Erie hatchery, $56,000,000$ whitefish fry were put in the waters of Lake Erie from the Canadian hatchery at Sandwich, Ont., and that previous to that year $248,650,000$ fry were also planted in the waters of Lake Erie froma the Canadian nursery, and if the output of the years since be added, there will be shown a grand total of $377,775,000$ whitefish fry turned out from this one Canadian hatchery.

The above report for the year 1890 is respectfully submitted.


> SAMUEL WILMOT, Superintendent of Fish Culture for Canada.

## FISH CULTURE 1890.

## ATPENDICES.

## REPORTS FROM THE SEVERAL OFFICERS IN CHARGE OF FISHBREEDING ESTABLISHMENTS IN THE SEVERAL PROVINCES OF CANADA FOR 1890.

## 1.-FRASER RIVER HATCHERL.

## Province of Rritish Columbia.

Report of the officer in charge of the fraser river hatchery for 1890.
I have the honour to submit my seventh annual report of this hatchery, together with a statement of the fry distributed and eggs collected in 1890.

From the supply of eggs collected in 1889, consisting of $9,233,000$, the following numbers of fry and semi hatched ova were distributed on the dates and at the places below named:-

| December 17, 1889,—Eyed ova, Nanaimo River, Vancouver's Island, near waggon bridge. | 500,000 |
| :---: | :---: |
| December 25, 1889, -Cowichan River, above railroad bridge. | 500,000 |
| February 4 1890,-,Sent to experimental hatchery, Ottawa | 100,000 |
| March 5, 1890,-Fry in Pitt Lake, half-way up north side | 800,000 |
| March 27, 1890,-Coquitlam River, below C. P. R. bridge | $3 \div 0,000$ |
| Mareh 31, 1890,-Pitt River, head of lake. | 480,000 |
| April 7, 1890,-Stave River, $1 \frac{1}{2}$ miles up. | 640,000 |
| do 9, 1890,-Harrison River, at foot of rapids....... | 1,040,000 |
| do 11, 1890- do do | 1,120,000 |
| do 17, 1890-Nicomekle River, Surroy........ ........ | 60,000 |
| do 19, 1890-Pitt Lake, half-way up on south side,... | 570,000 |
| do 21, 1890--Sumas River, near the mouth. .......... | 510.000 |
| Total. | 6,640,000 |

All of the above were obtained from fish which were caught in traps at the mouth of Morris Creek, where it flows into the Morris Lake.

There were not any eggs or fry received here from any other batchery in the Dominion; but 100,000 eggs of the (O. Nerka) "Suckeye" were sent on the 4th of February to the experimental hatchery at Ottawa, which I learn reached in grod condition.

The ova which supplied the above number of fry were all obtained from one species (O. Nerka) or "Suckeye," which are the principal commercial fish now caught in the waters of British Columbia.

Capture of Parent Fish and Collection of Ova.
There was no memorandum kept of the number of fish caught in the trap or with the drift nets this season, or of those that were stripped; but, as usual, the number was very large.

It is almost impossible to keep a record of the small salmon passing through the trap without a salmon register; And if the Department constructs the new pen which I bave suggested, I would recommend having a register put in it.

Owing to the lateness of commencing operations this season the majority of the "Suckeye" salmon had ascended the Morris Creek before we could set our traps, and a few days after we got them in an exceptionally heavy of rain commenced, which lasted for ten days, raising the stream, overflowing its banks and carrying with it large quantities of logs and rubbish, that tore away the pens and allowed all the fish that had been captured to escape. From this misfortune, therefore, we only secured $1,000,600$ eggs, where in previous seasons we obtained our full supply.

As the best of the season was then passed, and the fish had all gone out of the lake into the mountain streams beyond our reach, we had to resort to drift-net fishing on the Harrison River rapids to secure a supply, which was found to be a slow and expensive method. The fish captured with the gill-nets were unsatisfactory, as many of the females were found to be spent, or partially so, whilst others had to be kept for ten or fifteen days before they matured, during which time a large number sickened and died, owing to the rough method of capture by gill-nets and continement in the retaining pens. We left the hatchery, to commence spawning operations, on the 10th of October, and finished on the 18th of November, securing in all $3,861,000$ eggs, all of the Nerka or "Suckeye" species.

## Condition of the Hatchery.

The hatchery is in good condition, the eggs are doing much better than in previous seasons, the rate of mortality among the ova is much less, and they are all looking very healthy. Upon their arrival at the hatchery they were immediately put in the wire hatching baskets, and distributed thinly, so that the supply would extend over the entire building. This, together with the careful stripping of fish at the spawning grounds, which was done entirely by myself and only one assistant, and by increasing the supply of water by the erection of a new flume, has been the principal cause of the present success.

## Repairs.

The hatchery should have an entire coat of paint outside, and the walls whitewashed in the hatching room. The walls of the dwelling portion should be painted and a new kitchen floor laid. The total cost would be about $\$ 300$.

I think it inadvisable to expend more money to increase the capacity of the present hatchery, as I am satisfied that in a very short time the Province will require another and much larger hatchery, with a capacity of putting out $25,000,000$ of fry annually, in order to replenish the Fraser and other waters, which are bound in the near future to be reduced in their salmon yield, on account of the enormous quantity which are being caught each season.

Such a hatchery could be now built on the Morris Creek on Harrison River, with but little more expense than for the erection of the present one six years ago.

The good result from the present hatchery has now been clearly proven from the past two seasons' cnormous runs of fish in the Fraser River.

The small streams around the Harrison, and other places where the fry have been distributed, were quite as thickly crowded with salmon as iast year, while the fishery guardians and others on the Nanaimo and Cowichan Rivers inform me that the "Suckeye" salmon are appearing each season in increasing numbers.

I have the honour to be, Sir,
Your obedient servant,
THOS. MOWAT,
Officer in Charge.

## 2.-SYDNEY HATCHERI.

## Provinge of Nova Scotia.

## REPORT OF THE OFFICER IN CHARGE OF TIE SYDNEY HATCHERY FOR 1890.

Sir,-I have the honour to submit herewith my annual report upon the work done at this hatchery during the past year.

## Distribution of Fry.

As stated in former reports, I laid down in the hatchirg troughs 2,540,000 ova, from which $1,953,000$ fry were hatched and distributed in the following streams, viz. :-

| Margaree River (Inverness Co.) | 200,000 |
| :---: | :---: |
| Benacadia do (Cape Breton Co.) | 50,000 |
| Sydney do do | 350,000 |
| Ball's Creek do | 100,000 |
| Trout Brook do | 150,000 |
| Black do do | 100,000 |
| Grand Lake do | 100,000 |
| Estrasonia River do | 70,000 |
| Salmon do do | 100,000 |
| George's do do | 100,000 |
| Leitche's Creek do do | 50,000 |
| McLean's Brook do | 75,000 |
| Rory Brack's Brook do | 75,000 |
| Baddeek River (Victoria Co.) | 150,000 |
| Middle do do | 150,000 |
| Grand do (Richmond Co.) | 50,000 |
| Tier do do | 50,000 |
| Hatchery Brook (Cape Breton Co.) | 33,000 |
| Total. | ,953,000 |

I regret not having been able to attend to the application for fry for the Mabou River. The application came too late, and to attend to it would upset all other arrangements. The application called for $1,000,000 \mathrm{fry}$, which was more than half my supply. I presume it meant 100,000 , which I think would be sufficient for that river. Hereafter, I will make an allowance for that river of 50,000 or 100,000 fry.

## Collecting Parent Salmon and Eggs.

This fall I succeeded in securing a fair supply of parent salmon. These were kept in good condition at the several fishing stations till ready to spawn. The following table will show the number of salmon caught, and the streams in which they were taken :-

| Name of River. | Females. | Males. | Total. | No. of Ova. |
| :---: | :---: | :---: | :---: | :---: |
| Margaree | 20 | 10 | 30 | 100,000 |
| Margaree Big Inlet | 1 | 2 | 3 | 20,000 |
| Lower Middle River | 14 | 16 | 30 | 60,000 |
| Upper Middle River | 127 | 103 | 230 | (600, 000 |
| Sydney River... | 53 | 39 | 92 | 318,000 |
| Salmon River.... | 27 | 2.5 | 52 | 120,000 |
| Total | 342 | 195 | 437 | 1,218,000 |

This was a most unfavourable season for the catching of parent fish. In the early part of the season the rivers were very low, and salmon could not ascend, although they were reported as unusually plentiful in the tidal waters during the month of September. Then, during the month of October it rained heavily and continuously, so that it was impossible to work the nets. This is particularly true of the Margaree River. Salmon were reported very plenty in the Margaree, but could not be taken. In the Upper Middle River, where nets could be worked, some days the catch was above the average. The few days that nets could be handled in the Sydney River the catch was better than ever before. In all the rivers operated on the salmon were more plentiful than for some years back, but for the reason of the heavy rains we could not catch them.

## Condition of the Hatchery.

The present condition of the hatchery is good. This fall the floor and bottom work of the building was found to be in such bad condition that it could not be repaired. All the bottom work had to be taken out and replaced by new material, which necessitated considerable labour and expense. New sills, trimmers, joice and floor had to be put in; also, the posts were considerably decayed, and had to be cut, up as high as the window sills. On one side new rough boards had to be put on outside and inside 3 feet high, and the same shingled on the outside and the inside wainscotted. The building is good now for eight or ten years more without any further repairs. It will, however, require painting, which will cost about $\$ 80$ for the outside and $\$ 40$ for the hatching room inside.

## Increase of Salmon.

The beneficial results arising from the operations of this hatchery are becoming more apparent every year. The early run of salmon in the Mira River this season was far above the average. The few fishermen there, though poorly equipped, did better than for years past. Mr. Robertson, while engaged in building a bridge on the Sydney Kiver, reports having seen more salmon sporting around there than ever before; so much so, he says, that some of the inhabitants decided to furnish themselves with nets for the coming season. Mr. Grantymire, of Little Bras d'Or River, reports having seen shoals of salmon of a very small and uniform size, and in numbers never seen there before. Mr. George Munroe reports the same of the Margaree River, having seen them on several occasions about the Margaree Harbour bridge. Mr . John Brown, at Big Pond Cranberry (entrance of the Sydney River) took 75 salmon in three days, all weighing from 9 to 11 lbs ., and in the one week scored 100. I am informed that the Mira fishermen are very poorly equipped, some of them fishing with only the half of an old net, none of them having anything like proper gear. This is true of many of our salmon fishermen, but I understand they are to prepare themselves better for the coming season. The work of this hatchery is only beginning to show itself. Some men are very slow in giving eredit to an institution of this kind, especially when they look upon it as experimental. Most of these men never heard of fish culture till this establishment was built, and look upon it as robbing nature of its work.

Land-locked salmon could be very suitably planted in some of our lakes. There is a chain of lakes near Margaree, called Lake Law, which I think would be most suitable for them. Several gentlemen from the States, who are thoroughly acquainted with the habits and requirement of these fish, pronounce these lakes suitable. At present these lakes are practically useless, as far as yielding any kind of fish is concerned. If stocked with land-locked salmon they would become of great value.

I have the honour to be, Sir,
Your obedient servant,
C. A. FARQUHARSON.

Officer in Charge.

## 3.-BEDFORD HATCHERY.

## Province of Nova Scotia.

## REPORT OF THE OFFICER IN CHARGE OF THE BEDFORD HATCHERY.

Sir, - I have the honour to transmit my report upon the operations at this hatchery during the past year.

I am pleased to be able to inform you that the most gratifying results were obtained in hatching the large stock of ova laid down in the troughs of this institution last season. The trouble experienced in previous years in hatching the salmon trout ova was not met with, and not only here at the central hatchery, but at all the outlying auxiliary hatcheries, the proportions hatched were very satisfactory indeed.

As stated in my last report, the number of salmon ova obtained last season was $2,000,000$. In March last I received from the Ontario hatcheries a further supply of 400,000 salmon trout and $2,000,000$ whitefish ova. Shortly after their arrival here mild and open weather set in, and as evidences of hatching began to appear, I deemed it advisable to convey those intended for remote points to the smaller hatcheries as early as possible.

This work I commenced on the 15th of March, and the semi-hatched ova were distributed amongst these hatcheries, as follows:-

|  | Salmon Tront. | Salmon. |
| :---: | :---: | :---: |
| Tusket Hatchery | 40,000 | 70,000 |
| Kempt do | 50,000 | 150,000 |
| Shelbarne do | 50,000 | 90,000 |
| Lochaber do | 40,000 | 110,000 |
| Kentville do | 60,000 |  |
| Sheet Harbor Hat |  | 120,000 |

making a total of 240,000 salmon trout and 580,000 salmon ova disposed of previous to the first of April.

As stated above, the most satisfactory success attended the hatching of the ova deposited in these hatcheries-with one exception, that at Shelburne, where considerable loss took place.

After the distribution of the semi-hatched ova, as above, I had still left 130,000 salmon trout, 900,400 salmon and $2,000,000$ whitefish ova. The latter hatched early, and were distributed among lakes adjacent to the hatchery, as follows:-

| Round | Lake | Annapol | Cou | 250,000 |
| :---: | :---: | :---: | :---: | :---: |
| Aylesford | do | Kings | do | 250,000 |
| Grand | do | Halifax | do | 500,000 |
| Sandy | do | do | do | 500,000 |
| Williams' | do | do | do | 300,000 |

making a total of $2,000,000$ of these young fish planted in lakes considered most favourable for their growth.

The remaining stock of salmon and salmon trout were successfully hatched and planted in the rivers of the central portions of this Province, as per following schedule:-


| Middle | River, | Picton | County. |  | 40,000 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Gaspereau | do | King's | do |  | 40,000 |
| Cornwallis | do | do | do | ....... | 40,000 |
| La Have | do | Lanenburg | do |  | 40,000 |
| Gold | do | do | do |  | 20,000 |
| Middle | do | do | do |  | 20,000 |
| East | do | do | do |  | 40,000 |
| Annapolis | do | Annapolis | do |  | 40,000 |
| Round Hill | do | do | do |  | 20,000 |
| Bear | do | Digby | do |  | 40,000 |
| Kennitcook | do | Hants | do |  | 40.000 |
| Tantramar | do | Westmoreland | do | N. B. | 40,000 |
|  | Total. |  |  |  | 900,000 |

Total Distribution from Bedford Hatchery, 1890.

| Salmon trout fry............................................. 130,000 |  |  |
| :---: | :---: | :---: |
|  |  |  |

Whitefish fry
2,000,000

| Eyed ova | ent to | Kempt........ | Sal. Trout. 50,000 | Saluon. 150,000 | ...... | 200,000 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |
| do | do | Shellburne .... | 50,000 | 90,000 | ...... | 140,000 |
| do | do | Tusket........ | 40,000 | 70,000 | ..... | 110,000 |
| do | do | Lochaber..... | 40,000 | 150,000 | ..... | 190,000 |
| do | do | Kentville | 60,000 |  | ..... | 60,000 |
| do | do | Sheet Harbor |  | 120,000 | ..... | 120,000 |
| Grand total. |  |  | ... .. .................... 3, 850,000 |  |  |  |

Throughout the whole of this distribution the most perfect success was met with, no loss whatever having occurred, notwithstanding, in some instances, long and tedious journeys over abominable roads were undertaken in order to reach the most suitable points on the rivers at which to deposit the young fry.

It will be seen that this distribution extended over the whole of this Province proper, and that every river considered suitable for stocking and could be reached with safety to the young fry received its quota.

The subsidiary hatcheries, of which there are now six in this Province, enable me to reach the most remote points, and many excellent rivers that formerly were beyond my scope are now receiving substantial aid from these points. Further, numerous lakes, quite in the interior, and far removed from all railway or steam communication, are being stocked with large numbers of salmon trout and whitefish. The wisdom of this attempt on the part of your Department to introduce these fish into the lakes of this Province, with the view of endeavouring to create an extensive inland fishery, is being gratefully received and acknowledged by all who are at all interested, or give the matter due consideration; and their contidence in the results of the experiment is shown by the increasing demands for these fish with which to stock the lakes in different localities. Fortunately, these demands can be complied with, as the full hatching capacity of this hatchery, or of the auxiliary hatcheries, has not yet been reached, and without reducing the plantings in those lakes already upon my list (which is not at all advisable). other waters can be embraced, by the addition of more small hatcheries, and the receipt of larger shipments of these ova from the Ontario nurseries in future.

The erection of some additional small hatcheries in the counties of Lunenburg, Guysboro', Digby, Annapolis, and the erection of a more permanent one at Sbelburne,
in lieu of the temporary appliance used there last season, would extend the field of operations from this hatchery very materially, and would enable me to reach some very fine streams and lakes in those counties.

I may be permitted to say that the work of artificial fish-culture, as prosecuted in this Province, and although very satisfactory results have already been produced by it, is on too limited a scale to sufficiently affect and further materially the increase of fish.

There can be no doubt existing in the mind of any unprejudiced person who has studied the salmon fishery statistics for the last twenty years that our present supply of salmon is largely maintained through artificial culture. The continual decline in that fishery from 1870 to 1881 shows that unaided the natural production of salmon was insufficient to prevent the continuous decline in the annual catch, and it is also apparent that had no means been introduced to augment the production of young fry that this gradual depletion would have continued until the supply was entirely exhausted.

The beneficial effects of fish-culture began to appear in 1882, and, as is shown by the returns, a constantly increasing catch is reported up to 1887, since which date no further increase has taken place. This may be considered as an evidence that, with the present hatching and producing capacity of the appliances now in use in this Province, the full capacity of our hatchery has been reached, and that without additional efforts are put forth and more hatcheries erected no particular increase in the present annual catch can be expected.

## Collection of Ova.

In undertaking this part of my work this season, and guided by my experience of past years, I decided to utilize the Musquodoboit River, in Halifax County, and the West River, in Pictou County, and applied to your Department for permission to do so. On the Musquodoboit River I had in part the necessary appliances for prosecuting the work, and my experience of past years on that stream led me to expect a good catch of spawning fish; but unfortunately for me, heavy freshets set in in August, and enabled the greater portion of the run to enter the river at that time, and previous to my commencing operations.

It has been my practice to commence fishing on this stream each year on or about the 1st of September, and when favourable conditions were met with large catches were made. This season the conditions were unfavourable, and resulted in securing but 57 salmon, as against a catch last year of 270 .

On the West River, also, unfavourable conditions were experienced, and the catch was but 10 fish, as against 67 last year.

An attempt was made to secure a portion of my supply from Wallace River, and very good success was obtained in securing the spawning fish; but unfortunately, through the acts of some interested persons living upon this river, I was not permitted to collect the ova. The fish were caught at and below Rhinduss' dam, which crosses this river at the head of tide, and were retained in a tank or creel moored in the pond. In this tank were confined 54 of the largest salmon I have ever taken in this Province, and from which I expected to secure 500,000 ova. The particulars of the raid made upon the works, and the destruction of the appliances, and carrying away of the fish, having been already reported to the Department, it will be unnecessary to repeat them here. The loss of these fish occurred at the eud of the fishing season, and I was consequently unable to make good this loss by further fishing.

The result of my efforts to obtain a stock of ova for this season's operations was most ansatisfactory and discouraging, and leads me to the conclusion that some more certain means must be adopted in future for this purpose. Whatever system may be introduced, its most essential principle must be the prosecution of the work on such a basis that it will no longer be subject to the ignorant prejudices and depredations of the fishermen living along the streams upon which we operate. But two plans present themselves to me at present-either buy the fish from the net

$$
8 a-1 \frac{1}{2} *
$$

fishermen during the lawful fishing season, and construct salt-water ponds in which to confine them until ready to spawn, or locate the works on streams upon which there are no inhabitants above the head of tide.

As this question will be the subject of correspondence with your Department during the present season, it will be unnecessary to further allude to it now. The number of fish secured and ova obtained was as follows :-

Ovit Obtained.

making a total of 48 males and 73 females, from which I obtained 400,000 ova. This constitutes the full extent of the stock, and is not one-fourth of the capacity of the hatching troughs. I trust the deficiency may be made up by the receipt of a large supply of salmon trout and whitefish from the Ontario hatcheries.

## Water Supply.

Since the change in the arrangement of the hatchery troughs in this hatchery and the substitution of 32 trougns placed transversely in the building for the 14 troughs placed lengthwise, the water supply has been quite inadequate for the hatching and nursing of a large stock of ova. Representations to this effect having been made to your Department, I was permitted during the past season to replace the old 6 -inch pipe by one of 8 -inch, and now have an abundant supply of water.

## Repairs.

Some repairs of a light extent will be required next season. Some leaks in the roof are beginning to show themselves, and should be attended to at once, either by painting the shingles with two coats of some mineral paint, or patching. Painting, [ think, is preferable to patching, as the paint will preserve the shingles, and it is said it will make them last ten or twelve years longer. New eave-troughs will also be required, the old wooden ones being now very much decayed and broken away. Some decay is taking place in the foundation of the partition separating the hatching room from the dwelling rooms, and should be atteded to next summer. These repairs, with painting the interior of the hatching room, is about all the expenditure required this year.

I have the honour to be, Sir,
Your obedient servant,

A. B. WILMOT.<br>Officer in Charge.

Dunk River hatchery, P. E. Island, was not in operation in 1890.

## 5.-ST. JOHN RIVER HATCHERY.

## Province of New Brunswick.

report of the officer in charge of the st. john river hatchery, 1890.
Sir,-I have the bonour to transmit herewith my report in connection with the operations at the St. John River hatchery for the year 1890.

In the fall of 1889 there were no native fish ova laid down in this house, as the attempt to capture parent salmon on the Tobique River proved a complete failure; neither has there been any fish eggs laid down this season. No effort was made to gather them, although there was a fair prospect of getting quite a number of fish, if it had been so desired. The run of salmon on the Tobique was fairly good; the lessees had them well protected ; ten special guardians were employed all summer,
besides a head warden, who looked strictly after them, in order to guard the river day and night. By this means a number of salmon reached the spawning grounds-but under the most favourable circumstances the chances of getting a supply of salmon eggs on the Tobique or Serpentine Rivers to stock this house are very uncertain and unreliable.

In the month of March last I received from the Neweastle and Sandwich hatcheries, Ontario, per Mr. Charles Wilmot, a consignment of whitefish and salmon trout eggs in a semi hatched state, comprising about $1,500,000$ salmon trout, $2,000,000$ whitetish and 12,000 speckled trout; and later in the month I received 500,000 salmon eggs from the Restigouche, in charge of Mr. Alexander Mowat. They were all in good condition when received, and continued to do well during the remainder of the hatching season, and a fair percentage of young fry were turned out last spring and summer; asmall loss took place with the salmon trout. The loss of salmon, and whitefish, and speckled trout, were, comparatively speaking, very light. On the 9th of April last I commenced to distribute the whitetish, and on the 24th of July we finished putting out the salmon and salmon trout. It was a long and tedious operation, requiring care and diligence; but I am able to inform you that the work was done in a good and satisfactory manner, as the subjoined letters will show. Below is a tabulated statement of the several kinds of fish distributed, with the names of the different lakes, rivers, and streams, their locality, and the quantity planted in each, viz.:-

Whitefish.
Magaguadavic Lake, York Co...... ..................... . ...... 700,000
Harvey Lake, do ........ ............ ..... ....... 700,000
Oromocto Lake, do ....................... ............. 300,000
Lakeville, Carleton Co ............................................. 300,000

|  | 2,000,000 |
| :---: | :---: |
| Salmon Trout Fry. |  |
| Williamstown Lake, Carleton Co. | 60,000 |
| Jones Lake, Carleton County. | 120,000 |
| Oromocto Lake, York do | 120,000 |
| Harvey Lake, do do | 120,000 |
| Magaguadavic Lake, York County | 60.000 |
| Chamcook Lake, Charlotte do | 60,000 |
| Foster Lake, do do | 60,000 |
| Meadow Lake, Victoria do | 60,000 |
| Portage Lake, do do | 60,000 |
| Long Lake, do do | 60,000 |
| Frasers Pond, do do | 20,000 |
| Byrams Poud, do do | 40,000 |
| Several private parties, Victoria County | 60,000 |
| Turned out at Hatchery... | 100,000 |

$1,000,000$
Sea Salmon Fry. $\quad \stackrel{=}{=}=$
St. Croix River, Charlotte County............................... 132,000
Toby Guzzle, do do .............................. 72,000
Lake Utopea, do do .............................. 36,000
Magaguadavic River, York do .... ............................ 32,000
Tobique River, Victoria do ............................... 90,000
Salmon River do do ......... ....... ............. 60,000
St. John River do do ............................... 60,000

Speckled Trout Fry.

| Skiff Lake, York County. | 6,000 |
| :---: | :---: |
| Toby Guzzle do | 4,000 |
|  | 10,000 |

Recapitulation.

| Whitefish plan |  | $2,000,000$ |
| :---: | :---: | :---: |
| Sea salmon do | do | 482,000 |
| Salmon trout do | do | 1,000,000 |
| Speckled trout do | do | 10,000 |

Total number....................................... 3,492,000

In making the above distribution I took a different method of transporting them from the nursery from the one I fomerly pursued. Heretofore, we would start with eight or ten cans of fry at one time. This brought us in continual contact with the baggage-masters on the trains, on account of the great space we occupied, and then we could only make one trip every two or three days. The past season I sent one of my sons with six cans every morning, which was more acceptable to the train men; consequently, we got along more amicably, and by traveling in the night each messenger could start every second morning. By this plan six cans of fry were sent away every morning. This arrangement worked admirably, and gave one of us the opportunity of being daily in attendance to look after the hatchery and young fish.

## Repairs to Hatchery.

Before I got the fry all out the floor of the hatching room began to break down, and I found it necessary to secure the services of a carpenter to examine the floor and report what repairs be considered necessary to put the house in proper order. I reported to the Superintendent of Fish Calture the result of the examination, specifying the repairs required and the quantity of lumber needed, when I got orders to ask for tender. I did so, and the contract was awarded to Albert Dixon, who did the work to my entire satisfaction. Beyond this contract, other repairs were made. There are several other repairs that will have to be made next season, such as painting, whitewashing, and some little plastering, especially in the hatching room, office and hall. In all other respects the house is in good order.

It is very much to be regretted that the Department cannot arrive at some definite conclusion whereby this nursery can be supplied with salmon eggs every autumn, without depending upon the other hatcheries for a supply every year, especially when the facilities this hatchery has for the work are so great. It is fully equipped with all the necessary apparatus, with a good supply of pure water the whole year round, and having easy access to and from it by a railway station almost at the door. The whitefish and salmon trout hatched here are beginning to show up in some of our waters; some very fine specimens have been taken from some of the lakes the past year. Quite a quantity of very nice whitefish were caught in the Oromocto Lake the past autumn; this kind of fish was never known to inhabit that lake before. The residents there are unanimous in their opinion that they are the result of the whitefish fry planted in the lake about three years ago. Some nice salmon trout were taken in Chamcook, Skiff and Williamstown lakes, and there can be no doubt but that these fish are abondant in several of these lakes where I planted them three or four years ago, but many of the lakes are controlled by clubs, or private owners, and they will not allow any person to fish therein except with the fly, and it is a well-known fact that this class of fish cannot be taken that way. Some
have been caught by other parties in a surreptitious manner, but they will not willingly give any information about them, at least not publicly, A few parties were prosecuted for poaching in Chamcook Lake the past season.

I have the honour to be, Sir,
Your obedient servant,
CHAS. McCLUsKEY,
Officer in Charge.

## 6.-MIRAMICHI HATCHERY

Provinge of Nef Brunswici.
REPORT OF THE OFFICER IN CHARGE OF THE MIRAMICHI HATCHERY, 1890.
I beg herewith to submit my annual report upon the operations in connection with this establishment for the year 1890 .

As shown by last year's report, there was laid down in the hatchery troughs, in the autumn of $1889,1,100,000$ salmon ova. The closest attention was given to these eggs during the period of hatching, and I am pleased to state that the best of success was met with during this time, as well as in the transportation of the fry to the different planting grounds upon the head waters of the Miramichi.

## Distribution of Fry.

There were $1,022,000$ healthy fry distributed as far up the following streams as possible, viz.:-

| North-West Mi | 400,000 |
| :---: | :---: |
| Stony Brook. | 50,000 |
| Little South-West Miramichi | 300,000 |
| Sevogle River.. | 100,000 |
| Main South-West River. | 150,000 |
| Stewart's Brook. | 22,000 |
| Total | 1,022,000 |

In addition to these native fry, I received 40,000 eyed eggs from the Restigouche nursery. These were successfully hatched and planted in the North-West Miramichi and one of its small tributaries .

$$
\begin{aligned}
& \text { North-West Miramichi................ .............................. } 40,000 \\
& \text { Stony Brook.... ................. . .................................. . 15,000 } \\
& \text { Total................................................. } 40,000
\end{aligned}
$$

This shows that the total number of salmon fry distributed from this hatchery in the spring of 1890 amounted to $1,062,000$. The 25,000 Restigouche fry, along with 25,000 native, were planted a short distance above the falls on the North-West Miramichi, and at the Honourable Mr. Adam's fishing camp on the same stream, distant about 75 miles by the river from this nursery.

## Repairs.

During the summer months all necessary repairing about the ponds, dams and buildings were completed, except the shingling of the roof of the hatchery, which was delayed until after the stock of ova was gathered. The total cost of shingling the roof amounted to about $\$ 106$. The dams, ponds and buildings are now all in good
condition, and unless through an accident some unexpected expense is incurred, no further amount will be required during the coming year than may be necessary to carry on the ordinary routine work.

## Collecting Eggs, 1890.

The work of collecting parent salmon was not as successful this season as the previous year. This was not due to any scarcity of fish, but on account of the prevailing high water the fishermen were unable to use their nets until very late in the season. Then, before it was possible to procure a sufficient number to fully supply the hatchery, the spawning season set in. The men were kept at work as long as there was the slightest hope of adding to the number, until the cold weather caused operations to be altogether suspended.

The total number of fish amounted to $\mathbf{1 9 5}$. These parent salmon were taken from three different branches of the Miramichi, viz. : North-West Miramichi, 73 ; South-West Miramichi, 80; Little South-West Miramichi, 42. The total number of females captured amounted to 111 , the remaining 84 being males. If the water had not been so far above the usual height during nearly all the time fishing was practicable a far larger amount would have been taken, as the rivers were swarming with fish; but as it was almost impossible to use the nets, at least to any advantage, thousands upon thousands of parent fish passed up beyond our reach. The ova that these fish deposited are now nearly a total loss, as the beds upon which they were placed will have become almost completely bare, leaving the ova exposed to frosts, snow and ice. When salmon deposit their ova during a season that the streams are not above their usual height the ova will not be exposed to as much danger of being laid bare and destroyed after the heavy frosts sets in as it would be if the fish deposited the ova in the streams when they are far above their usual height, such as they were last season. Every one is aware that salmon naturally place their ova upon bars and gravelly shoals If the one-half of the fish that ascended these streams during last autumn deposited their ova upon bars and shoals at the height the water was at that time, millions upon millions of eggs are now a total loss.

The total number of eggs gathered from 111 females amounted to 810,000 , showing an average of about 7,400 to each. Comparing the average number of eggs taken from each female during the last three years, it will be seen that the number increased from 5,530 , in 1888 , to 7,400 for the present. This, in my opinion, points to the conclusion that the fry which have been hatched here from the eggs of the Restigouche salmon, which are of a much larger family than the Miramichi salmon, are showing some good results, from the increasing numbers of the very much larger salmon which are now to be found in this river.

> I have the honour to be, Sir, Your obedient servant, $$
\text { ISAAC SHEASGREEN, }
$$ Officer in Charge.

Note.-The portions of this officer's report, relating to the success of "Artificial Culture" will be found under that heading in the general report on Fish Culture, to which this report is appended.

## 7.-RESTIGOUCHE HATCHERY.

## Province of Quebec.

report of the officer in charge of the restigouche hatchery, 1890.
Sir,-I have the honour herewith to submit my annual report in connection with the operations of the Restigouche hatchery for the past season.

As previously reported, $3,022,000$ eggs were deposited in the hatchery in the fall of 1889 , from which were successfully hatched and planted in the varions waters, as follows :-

| Kedgwick Riv | 200,000 |
| :---: | :---: |
| Main Restigouche, from Indian House to Kedgwick... | 400,000 |
| Main River, from hatchery to Indian House.............. | 500,000 |
| Upsalquitch River above the Great Falls. | 300,000 |
| Matepedia River, including lake. | 490,000 |
| Nepisiquit River, Bathurst. | 200,000 |
| Middle do do | 100,000 |
| Miramichi do | 70,000 |
| Caraquet do | 100,000 |
| Jacquet do | 5,000 |
| Pond at hatchery.. | 4,000 |
| Total fry. | 2,396,000 |

The above numbers of fry were all planted in the various streams in a fine, healthy condition, with the exception of those deposited in the Middle River, Bathurst. A small loss occurred to this lot, owing to the train being several hours late. The fry were detained too long in the cans, and some of them were in a sickly condition when planted.

Independent of this number of fry 500,000 , semi-hatched or eyed eggs were transferred to St. John River hatehery 17th April, making a grand total of $2,869,000$ fry and semi-hatched ova distributed from the Restigouche hatchery the past season; and I humbly beg to draw your Honour's attention to the small percentage of loss, 152,000 , or about 5 per cent., from the handliug and hatching of this large number of eggs, which must at once convince all unprejudiced persons of the benefit and utility of the artificial breeding of salmon in the Dominion, and more especially eonsidering the authenticated statements that not more than $t$ per cent. of the natural-laid ova reach maturity. I have overturned the salmon rids, both on the Restigouche, Prince Edward Island and St. John rivers, after the water has receded late in the fall and left the rids dry, and the ora to perish, and in all instances not more than one vitalized egg in fifty were found; whereas, by the artificial works 95 per cent. of living fish are turned into the streams, and 90 per cent. of the parent fish liberated, which otherwise would have been marketed and their product totally lost to the river.

## Government Net at Island.

Owing to the unusual late spring and high water this net was not set out before the 12 th June, by which time the major portion of the fish had entered and already passed up the river; therefore, the catch was much less than last season, being as follows:-

$$
\begin{aligned}
& \text { Net at Island................................................................. } \underbrace{}_{2} 0 \\
& \text { Mission Point................ ...................................... ......... } 10 \\
& \text { Pitt's Creek....................................... ............................ } 30 \\
& \text { Purchased from Mr. Adams..... ....................................... } 59 \\
& \text { Total................ ........................ ............ ..... } 319
\end{aligned}
$$

Stripping began on the 20th October and continued till the Sth November; 307 fish were tound in the reservoir, 175 females and 12.7 males, from which were collected $1,800,000$ eggs. These were packed, as usual, in the trays, and conveyed to the hatchery by scow, and are now in fine condition, and a very successful hatch is anticipated. About a dozen fish died after they were placed in the reservoir, being injured by
escaping through the nets below. There were also a few fish tangled in the nets and drowned. These and all fish that died and were fit for food were sent to the dealers and credited to the Department.

The reason why the net fishermen do not furnish more salmon to us, although offering them full market value for them, is, that owi. $g$ to the use of the small mesh net creating a wall, and the rush of water through the small meshes, the fish get scared and will not enter the traps; and consequently the netters find their catch 50 per cent. less when using the small mesh; therefore, they all have, excepting Mr. Adams, discontinued giving any more parent salmon.

The hatchery with all its appliances is working very satisfactory; all trays, tanks, troughs, fawcets, de., \&c., were varnished during the past summer, and were in a first-class condition for the reception of the ora in the fall; also, a new boat house, $12 \times 30$ feet, was erected at the east end of the hatchery. This will be used in general for boat and store house. A new floor was laid in the loft; a dozen new distribating cases were obtained; the old primary log hatchery having outlived its usefulness was taken down, and the material used for a bridge and other purposes on the public road. This old nursery has been one of the greatest factors in making the Restigouche River what it now is, namely, one of the finest salmon rivers on the continent of America.

## Repairs to Hatchery for 1891.

The roof and outside of building is much in need of painting, as the first coat is entirely worn off; also, the inside plant, such as troughs, tank posts, de., de., should be painted, and the ceiling under the beams lathed and plastered, in order to make the house sufficiently warm and frost-proof; the cost of which would be about $\$ 200$. Plant may be also required, such as fawcets and distributing cans.

## The Retaining Pond at Hatchery.

This pond is only 40 by 60 feet, 2 feet deep, and was orerflowed from the brook during a heary snow fieshet in the spring of 1889 , and all the young fry put in the previous year were supposed to have escaped; but such was not the case, as quite a number of "parrs" were to be seen in it this summer, and when a fly was thrown into the pond a dozen or more would rush at it. I caught a few of those, and on examination fornd they were just about the size of the river "parrs." I am firmly of the opinion it would be a very unsafe and expensive undertaking to retain a large number of salmon fry through the winter season, where there in so much frost and floods to contend with. However, I may here mention that the Restigouche Salmon Club are anxious that something of this kind should be done, and talk of making the trial themslves; they have very suitable grounds on their propercy at Metapedia, and a pure stream of water to supply the ponds with, and if they feel inclined to construct them there till a year old, I would suggest that the Department supply the fry for that purpose.

## Net at Mission Point.

As this net for taking parent fish has, comparatively speaking, proved a failure, I would suggest that it be discontinued, and the net located in some better place.

## Government Net at Pitt's Creek.

Failing, as I have stated, to capture a sufficient quantity of fish in the Mission Point net, it was deemed adrisable, as a trial, to set another net higher up on the river and nearer to the reservoir. This net was not set until the 18 th of August. It has always been the opinion of old fishermen that fish do not enter the river after the above date, but between the 181 h August and the 1st October some 30 fish were taken in this net. This trial has proved two very important points: first, that more or less salmon enter the river all the season throught, from 1st May to 1st October; second, that it is in every way a very suitable locality for catching parent
salmon and conveying them to the reservoir, as it is only two miles above the reservoir. I am pretty fully convinced that with the two Government nets we can generally rely on getting a good supply of fish for the hatchery.

Repairs to Nets and Reservoirs, 1891.
The nets will require repairing and dying, and perhaps another new set. The reservoir will require some new timber and cross-ties and new netting, and five or six hundred new stakes. The whole will probably, cost $\$ 200$.

## Condition of River Catch of Fish with Fly and Nets for 1890.

The net fishery on the estuary and coast was not quite up to the average, although some large catches were made between Petit Rocher and Miscou; but why this falling off in the net fishery while the river was teeming with fish? The elements over which man has no control answers the question. One of the highest freshets ever known on the Restigouche prevailed, bringing down thousands of drift logs and débris of all kinds; this, combined with a heavy easterly storm, tore up the stake nets, overturned and displaced the trap nets on the coast, just at the time when the largest run of fish were entering the river; and while this destruction and loss in the estuary and on the coast was taking place the anglers were rejoicing and having one of the best fishing seasons ever known on the Restigouche, some of the angling parties killing as high as 100 fish in ten day, and eight or ten fish were often taken by one individual in a day. Mr. J. Mowat killed nine fish on a small pool at Deeside, the 5th June, where salmon were never thought of being fished for until very lately. Some 2,000 salmon were taken by anglers with the fly this season on the river. The guardians, lumbermen and all others acknowledge there never were seen so many fish in the Restigouche River as there were this season. Mr. A. Robertson, the Chief Guardian of the Restigouche Salmon Ciub, told me he went to the head of the Kedgewick River during the latter part of August, when the water was low and clear, and every pool was filled with salmon, and in places he had never seen a salmon before they could be counted in hundreds.

It may not be out of place in this report to give a few figures showing the increase and value of angling property and some of the prices paid during the last season. Some five miles on one side of the stream, near Indian House, brought $\$ 35,000 \mathrm{in}$ cash ; only half a mile on one side of the stream, near Upsalquitch, was sold for $\$ 18,000$; eighty rods frontage on one side, near Metapedia, brought $\$ 2,000$; forty rods, $\$ 1,800$; sixty rods front, near Metapedia, $\$ 2,500$. Four or five years ago very few of those places could be sold, or even leased-in fact, there was no fishing on them; but since then the river has become one continuous pool, so to speak; every inch of vacant water is largely sought after. Then why should not the hatchery and the many millions of fry that have been planted from it annually the last ten or twelve years be credited with at least a fair share of bringing about this. most gratifying state of afficirs?

To this I desire to give the testimony of a couple of the lessees* who have been receiving a supply of fry from the Restigouche hatchery for the stocking of the Miramichi and the Nepisiquet rivers. Referring to a paragraph in Mr. Spurr's letter, I beg to say canoes were used in the distribution of fry every year until last season, and no two cans were emptied in one place, but carefully-selected, mosscovered bottoms and grassy-banked pools were chosen, and the fry were distributed in various places throughout twenty miles of the river in fine condition. It was the lessees' own fault if there were no canoes; they were notified to send canoes, but did not do so.

In conclusion, I beg to say that every precaution is invariably taken, both in the hatchery and the distribution of the fry, and performed as economically as possible.

I have the honour to be. Sir,
Your obedient servant,
ALEX. MOWAT, Officer in Charge.

[^12]
## 8.-GASPÉ HATCHERY.

Province of Quebec.
report of the officer in charge of the gaspe hatchery, 1890.
Sir,-I beg to submit the annual report of operations connected with the above hatchery during the past year.

Work in Dartmouth River was commenced on 19th May, when preparations were made for the summer. Scows and flats were repaired and other necessary work was carried out. The trays and troughs were varnished, and subsequently the interior of the hatchery was painted, cleansed and aired, and all other appliances fully prepared for the winter labours.

The sphere of our work embraces the three rivers-St. John. York and Dartmouth, all flowing into the basin south and west of Gaspe Bay. The following shows the number of young salmon bred and put out during the year.

| St. John River | 136,000 |
| :---: | :---: |
| York River. | 100,000 |
| Dartmouth River $\{$ Above the talls. | 400,000 |
| River $\{$ Below the falls................. | 170,000 |
| Total. | 806,000 |

Our operations are solely concerned with salmon, and all were liberated in excellent condition. The planting was commenced on 23rd June and completed on 22nd July, notwithstanding the fact that the majority of the Dartmouth fry had to be conveyed, at the cost of much labour, above the falls. This operation was ordered by the Superintendent. Though involving an expense beyond the previous outlay, it appears to be justified by its more effectual results.

The Department nets were set from 4 th June to 29 th August in the Dartmouth River, and captured 60 parent salmon. According to instructions, I purchased 23 more from William Stanley, at the current price of $\$ 2$ each. When taken from the piers these 83 fish were found to include 33 males and 50 females. The spawning continued from Sth October to 2 nd November, and the 50 females produced as follows :-


In September I received instructions to proceed to York River, in order to capture additional fish to stock our hatchery. Owing to the lateness of the season there was considerable scarcity, as salmon had nearly all passed above the Narrows. We succeeded, howerer in securing 25 females and 12 males. These produced :-


We thus obtained a total of $1,020,000$ eggs from all the salmon in good condition which were placed in the hatchery. It will be observed from these figures that the York salmon were much more productive than those taken in the Dartmouth.

The batchery itself is in first-class condition, but not having been painted for orer twelve years, it is desirable that its extension should be done during the
ensuing year. The estimated cost of it is $\$ 30$. The pond in connection with the hatchery requires a new railing to fence it in, as its present condition involves danger to the life of the inhabitants. This would involve an outlay of about $\$ 12$. An unprecedented storm swept over this locality on 28th and 29th August. In consequence of this, the Darthmonth River rose over 12 feet in twenty-four hours, and inflicted vast damage on the surrounding country. On these days we lost 8 of our fish, the land around the pond being submerged. We also lost since 350 feet of boom (which is necessary to the protection of our trap net) and part of the net itself, and the stakes. This damage must be repaired in the spring, and will cost about $\$ 16$.

During the year we purchased 8 tons of coal for the nursery, at a cost of $\$ 40$. I had the pleasure of meeting one of the lessees of the Dartmouth River, who was well satisfied with the number of salmon he had taken with the fly. The number taken this year was a larger increase over previous years. It is the unanimous opinion of anglers that a large number of salmon went up the Gaspé River before the nets were set, thus accounting in part for the well-stocked state of the upper waters. This has been the subject of much favourable comment. The guardian of the York estimates that his river contains many hundreds of salmon- 46 were taken with the fly, and as there were considerable less fishing than usual, which practically shows that a substantial increase has taken place over previous years. The St. John is well stocked with salmon fry and smolt; no statistics are avilable yet, but it must be remembered that there were a large number of nets in tidal waters, and they must have had a successful year. These nets during recent years have made a constant drain upon the river. In view of this fact, and the improved catch, leads to the conclusion that the work of fish culture and protection, as carried on here, confers a benefit on all interested in the salmon industry,

## 9.-TADOUSSAC HATCHERY.

## Province of Quebec.

## REPORT OF THE OFFICER IN CHARGE OF THE TADOU'SSAC HATCHERY, 1890.

In accordance with the requirements of the Department, I herewith submit the following report of the proceedings at the Tadoussac Hatchery for the year 1890 :-

From the crop of salmon egge obtained last year, $1,700,000 \mathrm{fry}$ were hatched and distributed in the tributaries of the Saguenay and lakes having a discharge running to the St. Lawrence River. The loss on our eggs was somewhat greater than usual, caused by the ravages of rats entering the hatchery. The temperature of the water remains the same the whole winter-34 degrees-and the eggs began to hatch in May, when the water was 36 degrees.

Following is a list of the rivers and lakes, with the numbers of fry planted in each :-


The distribution in the Upper Saguenay was done with the assistance of a tag boat belonging to the firm of Price Bros. \& Co. All the distribution has been made in all the places under my personal care, with a man to help me in changing and rating the water in the cans. To take advantage of the coolness of the nights for the fry we left the hatchery at 11 o'clock at night. By doing so we reached the

Upper Saguenay the next morning. By all means it is very important that the greatest part of the distribution should be made in the Upper Saguenay. I claim there ought to be as much pains taken to distribute fry as there is in hatching them.

We set our nets for the capture of parent salmon in May, and everything was ready for the last high tide of the same month. The first salmon was caught on the 27th of May, and herewith is given the catch in detail up to 3rd of July:-

| Date. | $\begin{gathered} \text { Number } \\ \text { of } \\ \text { Finh. } \end{gathered}$ | Males. | Females. | Liberated. |
| :---: | :---: | :---: | :---: | :---: |
| May 2 - | 12 | 1 | 7 | 4 |
| do $\geq 8$. | 14 | $\underline{9}$ | ! | 3 |
| do 29. | 10 | 3 | - | 2 |
| do 30. | 4 | $\because$ |  | $\stackrel{2}{2}$ |
| do $31 . \ldots . . .{ }^{\text {d }}$..... | $10^{\circ}$ | 3 | $\cdots$ |  |
| Tune 1 (Sundizy)...... |  |  |  |  |
| do 2.. ... ........ | 3 | 1 | 3 |  |
| do 3.. | 4 |  | 2 | 2 |
| do 4 | 12 | \% | $\stackrel{9}{6}$ | $\stackrel{2}{4}$ |
| do 1 | 13 | $\stackrel{3}{1}$ | $\frac{6}{6}$ | 4 |
| do - | 2 |  |  | 21 |
| do 8 (Sunday)... |  |  |  |  |
| do 9 | 7 | $\geq$ | 3 | 2 |
| do 10 | 20 | 4 | ; | 10 |
| do 11. | 31 | 10 | 6 | 1.) |
| do 12. | 42 | 12 | 10 | 20 |
| do 13. | 93 | 1.8 | 3.5 | 41 |
| do 14. | \$1 | 18 | 25 | 3:7 |
| d) 15 (Sunday) |  |  |  |  |
| do 16. | 111 | 15) | 30 | $6{ }^{6}$ |
| do 17 | 47 |  | 17 | 31 |
| do 11. | 71 |  | 20 | 71 |
| do 19. | I |  | 10 | $1:$ |
| do 20. | 54 | $\cdots$ | 12 | 45 |
| do $21 . \ldots . . .{ }^{2}$. ${ }^{\text {do }}$ | 103 | - |  | 102 |
| do ${ }^{\text {do }}$ 23 (Smolay) | 24 |  |  | 24 |
| (i) 24. | ]. |  |  | 1, |
| do 2 s . | 311 |  |  | 31 |
| do 26. | 119 |  |  | 19 |
| do 27. | 15 |  |  | 1.5 |
|  | 8 |  |  | 8 |
| do 29 (Sunday) |  |  |  |  |
|  | 20 |  |  | 20 |
| Tuly $\begin{gathered}\text { The } \\ \text { do } \\ \text { dor }\end{gathered}$ | 1.5 |  |  | 15 |
| do 3. | 14 |  |  | 14 |
| Total, | 980 | $10 \%$ | 219 | isj |

On the 7 th of June it was blowing a north-west gale, the boatmen could not go to the fishery, and next day being a Sunday, l gave orders to open the door of the fishery, and 20 salmon were liberated. As can be seen by the manner our nets were kept from the 20th of June to 3rd July, this was done to ascertain the number of salmon coming in our nets, they were counted and many were liberated at the same tide. Of the number caught, 325 parent salmon were kept in our pond for breeding purposes, and 655 were set free again. There were 185 females, they gave us a crop of $1,879,000$ eggs, being an average of about 10,000 , all the females being of medium size. The seining of the parent salmon from the pond commenced on the ${ }^{2}$ ith of October, and the spawning time was completed on the 15 th of November. The greatest part of the work was done in the last week.

## The Salmon Fisheries.

The salmon fishing this season has been very good in this district, the increase from 1886 is very remarkable, with always the same number of salmon fisheries, 12
in all: 14,790 pounds of salmon were taken in $1886 ; 16,720$ pourds in $1837 ; 24,000$ in 1888; 37,900 in 1889, and 61,000 pounds this year, 1890 . I am satistied that this great increase in the catch of salmon is largely the result of the planting of salmon fry in the tributaries of the Saguenay River. For many years salmon have not been so plentiful in our rivers, as in the year now drawing to a close. The largest river in my district, the Ste. Marguerite, is full of parent salmon, by a report made to myself by the president of the Ste. Marguerite Club, Mr. James Grant, of New York. His nephew, Mr. Charles Grant of Montreal, told me that they counted one hundred salmon while passing one pool. The local guardian, Mr. Gravel, reports the same thing. The same good reports come from the Little Sagnenay River, St. John River, Eternity River, A Mars River, and as far up as the Shipshaw River in the Upper Saguenay. On the 18th of November, after the wire net of the pond was taken up, about one hundred fine young salmon about 25 inches long. and rery fat, came in the pond and mixed with the parent salmon. I called Mr. Plourde, the guardian. to have a look at them, it was high tide at the time, they went round the pond with the old ones and all went away again. On the 16th of October, Mr. Plourde, being at the rocky point of the hatchery cove outside the wharf, saw, quite close to the rocks, a very large number of young salmon, about the size of the ones mentioned above, coming down the Saguenay. He says there were many thousands.

## Repairs.

No repairs have been made about the house the past summer, although some were much needed for the last few years. The building, inside and outside, and the wharf are in a dilapidated state; something must be done.

As reported last year, no doubt, in riew of economy, it would be better to have a new building, instead of making additional expenditure on this old building. It is erected on a wharf made of slabs, and is becoming every year more and more filled with rats, which destroy many eggs, no matter what precantion is made to prevent it.

## Distribution of Fry.

As the destribution of fry is the mostdelicate part of our work, and upon which depends all good results therefore everything should be done to facilitate it. Tadoussac is certainly the right place, with its natural pond, to keep the parent salmon during the hot season, and as the Tadoussac Hatchery is intended for the Saguenay River, it would be far better to have the hatching located at the Upper Saguenay, thus saving, every year, a large sum of money in the distribution of the fry, and with better chances of success, as there are so many streams of the purest water to plant the fry in.

The inconvenience of the small lake here which gives the water supply to the hatchery, is that the ice remains too long on it in the spring, keeping the temperature very low, and retarding the hatching of the eggs. Last year the ice on the lake broke up on the 18 th of May. And as soon as the ice is all melted, the temperature of the water goes up very fast, the sun and the heat having great power on the small surface of water in this lake. I have always found it unsafe to keep the fry after the 20th of June, and as I never put out the fry before the sack is fully absorbed, it gives us a very short time for the general distribution.

For many reasons if the hatchery is to be rebuilt, I would suggest the Shipshaw River, in the Upper Saguenay, as a very central and desirable place. This river is a splendid one, with its pure and abundant supply of water coming throngh a wild country and affording facilities for the distribution of fry in it, and also in the other waters of the Saguenay by land and by water.

The erection of a good building to hold from tive to six millions of egge, at a cost of a couple of thousand dollars, would, in a few years, repay what it now costs for a tug, and boats and carters, and instead of planting a few thousands of fry up river as at present, millions could be planted for less money and with more safety. All
the windows of this old building could be used for the new one, and by pulling down the old hatchery and carrying away the slabs forming the wharf, and using all the heavy timber found suitable to improve and extend the dam of the present reservoir up to the rocks, a splendid pond would be had to keep a thousand parent salmon if wanted.

> I have the honour to be. Sir, Your obedient servant, $$
\text { L. N. CATELLIER, }
$$ Officer in Charge.

## 10.-MAGOG HATCHERY.

## Province of Quebec.

## report of the officer in charge of the magog matchery, 1890.

In accordance with the requirements of the Department, I beg herewith to submit my annual report for the past year.

On the 26 th of March, 1890, two millions whitefish and two millions salmon trout eggs were received, in good condition, from the Newcastle Hatchery.

The small fry from the hatching of the above-named eggs were successfully planted on the following named waters, to wit:-

Whitefish.

| Lake Megantic, County of Megantic | 100,000 |
| :---: | :---: |
| Massawippi Lake, County of Stanstead. | 100,000 |
| Memphremagog Lake, Counties of Brome and Stanstead. | 800,000 |
| Orford Lake, Counties of Brome and Sherbrooke ........ | 200,000 |
| Brome Lake do do | 100,000 |
| Total. | 1,300,000 |
| Salmon Trout. |  |
| Megantic Lake, County of Megantic. | 100,000 |
| Massawippi Lake, County of Stanstead. | 150,000 |
| Memphremagog Lake, Counties of Brome and Stanstead. | 1,160,000 |
| Orford Lake, Counties of Brome and Sherbrooke........ | 150,000 |
| Ste. Rose.. | 40,000 |
| Total.. | 1,600,000 |

We did not catch any parent fish to supply the Magog Hatchery with eggs this year. They were all received from Newcastle.

Two millions whitefish and two millions salmon trout eggs were placed in the Magog Hatchery in 1890.

The batchery will be in good working condition when the supplies are furnished which have been asked for.

The supplies required and applied for are: 1 wood stove, 50 lengths pipe, 6 distributing cans, conductor or pipe for whitefish, with cocks; $\frac{3}{4}$-in, rubber hose, 12 tins, 6 cords dry hardwood, 8 globe valves; estimated cost about $\$ 70$.

From information which I have received from fishermen and others living near the lakes wherein salmon trout and whitefish fry have been deposited, I find that there is an increase in both salmon trout and whitefish, but that the increase of the former is much retarded in some localities by poachers during the spawning season. The few fishery officers employed, and the large area over which they have to watch, has a tendency to make the poachers more bold and the trout less plentiful, other-
wise the increase would be much more apparent. Large schools of small whitefish are now noticed in all the bodies of water wherein the try have been deposited. These all came from the Magog Hatchery, as no whitefish were ever seen in them before the hatchery commenced operations.

I have the bonour to be, Sir,
Your obedient servent, A. H. MOORE,
Officer in Charge.

## 11.-NEWCASTLE HATCHERY.

## Province of Ontario.

report of the officer in charge of the newcastle hatchery, 1890.
I have the honour herewith to submit my annual report of the operations carried on at the Newcastie fish breeding establishment for the past year.

The work of hatching and distributing the various kinds of fish was most successfully carried out. The fry when planted even at the most remote points from the hatchery, appeared to be quite as lively and strong as when taken out of it.

In February last I received instructions from the Department to transfer from Newcastle to some of the Maritime nurseries a quantity of eyed eggs. As previously reported these eggs reached their destinations, under my personal supervision, in good order. No trouble need be apprehended in the carriage of fish eggs even for long distances if escorted by a careful and experienced officer; but it is quite unsafe to ship these delicate and perishable eggs by express messengers alone. I notice in reading some of the United States reports on fish-breeding that the American nurseries have met with some very serious losses by allowing boxes of carefully packed eggs to be shipped in care of the express messengers on board the trains. These agents, though they may be deeply interested in this industry, have little or no time to devote their close attention to these perishable eggs when sent long distances, even though written instructions may have been sent with the consignment. It is, therefore, always desirable, in fact absolutely necessary to send an experienced officer to take charge of either fish eggs or young fish, when shipped from the hatcheries to their points of destination.

The total number of semi-hatched eggs shipped to the Lower Provinces; last winter, and the try of various kinds liberated from the Newcastle establishment this spring was as follows:-

Semi-hatched Salmon Trout.

| Magog | er | ovin | Quebe | 2,000,000 |
| :---: | :---: | :---: | :---: | :---: |
| Bedford | do | do | Nova Scotia.. | 500,000 |
| St. John | do | do | New Brunswick | 1,500,000 |
| Ottawa | do | do | Ontario | 1,500,000 |
|  |  |  |  | 5,500,000 |

White-fish Fry.

| Toronto, Lake Ontario | 500,000 |
| :---: | :---: |
| Cobourg do | 250, 000 |
| Newcastle do | 300,000 |
| Colborne do | 100,000 |
| Meaford, Georgian Bay.. | 1,000,000 |
| Belleville, Bay of Quinte | 500,000 |
| Lefroy, Lake Simcoe | 100,000 |
| Total. | 2,750,000 |

Salmon Trout Fry.
Toronto, Lake Ontario ..... 500,000
Cobourg do ..... 200,000
Colborne do ..... 200,000
Kingston do ..... 400,000
Newcastle do ..... 250,000
Bowmanville, Lake Ontario ..... 250,000
Marmora, Crow Lake ..... 100,000
Lakefield, Stony Lake ..... 100,000
Port Carling, Rosseau Lake ..... 200,000
Belleville, Bay of Quinté ..... 500,000
Toronto, Howard Lake ..... 25,000
Collingwood, Georgian Bay ..... 500,000
Wiarton ..... do ..... 500,000
Meaford do ..... 500,000
Barrie, Lake Simcoe ..... 200,000
Orillia do ..... 200,000
do Row's Lake ..... 25,000
Lefroy, lake Simcoe ..... 50,000
Total ..... 4,700,000
Speckled Trout Fry.
R. Croft Hulme, Belleville ..... 5,000
James Haw, Orillia ..... 4,000
D. Martin, Guelph ..... 5,000
Woodstock Club, Woodstock ..... 20,000
John Barr, Shelborne ..... 5,000
Israel Kinney, Brantford ..... 11,000
Doctor Mallory, Grafton ..... 5,000
Harry Piper. Toronto ..... 5,000
E. R. C. Clarkson, Toronto ..... 10,000
Samuel Dice, Milton ..... 3,000
R. Burgess, Muskoka ..... 10,000
W. McDonald, Tilsonburg ..... 10,000
J. Forsythe, Barrie ..... 2,000
W. H. Rittenhouse, Barrie ..... 2,000
J. Gardiner, Paris ..... 5,000
G. P. Buchannan, Paris ..... 10,000
J. T. Brownridge, Paris ..... 1,000
G. Farnham, Hamilton ..... 1,000
J. E. Murphy, Hepworth ..... 5,000
Z. A. Lash, Toronto ..... 50,000
R. Z. Rogers, Grafton ..... 50,000
E. C. Cochrane, M.P., Toronto ..... 2,000
W. Williamson, Ingersoll ..... 5,000
R. Southam, London ..... 5,000
Number turned out in hatchery stream ..... 45,000
Number kept on hand in spring tank ..... 5,000
Number semi-hatched eggs sent to Ottawa ..... 75,000

| do | do | St. John Hatchery | 15,000 |  |
| :--- | :--- | :--- | :--- | :--- |
| do | do | Bedford | do | $\cdots$ |Total391,000

## Grand Total Fry Hatched.



## Repairs to Hatchery.

The main tank or trough, which supplies the hatchery trays with water, was very much decayed and unsafe. This was renovated last summer and lined with galvanized iron, making it perfectly secure for years to come.

The outside of the hatchery has not been painted since its first erection, and unless it is attended to next spring the building will become mach injured. With the exception of a few other unimportant repairs which can be done with little expense after the fry are liberated the establishment and all its appliances are in first-class condition.

The grounds and fish ponds adjoining the hatchery are kept in grood order and are visited by a large number of people during the summer.

## Collection of Salmon Trout Eggs.

This undertaking received my personal supervision last fall, and was commenced on the 15th of October and completed the 3rd of December, which will be seen by reference to my daily statement of the work hereto appended.

Some important changes were made last fall in locating the pound nets. The two formerly set on the Indian reserve, at White Cloud and Hay Islands, were not placed there this seasov. It was found that these nets did not capture as many parent fish as was expected, and as the distance from Wiarton to these nets was about fifteen miles, it was decided to abandon these locations and try the experiment of putting one of these nets close to the old and reliable stand at Gravelly Point, which is only nine miles down the bay from Wiarton. This proved to be a great success, notwithstanding the views put forth that two pound nets would not operate successfully when located close to each other. As many eggs were taken from the fish in these two nets as were collected from three during the previous season. The distance to be travelled by tug was lessened by many miles, and the guardians bad much less difficulty in protecting the nets against poachers.

A good deal of trouble was experienced in getting a suitable person to set the pound nets last fall. The expert who managed the work last year promised to undertake the job again, but disappointed me at the very last moment, and after writing to several other persons capable of performing this special work, I was compelled to go to Port Dover and procure the services of Capt. Allan to overcome the pressing difficulty. It was most fortunate that his services were obtained, otherwise the collecting of a supply of salmon trout eggs for the several hatcheries in the Provinces must have proved a failure. The proper setting down of pound nets requires years of experience. In fact there are few mon to be found in the country who practically understand this business. I am glad to report, however, that after the several years experience now had at Wiarton in connection with the management of the pound net system, that with another season's work our own employees will be able to manage this difficult undertaking without employing these expensive experts as formerly.

I herewith append a statement of the work at Wiarton which gives the number of salmon trout eggs collected daily last fall, also the number of parent fish mani-
$8 a-5 \frac{1}{2} *$
pulated and liberated, together with other valuable information which will serve as a reliable record to the Fisheries Department, especially in refuting erroneous statements which are often made by fishermen and interested fish dealers in reference to the " close season" for salmon trout and whitefish. It will be noticed by looking at the last three yearly statements that the Department had wisely set apart the whole month of November, and I am glad to learn that it is the intention of the Government to lengthen the period. This step is absolutely necessary, as it can be proved beyond doubt that large numbers of salmon trout and whitefish spawn as early in the season as the 15 th of October.

## Condition of the Eggs in the Hatchery.

The hatchery with its large number of eggs, upwards of eleven millions, is at present very much crowded, and as it will be utterly impossible to hatch out more than half this quantity safely next spring, it will be necessary to remove at the proper time, say six millions, to the Ottawa and other establishments in the Eastern Provinces.

> I have the honour to be, Sir, Your obedient servant,
C. WILMOT, Officer in Charge of Newcastle Hatchery.

Statement showing the daily operations of collecting Salmon Trout Eggs at Wiarton during the Season of 1890 .


Statement showing the daily operations, \&c., at Wiarton-Concluded.


We had not more than half as many fish in nets as last year. Tinder these circumstances we should feel that the work was a great success.
C. WILMOT.

## 12.-SANDWICH HATCMEERY.

## Protince of Ontario.

## REPORT OF THE OFFICER IN CHARGE OF THE SANDWICH FISH HATCHERY.

I herewith forward the annual report of the work performed at the Sandwich Fish Hatchery for the past year.

From the eggs placed in the hatchery last year there were hatched $45,000,000$ young fish. This was somewhat under the regular percentage, and may need a little explanation. We gathered more eggs than we had incubators or room for, at the time, and in order to accommodate these eggs we were put to the last resort of using the old wire trays that were in use years ago, when the culture of whitefish was first begun. The numbers hatched in the glass jars were fully up to the usual standard, and the falling off on the general percentage can only be laid to those
hatched in the wire trays. Taking this into consideration we can feel quite satisfied with the number of young fish that were hatched. These young fish were placed in the following waters:-


These young fish were in fine condition when placed in the above named waters.

## Collecting Pickerel Eggs.

After having cleared the house of the young whitefish, preparations were made for the reception of the pickerel (dore) eggs. Below are given the numbers collected, and the names of the places where secured:-

$$
\begin{aligned}
& \text { Wees Bros., Lake Huron......................... ................ 8,000,000 } \\
& \text { Joseph Leazeau do ...... ............ .................... 8,000,000 } \\
& \text { Hitchcock \& Stead, Point Edward .............. .............. 16,000,000 } \\
& \text { Making the total secured .................................... } 32,000,000
\end{aligned}
$$

From these eggs were hatched out $22,000,000$ young pickerel, which were placed in the following waters:-

| Ottawa (eyed eggs) | 1,000,000 |
| :---: | :---: |
| Point Edward, Lake Huron. | 2,000.000 |
| Port Lambton, River St. Clai | 1,000,000 |
| Mitchel's Bay, Lake St. Clair. | 1,000,000 |
| Peach lsland do | 2,000,000 |
| Fighting Island, Detroit River | $2,000,000$ |
| Bois Blane Island do | 2,000,000 |
| Pigeon Bay, Lake Erie. | 3,000,000 |
| Bar Point do | 2,000,000 |
| In river at hatchery. | 6,000,000 |

Making the total.................................... ........ $22,000,000$

I can here state that the different fishermen report to me the catch of pickerel was above the average last spring, and, as usual, give great praise to the hatchery for the cause of the increase in theee fish.

I have just received certain nets from the Department for the purpose of securing our own fish, but as yet have not decided on a location where to place them. Soveral places have been recommended to me, but until some satisfactory place is located f. would not advise the giving up of the present mode of securing parent fish until the new venture had proved successful.

## Collecting Whitefish Ova.

The fall of 1890 can be recorded as having the greatest number of whitefish eggs laid down since this hatchery was first organized, there being fully ninety millions of eggs put in the incubators. These eggs were taken from fish caught at the following places :-

> Bois Blanc fishery
> 30,000,000
> Fighting Island fisheries.
> $4 \overline{0}, 000,000$
> Mainland fisheries.
> $15,010,000$
> $90,000,000$

## The Catch of Whitefish.

From all around this section of the country comes the report of increase in the catch of whitefish. The fishermen are jubilant, and expect greater results from the artificial hatching in years to come, from the fact that the catch continues to improve from year to year, and from the size of the fish caught it is contended that they are largely the production of artiticial breeding. For instance, take the Bois Blanc fishery's catch this fall. Here there were hauled in over 1,000 small fish which were put into the racks for spawning purposes, nearly all escaped through the openings which were made suitable to keep in the ordinary sized tish. The fishermen claim that these small fish were, without any doubt, the production of the hatcheries. The same statement of the catch of small fish comos in from every fishing ground hereabouts. This catch at Bois Blanc Island fishery is a very strange one, but is a very strong argument in favour of the hatcheries, as the fish formerly taken at this fishery were noted as being the largest of any caught in the river.

## The Herring Fishing.

Although we have never done anything with the cultivation of the herring, yet, I believe, it will be advisable to do so, as that fish seems to be fast decreasing in these waters. The catch this year is a long ways below that of any former year, and the fishermen are beginning to ask if we are not going to breed them in the batchery in like manner as the whitefish. I would recommend the Department to engage in the cultivation of the herring.

## Improvements in the Hatchery.

Since last year several improvements have been made in this house. The entire floor is now devoted to the hatching of fish, and instead of rumning 350 glass jars as formerly we now operate 600 , and will be able to turn out about double the number of young fish. In the centre of the floor a large tank is built, in which there were placed 100 adult whitefish, which gave quite a quantity of eggs. I think the idea of bringing the fish, which we are unable to spawn at the fishing stations, and putting them in this tank, is a good one, and one which will in after years prove of great benefit to the hatchery, as we will then secure quite a number of eggs that otherwise could not be had. In speaking of the improvements that have been made it might be well to speak of another which is needed-that of securing and controlling a steam yacht for the purpose of putting out the young fish at our convenience.

Last season, on account of no steamer running to Pelée Island, it was impossible to place any tish at that place without heavy expense, which I did not incur. With a small yacht fry could be distributed readily and cheaply at this and other important points. This boat would not only be useful for the distribution of young fish, but also for the collecting of eggs, and would save the Department much expense now incurred and at the same time advance this hatchery. The cost of such a boat would be in the neighbourhood of $\$ 500$ or $\$ 600$.

There should also be a movable breakwater builtat Bois Blanc fishery to prevent the water dashing the fish against the racks when storms prevail, which they frequently do at this point. The cost of this would be $\$ 100$, and would save the fish from being bruised, which materially injures the egg within them.

The only other improvement that I know of now for this establishment is the painting of the hatchery, the cost of which will amount to about $\$ 200$.

In closing this report I desire to say something about the decrease of the sturgeon. As this has become a very valuable fish, I would recommend that efforts be made to secure some of their ova and propagate them in the same way as we do other fish.

I desire also to state that all the improvements ordered by your Superintendent, of Fish Culture, Mr. Wilmot, is working admirably.

> I have the honour to be, Sir, Your obedient servant,
> WILLIAM PARKER, Officer in Charge.

> 13.-OTTAWA HATCHERY.

## Province of Ontario.

Report of the officer in charge of the ottawa hatchery, 1890.
Herewith is submitted the first annual report of the working of this hatchery. The ova received from the different hatcheries were as follows:-

| Salmon ova from British Columbia .......................... | 150,000 |  |  |
| ---: | ---: | ---: | ---: |
| do | Restigouche Hatchery, Prov. Quebec. | 25,000 |  |
| Salmon trout ova from Neweastle Hatchery, Ontario... | $1,500,000$ |  |  |
| Speckled trout ova from | do | do | $\ldots$. |
| Whitefish ova from Sandwich Hatchery, Ontario....... | $6,000,000$ |  |  |

The young fry were distributed from this hatchery last spring in excelient condition, considering the long journeys and rough roads to their destination. They were planted in the waters at the following piaces:-

| Salmon fry. |  |  |
| :---: | :---: | :---: |
| Meache's | Lake, Prorince Quebec. | 84,000 |
| Knowlton | do do | 14,000 |
| Smallions | do do | 14,000 |
|  | Total | 112,000 |
| Salmon Trout fry. |  |  |
| Meaches | Lake, Province Quebec | 20,000 |
| Moseau | do do | 30,000 |
| Rideau | do Province Untario | 200,000 |
| Duchesne | do do | 60,000 |
| Bernard's | s do Province Quebec.. | 21,000 |
| Duchesne | do do | 200,000 |



## Remarks.

All the ffy were planted in the different waters in good condition, with the one exception of some Fraser River salmon try which were shipped by express to Brome Lake in the Eastern Townships, and to avoid any such loss in the future it will be found absolutely necessary that the officer in charge or some other competent person shall accompany the fiy to the different waters in which they are to be planted.

The hatchery being newly constructed, considerable difficulty was experienced by not having sufficient accommodation for them at the proper time, many whitefish and salmon trout were hatched out before the tanks were built outside to receive them. It will be found necessary to bave two more rows of tanks put up next spring to accommodate the young fish and prevent overecrowding in the troughs inside. The hatchery and the frames for the outside will require painting the coming summer, and there will also be required some carpenter's wark for putting up additional stands for the tanks in the yard.

I have the honour to be, Sir,

> Your obedient servant,

PHILIP VEALE, Officer in charge.

## ANNEX TO FISH BREEDING REPORT.

## REPORT. <br> - <br> WHITEFISH FOR LAKE ONTARIO.

CORRESPONDENCE RELATIVE TO STOCKING LAKE ONTARIO WITH WHITEFISH,
Rochester, N. Y., 14th January, 1891.
Sam. Wilmot, Esq.,
Ottawa.
Dear Sir,-Please read the enclosed slips and tell me fully what your answer is to the accusation against your people.

An early answer will oblige.
Yours truly,
F. J. AMSDEN.

## IEETING OF THE NEW YORK STATE FISH COMMISSIONERS.

("Eicning Post," 14th Jenuary, 1891.)
A meeting of the State Commissioners of Fisheries was held to-day in the market and Fulton Bank building, at Gold and Fulton streets. Applications for twenty oyster franchises were granted, and a long list of arrests and fines by the state game protectors was read. The reports from the various state Superintendents of fisheries for the coming season were encouraging.

A letter was read from F. J. Amsden, of Rochester, asking for the co-operation of the commission in bringing about concerted action on the part of the United States and Canada for the propagation of the whitefish in Lake Ontario and elsewhere. It was said there was a necessity for such action, and that more attention should be paid to the more common varieties of food fish. However, no united action could be taken with the Canadian Gouvernment, nor could uniform taws be passed on both sides of the lakes as long as the Canadians permit net-fishing. Most of the whitefish had now been taken from waters off the Canadian shores. It was useless to stock the lakes until netting was stopped. At the present time, not only were the large whitefish being taken, but thousands of the small whitefish wre eaught and sold in this city and tlsewhere as herrings.

## CORRESPONDENCE REGARDING PRESERVATION OF WHITEFISH IN LAKE ONTARIO.

## Mr. Edward F. Doyle,

Secretary Commissioners of Fisheries, New York.
Dear Sir,-I I am in receipt of your favour of the 14 th instant, informing me of the action of the Commissioners of Fisheries in respect to stocking Lake Ontario with whitefish, siscoes and wall-eyed pike, and conveying the assurance that the Commission is in sympathy with myself and associates in the effort we are making to increase the supply of fresh-water food fish, available to the residents of States adjoining the Great Lakes.

The purpose of the association with which I am identified is entirely of a public nature, and its design is to render a wholesome article of food so abundant and accessible to the communities residing in States bordering the Great Iakes that any one can, for a small sum of money, have on his table, every day in the week, during the season, a supply of those fish which are universally regarded as highly desirable food.

The assurance that the Commissioners of Fisheries of the Empire State will co-operate with us in our endeavours is exceedingly gratifying, and cannot fail to be of the utmost importance in all future efforts that are to be put forth.

From the experience which I have acquired since becoming interested in this subject, aided by my correspondence with others, at home and abroad, who have also given much consideration to the project, I am convinced that the task before us will not prove to be an easy one to accomplish, but will call for persistent and concentrated efforts by all who take the matter to heart. The public voice will no doubt be with us, but we may reasonably expect to meet with opposition, either direct or indirect, from certain interests that can always be depended on to oppose any public measure adverse to their own short-sighted and selfish policy. The fishermen who persist in using nets of such small mesh that they catch fish of not more than half a pound weight are pretty sure to be heard from in a united wail when an attempt shall be made, in the public interest, to compel them to abandon their foolish practice of taking the immature fish and thus depleting the waters, which, if fished in a rational way, would continue forever to supply the growing population with a generous amount of full-grown fish.

The importance of the subject suggests that it may be necessary to enlist international interests in the cause, or, if not international, at least interstate. It would be obviously futile for the State of New York
to expend money and effort in stocking the waters of Lakes Ontario and Erie with food-fish unless concurrent action toward its reasonable protection should be taken by Pennsylvania, Ohio and the Provirce of Ontario. There are no bounds between the waters of the various States named that would prevent the fish planted by New York from going to other shores, where they might be caught out of season or by the use of nets, which would not be tolerated by the State which had them hatched. It is self-evident that those States, including the Dominion, which are so fortunate as to be bounded by the Great Lakes, must unite in a determination to stock their waters, and, when they are stocked, to give them such thorough pr tection that no one but an outlaw will think of violating the regulations prescribed by reason and experience for the protection of the fish. Anything short of this would, in my judgment, be but little better than a waste of time and money.

I therefore respectfully submit to the Commission that, as it has the advantage of being a lawfully appointed and influential body, representing the Empire State, it could with grace invite representative organizations from other States interested to take up the subject in a common spirit and obtain such legislation from the respective States as will give assurance that when the minor work of depositing millions of fry in the waters of a lake has been done the more important and difficult task of protecting the stock until it is mature shall be carried out with fidelity by the united power of all the States that border on the waters.

In your communication of the 14 th I note with interest the fact that the Commission intends to liberate $4,000,000$ siscoes in Lake Ontario next spring. It may be presumptuous in a private citizen to offer suggestions to a body of experts, but it has occurred to me that, as the siscoe is at best lut an indifferent fish, and when mature is not as large as a whitefish or pike should be before it is fit to be caught, the presence in the lake of so many siscoes would offer a temptation for unscrupulous persons to set nets, ostensibly for siscoes, which would take innumerable young whitefish, lake trout and pike, that would otherwise remain in the water until large enough to be caught in the net of legitimate size mesh, which should alone be allowed in the water where the better fish are to be cultivated. If the purpose of putting out the siscoes be to furnish food for the pike, then the objection would not prevail. But it would seem that such a large number of siscoes would necessarily consume food that might better be reserved for the more valuable whitefish.

Respectfully yours,
FRANK J. AMSDEN.

OnTAWA, 17th Jammary, 1891.
F. J. Amsinen,

Rochester, N. Y.
Your note enclosing paper cutting to hand. I notice its contents. I am very much surprised at the want of knowledge shown therein regarding the whitefish question, when it is stated : "It will be useless to stock the lakes until netting is stopped.'

It will he a nice question to solve, how whitefish are to be taken for commercial purposes unless with nets, as they cannot be taken in any other way. Whilst the taking of the whicefish in nets cannot be avoided, and should not be prevented, yet, with proper laws and regulations regarding the times and modes of applying them, the great whitefish industries of the country wonld, at the present day, have been largely upheld-in fact, had our American cousins shown the same anxiety and the same amount of wisdom for protecting the whitefish and other fisheries in Lake Ontario and many other waters on their sides of the line, they would not now present the lamentatable state that exists at the present day, and of which complaint is made "that the Canadian Government has been instrumental in bringing about." Why so forgetful of the fact that Canada has on her statute books laws to protect whitefish at the spawing time, and regulations regarding the mesh of nets to catch them, during the past thirty years and more, whilst the United States or the State of New York has not now and never had any laws and regulations for protection of this valuable fish, but has allowed indiscriminate slaughter throughout at the spawning time, and at all times, with every description of engine that the ingemuity and cupidity of the American fisherman could invent to kill and destroy fish with.

Not only has the absence of a law for protecting whitefish in American waters seriously injured- in fact, almost wholly depleted them-but it has also given trouble and difficulty without end in the enforcement of the Canadian fishery laws, its inhabitants complaining that they (the Canadian tishermen) were restricted from taking fish at the close time, when on the American side, where, in sone cases, only an indefinite international line exists, the latter are allowed to fish how, when and where they chose. In some cases, where a narrow boundary existed like the Detroit River, by such proceedings and sibterfuges of all kinds the Fisheries Department of Canada had to give way and allow infringement upon its well-intentioned legislation to protect their fisheries. Did not the Fisheries Department of Canada erect the first governmental whitefish hatchery on this continent, or even in the world? And have not many of the States of the Union followed most wisely and liberally in this praiseworthy undertaking to replenish their waters with whitefish. I reget to say that not only did the Federal Government but many of the Stase Commissions advance the fallacious idea that as the artificial breeding of fish had been entered upon, and had proved so successful, it was useless to restrict the fishermen from keeping any close season, and that the supplies of fish would be upheld by this artificial process. What a fallacy to put forth, that artificial breeding would take the place of natural breeding. No wise or favourable advocate of artificial culture of tish should put forth such a statement, for in the minds of the more intelligent classes such a theory must injure rather than benefit the actual or anticipated results from artificial fish culture. Strong advocate as I am, and as one of the pioneers of the work, I have never advocated but one view, namely, that artificial breeding must only be considered as a great adjunct and supplementary aid to the natural process. The natural and artificial means, combined with judicious laws as to the close seasons and regulations regarding nets, etc., would maintain the fisheries for all time to come. Artificial propagation alone, without the other methods being wisely applied, will never effect the desired end of replenishing or maintaining the fish supplies in the waters of any country.

Let such of your people as may be desirous of intelligently husbanding, and improving the whitefish wealth of their country. and especially of Lake Ontario, which is referred to, adopt similar laws and regulations to those in Canada (which may yet be largely improved upon) for enforcing a "close season" in which these fish reproduce their species, unmolested by the American fishermen; regulate the nets as to length, size of mesh, etc., so that the young and immature fish shall not be taken; supplement this by an extensive system of artificial propagation ; adbere to this systen for years, and every year; eschew the iniquitous clap-trap of greedy fishermen and party politicians, whose only desire is to kill and destroy for the present, caring nothing for the future, and I doubt not the fish wealth which Providence had so bountifully supplied the waters with for the use of mankind may again be largely replenished. Otherwise, but a few more years of the present reckless system of tishing must inevitably bring about such a depletion in Lake Ontario and elsewhere, of the whitetish and other fishing industries. as to make them counted as things of the past.

Let your Commissioners condescend to ask the co-operation of the Canadian authorities for the preservation of the fisheries in Lake Ontario or elsewhere, and I doubt not but that it would be received courteously and acted upon with that mutual spirit which should prevail between people, though of different nationalities, for the preservation and improvement of a source of wealth which so largely abounded in the dividing waters between them, but which now, for the want of proper care, is fast passing away.

Yours very truly,
SAMUEL WILMOT.

## UNITED STATES SALMON AND WHITEFISH HATCHING STATION ON LAKE ONTARIO, N.Y.

Following is a report in Congress upon the Bill for the erection of the hatchery, and accompanying it is a letter from the United States Fish Commissioner. This will prove one of the most important stations of the Commission :-

Mr. Farquhar, from the Committee on Merchant Marine and Fisheries, submitted the following report:-

The Committee on Merchant Marine and Fisheries, to whom was referred the Bill (H. R. 13350) for the establishment of a fish hatchery in the State of New York, near the St. Lawrence River, respectfully report said Bill back to the House, with a proviso thereto as follows:-

Procided, That the Commissioner of Fisheries shall first be satisfied that the State of New York has taken efficient measuces for the regulation of periods for fishing and for proper protection of fish in the spawning season in the waters of northern New York.

And that when so amended your Committee recommend the passage of said Bill.
The accompanying letter from the United States Commissioner of Fisheries, communicated to the Senate, gives sufficient reasons for the establishment of the fish hatchery proposed to be established by the Bill, and the same is made a part of this report :-

## U. S. Commission or Fish ani Fisheries,

Washineton, D. C., 26ith January, 1891.
Sik, -In obedience to Senate resolution of 18th December, 1890, directing the United States Commissioner of Fish and Fisheries to report to the Senate as to the desirability of the establishment of a fish hatchery in northern New York, near the St. Lawrence River, I have the honour to report as follows:--

The basin of the St. Lawrence, including Lake Ontario and Lake Champlain and the innumerable smaller lakes and tributary streams which drain into these, comprises fully one-half of the area of the State of New York, about one-fourth of the State of Vermont, and on the Canadian side a more considerable drainage area.

In Lake Ontario whitefish were formerly very abundant. The value of this fishery has deelined year by year, and at present the production is relatively insignificant compared with the whitefish fisheries of Lake Erie, Lake Huron and Lake Michigan.

In the waters referred to a like decline was in progress, but those who were interested in those fisheries were prompt to recognize the necessity of legislation to restrain and regulate the methods, and apparatus, and seasons of capture.

Artificial propagation was also systematically resorted to, to supplement and reinforee natural reproduction, and whitefish hatcheries were established by the States of Michigan, Ohio and Wisconsin, and by the Canadian Govermment. Entering the field at a later date, the United States Commission has established stations for the collection and hatching of whitefish at Alpena, Mich.; Duluth, Minn.; and Put-in-Bay, Ohio.

The result of this co-operative fish culture work by the Canadian, State, and [rinted States Fish Commissioners has been not only to arrest the alarming decline that was in progress, but to determine a marked increase in the catch of whitefish in those waters in which fish-cultural work has been carried on.

The marked contrast between the present conditions of the whitefish fisheries of Lake Erie and Lake Ontario sharply defines and emphasizes the necessity of artificial propagation as a means of maintaining and improving our important commercial fisheries, and of creating such in waters where they have not before existed.

We can not afford to neglect so important an economic resource, one whieh gives such substantial and valuable returns for moderate expenditures.

We can not expect individual enterprise to undertake such work in public waters in the expectation of private gain. Men, however public-spirited, will not sow the seed of a harvest which all men may gather. Our lakes and rivers and coast waters must be farmed by the Government for the general use, and under such rugulations as will establish and maintain the largest production.

Another important commercial species which formerly existed in Lake Ontario in marvellous abundance, but which is now so rare as to be an object of curious interest when seen, is the Atlantic salmon. Sixty years ago, each season it ascended the St. Lawrence in vast numbers, and swarmed in all its tribu-
taries. Following both shores of Lake Ontariv, it ascended all the smaller streams which fall into it and which afford suitable spawning grounds for the matue fish and favourable nurseries for the fry during their period of river life.

The following extract from the ammal report of the Department of Marine and Fisheries of Camada, for the year ending 30th June, 1869, will be instructive as well as suggestive :-
"Special Report of Inspectors Whitcher and Yrnniny, on Fish-Breerting at Newcastlc, Onterio.
"We proceeded yesterday to Newcastle, Ontario, in compliance with your directions, and made a persomal inspection of the fish-breeding establishment there, under charge of Mr. Wilmot. The premises are situated on Baldwin's or Wilmot's Creek, a small stream traversing the township of Clarke, in the County of Durham, and discharging into Lake Ontario, about forty miles east of Toronto. This creek is well situated for salmon, as it forms a natural inlet of the sheltered bend of the lake between Bendhead and Darlington. Although at its entrance into the lake it passes through a marshy lagoon, the bed of the stream farther inland is of a gravelly nature and the water is pretty clear, regular, and lively in its flow. In early times it was famous for salmon, great nmmbers of which frequented it every autumn for the purpose of spawning. They were so plentiful forty years ago that men killed them with clubs and pitehforks, women seined them with flannel petticoats, and settlers bought and paid for farms and built houses from the sale of salmon. Later they were taken by nets and spears, over 1,000 being often caught in the course of one night. Concurrently with such annual slaughter, manufactories and farming along the banks had obstructed, fonled and changed the creek from its natural state, and made it less capable of affording shelter and spawning grounds. Their yearly decreasing numbers at leugth sucenmbed to the destruction practised upon them each season from the time of entering the creek, until nearly the last straggler had been speared, netted or killed."

The history of the salmon fishery of Wilmot's Creek, so graphically told by the Canadian commissioners, has been repeated in every stream of the State of New York which drains into Lake Ontario and the St. Lawrence River. All were frequented by the salmon, and from each, each season, went out a numerous colony of parr and smolts, which descended the St. Cawrence to the Gulf, where they remained until they had attained size and maturity, when, obeying the impulse of reproduction, they ascended the St. Lawrence and distributed themselves to all the tributaries of lake and river, carrying back to these inland waters the rich harvest of the sea which they had garnered.

This magnificent fishery has ceased to be. Did it exist to-day, and were the conditions which made such a fishery possible prevailing to-day, a hundred streams now barren would afford salmon fishing as attractive as the more favoured waters of Canada, and the catch by net in the lake itself would furnish the motive of a valuable commercial fishery.

The cause of the disappearance, practically, of salmon from the streams of the St. Lawrence Basin, has been chiefly and primarily the erection of obstructions in all of the rivers, which have prevented the salnon from reaching their spawning grounds, and so natural reproduction has been absolutely inhibited.

The restoration and maintenance of the whitefish tisherips of Lake Erie, or of the salmon fishery of the lake and rivers, would either of them furnish sufficient motive for liberal expenditure on the part of the Government, if we consider the matter from a purely practical and economic standpoint. It is not only possible, it is entirely practicable, to restore and maintain these fisheries, by adequate recourse to means and agencies entirely within our control.

The regeneration of the fisheries must be accomplished through fish cultural work, systematically and persistently pursued. Their maintenance must be assured by concurrent regulation of the lake fisheries by the United States and Canada, and by the enforcement on the part of the State of New York of such regulations and requirements as will pernit the salmon to ascend to their spawning grounds. In the absence of such regulations and requirements it will not be reasonable to expect that the results of fish cultural work will be permanent or compensating, however extensive such work may be.

A fish cultural station, planned to mett all the requirements, must be very extensive and eomplete in all its appointments, and will involve larger expenditure than would be required for a station devoted exclusively to the production of whitefish or the salmonidse. The hatchery must be commodions, providing at once for the hatching of $100,000,000$ of whitefish and for the incubation of $1,000,000$ salmon ova. It must also provide trough accommodation for holding $1,000,000$ salmon fry for some weeks after they begin feeding. Quarters, offices, storage rooms and shops must be erected; an extensive system of ponds for rearing the salmon nust be constructed, for none would be released in open waters until they were of sufficient size to have comparative immunity from capture by other fish.

At the first installation of the station, and for several years, it would be necessary to draw our supplies of whitefish ova from our collecting stations on the upper lakes, and our salmon ova from Maine. With the improvement of the fisheries, we should expect to find our eventual source of supply in Ontario waters, and the location of the station should be with reference to this. Wherever placed, it should be convenient to transportation routes, and should control a gravity water-supply which should be withour stint or measure.

The cost of such a station as I have indicated, complete in all its appointments, would not be less than $\$ 20,000$, exclusive of cost of site and water franchises, and for its maintenance there would be required an appropriation of $\$ 9,000$ per annum.

Respectfully,
Hon. Levi P. Morton,
Vice-President.

MARSHALL McDONALD,
U. S. Commissioner of Fisheries.

## RESULTS OF FISHCULTURE.

## ("Forest and Stream," Lst Jtenuary, 1891.)

It is probable that to those of the readers of Forest and Stream who are not particularly interested in fish culture, and are therefore not acquainted with the facts, the statements of Mr. Milton Peirce, which have recently been made concerning the present aspects of trout culture, will appear to be quite frank and plausible. Therefore, in view of the attitude he holds toward present methods of fishculture in general a little further dissection of them, as evidence of his competency as a critic, may be advisable. And first,
what does he offer to sustain his statements? Simmered down, it might be formulated into the following declaration, viz. : "I, Milton $\mathcal{P}$. Peirce, an eminent authority on fish culture on my own showing, say that is so, and therefore it is so." Mr. Peirce's egotism is apparently unconscious, to do him justice. The gist of the controversy between Mr. Peirce and myself is well set fourth in the following from the American Angler of 4th October:
"A Mad Fish Cultcrist.--We print the annexed communication in full at the request of Mr. Peirce, whose main trouble seems to be restlessness under opposite opinions to his own. His dictatorial style is offensive, and discussion of any subject with him appears to lead to personalities that are always avoided and condemmed when gentlemen exchange views on public questions. Our editorial, 'A Mad Fish Culturist,' published some weeks ago, was suggested solely by the humorous element contained in two public assertions by Mr. Peirce, that Byers (an old veteran) was a callow youth, and that he (Peirce)'knew it all. We had no special design to belittle Mr. Peirce's abilities or ridicule his pretensions, and cheerfully accede to his somewhat modest request that we should allow him to blackguard us in our own columns. - En.

I very respectfully decline to accept controversy upon Mr. Peirce's terms. Trout culture is not being abandoned, but is keeping step with other branches of fish culture, and needs no very urgent defence. Mr. Peirce states that trout culture has been discontinued in France. Now the papers by C. Raveret-Wattel, F. Muntadas and Frank H. Mason, Consul at Marseilles, in the Bulletin of the cinited States Fish Commis sion for 1887, are direct evidence to the contrary. Mr. Peirce's observation appears to be of the period when very young fry were deposited as food for the cottoids which inhabit trout brooks, instead of the past four or five years, during which the output has been yearlings, which are not only able at once to defend themselves against their enemies, but also to devour the smaller of them, and which policy is producing such marked results in this country and in Enrope.

Mr. Peirce is willing to admit that if his methods are followed there is still some hope for fish culture. (This appears to be the main trouble with him). In trout culture it consists in increasing the meanderings of the streams. Even if there were anything in this, those who are at all familiar with trout streams are aware that they will insist upon laying out their own courses.

There is a vague hint of some experiment in shad culture by "Peirce's methods " now being made. This is certainly interesting news, and the result will be awaited with great expectations. But let us take up the shad and whitefish culture as tests of Mr Peirce's faimess and reliability as an observer, since these are commercial fisherjes, the statistics of which are regularly and accurately collected, and cannot be comtroverted by vague and unsupported assertions. Any reasonable person would be convinced by their growing abundiance and cheapness that there is a constant increase in the numbers of shad. In spite of the fact that by reason of the wonderful improvements in methods of refrigeration, by means of which they not only can be shipped to any distance, but are kept in fresh condition for any length of time, and alsc notwithstanding the rapidly increasing population. fine roe-shad were sold in the cities of the Atlantic coast States during the spring of 1890 for 25 cents each. Further, so great was the glut that for the first time in twenty-five years the salting of shad was begun on a commercial basis on Chesapeake Bay. Still further, as many as one hundred barrels of shad have been caught at sea recently at one haul of a purse-net by mackerel fishermen. These evidences would be explained by Mr. Peirce by the assertion of "a year of plenty." To this I will refer further on.

Mr. Peirce's qualified admission as to the value of artificial stocking, as shown by the population of Pacific waters with shad, may be supplemented by some statistics of interest. The shad catrh of California in 1888 was $151,871 \mathrm{lbs}$., or about $45,000 \mathrm{fish}$. In many places where the largest runs occurred, notably in Monterey Bay, there is no special apparatus used for shad, and more are taken by accident than otherwise. The catch, therefore, while large for a new fishery, probably gives no real idea of the abundance of the species. During 1887 as many as one or two tons of shad were shipped from Santa Cruz, Cal., in one day. They are found as far north as British Columbia and Alaska, and certainly furnish, to a reasonable mind, sufficient evidence as to the beneficial results of artificial stocking. If the one or two hundred thousand delicate little fry carried in cans from the Atlantic coast to California, and deposited in waters to which they were until then unknown, would live and multiply at such a rate, what must be the resuit of work so much more extensive and constant.

Now, to return to the Atlantic coast. If Mr. Peirce were to ask shad fishermen at Gloucester, N.J., Alexandria, Va., or on the Susquehanna, above Havre de Grace, whether the shad fishing is improving or declining, he would probably be told with a mournful shake of the head that shad fishing is "played out." It is very evident that it is from such sources that Mr. Peirce draws his inspiration. What are the facts in the case as shown by the carefully collected statistics of the Fisheries Division of the United States Fish Commission? Why, that at present the shad catch of the Atlantic coast is increasing at the rate of about one million per annum, that since 1884 this increase has finally resulted in an addition of $\$ 1,200,000$ a year to the food supply of the country (at the moderate estimate of 20 cents each) in this one species. And to show that this is not mere vogue, guess work or speculation let us take what statistics are available for the purpose. The first statistics which were taken after the commencement of the artificial propagation of shad, which were those of the census of 1880 , which showed the catch of that year to have been 4,140,968. It was not until 1885 that a systematic collection of statistics of the Atlantic coast fisheries was begun. In that year, although at that time, as compared with the present, the output of fry was but meagre, the catch had increased to $5,173,931$, an increase of $1,032,963$, representing an increase of value of $\$ 208,593$ over 1880. In 1886 the catch was $5,584,368$, an increase in number of $1,443,300$, and in money value of $\$ 288,680$ over 1880. In 1887 the catch was $6,715,405$, an increase in number of $2,574,437$, and of money value $\$ 514,887$ over 1880 . In 1888 the catch was $7,660,474$, an increase in number of $3,519,506$, and of money value $\$ 703,901$ over 1880 . The statistics for 1889 and 1890 are not yet complete, but a conservative estimate places them in the neighbourhood of $9,000,000$ and $10,000,000$ respectively. The money value is based on a rate of five shad to the dollar. It will be seen by the above statistics that in the four years of 1885-88 theaggregate money value of the increased production was $\$ 1,714,061$, and the average annual increase in value $\$ 428,515$. Now, it is well known that it was due to the rapid decline of the shad fisheries and the threatened extinction of that fish, more than to any other cause, that the United States Fish Commission came into existence, and to the work of that great organization, supplemented to a small extent by some of the States, alone can be traced this gradual and regular increase in the shad fisheries. How, then, are we to account for the impression which prevail in some localities that the river shad fisheries are on the decline,
and which are undoubtedly the basis of Mr. Peirce's erroneous conclusions. Here comes in the value of statistics over the conjectures of disappointed fishermen and the local Veritas or Pro Bono Publico. The explanation of it all will be found in the development of the pound-net or gill-net fisheries of the Atlantic coast. Let us take Chesapeake Bay for example. The number of pound-nets in these waters in 1887 was 973 ; in 1888 it was 1,414 . The statistics of 1889 and 1890 are not yet available, but it is estimated that there are now at least 2,000 of them. By reason of these great pound-nets, some of them stretching two and three miles out from the shore, the bulk of the shad catch is now taken in salt water, and finds its way to market, to a great extent, through new channels. As four men operate as many as ten pound-nets, there is great economy in this method of fishing. The gill-nets, also requiring but little capital, have greatly increased in number, and so the fish which find their way into the rivers are apparently less abundant, because the catch is divided among a greater number of fishermen.

The proportion of fish taken in the bays and lower portions of rivers is becoming greater each year, and thus the great and expensive shore seines in fresh water are becoming less and less profitable. As a matter of fact, however, there is a constant increase in the number of shad caught in the rivers, as the statistics show. During the season of 1890 , which was regarded by the fishermen of the Potomac River as $\approx$ poor one, 100,000 more shad were canght in that stream than in 1889 , as shown by the statistics of Health Officer Addicks, of Washington, D.C.

It is well known that certain of the salt fish industries of New England are declining, simply because, by reason of improved refrigeration, more fish arr finding their way to the markets of the country in a fresh condition, and this, to some, has the appearance of a decline in the fisheries themslves. During 1888, 1889 and 1890 the output of shad fry was many millions greater than during the entire previous history of the work, and this great output will probably be heard from 1891 to 1894 , showing, it can be safely predicted, a still greater ratio of increase.

Mr. Peirce complains of the meagre shad catches of the New England waters. This can be traced to the meagreness of the output in those waters. The total output of 1886 was $34,659,000$. Of these, but $5,500,000$ were deposited in the Hudson and New England waters. In 1887 the output was $108,425,000$, and $5,250,000$ of these were placed in the Hudson aurl New England waters. In addition, 6,644,000 eggs were sent to Cold Spring Harbour for hatching and deposit in the Hudson and its tributaries. Here we can trace out cause and effect very clearly. Perhaps in this connection the following concerning the shad fishery of Florida will prove interesting : Compared with 1880, the catch in Florida in 1889 was 1,000 per cent. greater, while the number of fishermen employed was only 200 per cent. greater.

The output of shad fry by the United States Fish Commission is now nearly $150,000,000$ per annum, The survival of 7 per cent. of these would equal the shad catch of the Atlantic coast. "Does any one suppose that one in fifteen of the plant of young shad made in the waters of the Delaware last season will ever be seen again by mortal eye?" asks Mr. Peirce in the late Journal of Carp Culture and Rural Hydraulics. Well, judging by the results on the Pacific, some of them do live in spite of the wails and lamentations of the "proplets." And would the survival of seven out of one hundred of these fry be an unreasonable expectation?

And now concerning the "years of scarcity and abundance" which prevailed generally before the statistics were regularly and systematically collected, and which are still used as an argument by those who view the question from a purely local standpoint, or are not well informed. Regarding seasons of plenty and scarcity of shad, it has become recognized as a law of the species that years of plenty in certain rivers are superinduced by a high temperature of the water in the early season. Thus while the run of shad in southern rivers and coastal waters south of Virginia may be exceptionally large, the passage of these migratory hordes into the Chesapeake and Delaware basins, as well as into the Hudson and Connecticut, is controlled entirely by the temperature of those waters, while, as often is the case, the waters of the Chesapeake nay be of suitable temperature, a reverse condition may exist in the Delaware, in which case the run in the Chesapeake and tributary streams is usually greater than in the Delaware. Reverse the order and like results are obtained. The movement of these migratory species in spring along the coast from the time of their appearance in Florida rivers is wholly a matter of condition of environment. If the waters are not suitable the migration continues until proper conditions present themselves. A perusal of the reports of the Canadian fishery officials for the years in which the shad were least abundant in our waters shows that they were the most prosperous years in these regions.

Regarding the abundance of whitefish, it is acknowledged by all the leading dealers and fishermen of the largest shipping centre on the lakes (Sandusky) that artificial propagation is the only means of maintaining a supply of that species. Again, the fact,s adduced from the shad hypotheses are applicable to the whitefish. There are seasons of bounteousness in the United States, while the opposite extreme applies to Canada; yet an evenly distributed supply is more generally the rule. With this fish partial returns for 1888 indicate a marked increase in the abundance in localities where artificial propagation has been systematically carried on on a large scale. This is especially noticeable in the fisheries of the western end of Lake Erie. In the region embraced between Toledo and Vermilion, and including those towns, together with Port Clinton, Sandusky, Bass Islands and Huron, the increase in the quantity of fish in 1888 as ompared with 1885 amounts to about $12,000,000$ lbs., having a market value of over $\$ 300,000$. The catch 1888 in the region named was nearly as large at that of the entire lake in 1885 . Now, let us see how thecrease of fishing appliances would be likely to affect the individual catches of the fishermen and create We impression among them that the fishery is declining. It is hardly likely that declining fisheries would offer inducements for a rapid increase of fishing appliances. In Lake Lrie there were, in 1880, 758 pound tets ; in 1885, 928 . Of gill-nets there were in $1880,5,775$; in 1885, 22,664 . Of haul seines there were, in 1880, 18 ; in 1885, 71. Persons employed in 1880, 1,690; in 1885, 4,298. Steam vessels in 1880, 9 ; in 1885, 58. Other vessels and boats in 1880, 593; in 1885, 1,483. Total of primary products of the fisheries in $1880, \$ 29,087,000$; in $1885, \$ 57,556,517$. This shows the increase for five years, and the succeeding five years, when the statistics are completed, will show still greater increase. If Mr. Peirce is wrong in these matters of shad and whitefish culture where is he likely to be right?

My purpose in taking the trouble to produce these statistics is not with an expectation of convincing Mr. Peirce of the fallacy of his position, I am well aware that that is impossible. But they will enable the readers of Forest and Stream to form an intelligent opmion on the subject, as they represent not only the carefully collected statistics of a great Government bureau, but also reflect the opinions of the great fish culturists
of the country, not one of whom will be found to agree with Mr. Peirce. His charge is that they are all self-interested, and in fact no better than robbers. I leave that element of the discussion to your readers. I will stop only to correct one of Mr. Peirce's misstatements. He attempt: to make it appear that the publisher of the Journal of Carp Culture and Rurrt Hydraulics was in some way attacked by me. This is not so. That gentleman has my sympathy. The case still remains the same: Milton P. Peirce $2 \%$ the world of fish culture. If he was right Prof. Baird was wrong, and all the living lights of modern fish culture are frauds or victims of delusion. And further, if he is right the sooner we know it the better. The country is going to destruction rapidly enough now, according to the "prophets."

Mr. Peirce has some special-personal grievances against me.
First, he thinks I am not a fish culturist - as he is. I hasten to way that I am not, and never pretended to be.

Second, because some months ago I said that I had recently had an application to lease certain premises for a trout hatchery, he has since persistently advertised me as the malevolent owner of a trout strean with which I wanted to victimize some poor deluded fish culturist, who had not consulted Mr. Peirce. I am not so fortunate. The fact is, I own a little tract of land on which there is a group of springs, such as are used in this neighbourhond for hatching and rearing trout. The State Hatchery has a similar group and its enterprise is a wonderful success. I know of five such plants near this city. I spoke of the application simply to show that another enterprising citizen wanted to embark in the business. The land was already leased and used for another purpose.

Third, I said early in this controversy that trout planting had greatly improved the fishing in many streams of this State, I think using the number "a hundred." Ever since Mr. Peirce has been in mortal distress because I would not give him the names of those hundred streams. I desire now to amend by saying "hundreds" I think the Platte alone has a hundred tributaries above where it leaves the mountains, and all its waters, accessible to trout, have been improved by planting, in the main stream and its larger branches, trout fry from the State hatchery. But only a few of these streams have been named as yet, and hence it is impossible to satisfy the consuming curiosity of Mr. Peirce upon that score. Besides the Platte, plantings have been made in a dozen other great river systems, or watersheds, viz. : The Arkansas, Kio Grande, Les Animas, San Juan, Gunnison, Blue River, Eagle River, the Boulders, St. Vrain, Big and "ittle Thompson, Cache-a-la-Poudre, North Platte, and others. I may as well amend again and change "hundreds" to "thousands." And, bear in mind, the Eastern brook tront is not a creature of accidentride Mr. Peirce's theory of "years of plenty and years of scarcity "...in this region. It is an exotic, introduced here but a few years ago through the State hatchery-the best investment the State ever made.

In order that Mr. Peirce may not stumble over any more imaginary ohstacles on my account I wish to repeat that I am not a fish culturist ; that I have no trout brook to lease, and am not a competitor in his line of business: that I never caught a fish for the purpose of selling it; that I never sold a tish first or second hand; that I know what I see, believe many things I hear a goodly portion of that which I read. I know that trout hatching and trout planting in the waters of Colorado have been a marvelous success; I am convinced that fish culture in other lines in many parts of the world has been no less successful, and that the science is gaining ground every diay to the incalculable benefit of nations and peoples. I have lived long enough to see its beginning (in this modern age) to follow its history and to glory in its magnificent triumphs. I do not believe that Mr. Pcirce's calling me "callow" in all the Sportsmen's papers of the country, as he seems determined to do, will either stop or turn back the wheels of progress in this great industrial enterprise, nor do I think that all its disciples are fools, and that Mr. Peirce is the only living creature who knows all about it.-W. N. Byers.

## FISH CULTURE

its progress in various countries of the worlid, showing its present condition and reslets.

## (From "The Edinburgh Scotsman.")

## [By George Malcolm, Invergary.]

Can any one render a reason why the family fish-pond should not be as general and useful as the family poultry-house? The adyances recently made in the art of fish culture can hardly be described as less than marvellous, and do certainly favour the view upheld by modern pisciculturists that there is no more difficulty attending domestic fish-rearing than there is about domestic poultry-keeping.

Many large fish-breeding establishments, or fish farms, as they are sometimes called, have lately been planted throughout England and Scotland upon a commercial basis, some of which are already doing an extensive and, it would appear, remunerative business. From these great numbers of young fish, and artificially fecundated ova of fish, chiefly of various varieties of non-migratory trout, have been disseminated throughout the country for the furnishing of small private fish nurseries, and the stocking or repletion of larger lakes and streams, both at home and abroad. Printed catologues and pricelists are now regularly issued from these establishments at the advent of every fish-hatching season, and orders are promptly executed to all parts of the United Kingdom; or, as regards ova, to almost any part of the world, with a precision and success which are marvellous, and would, if attempted not very many years ago, have been regarded as the wildest folly. Now we have rival fish farmers keenly advertising their wares by the same attractions as are practised by the breeders of pedigree cattle or poutry, and breeders proclaiming the superior purity of pedigree or surpassing vigour of constitution of their especial stud fish over others in the business.

All this is no doubt very novel, and may be startling to persons who have not noticed the silent but wonderful strides made in the fish-bn eeder's art in quite recent times. To those who have been engaged in it, however, or who have followed its advances, there is really nothing surprising about it. They know that the possibilities of fish culture have by no means yet been attained. We seem, indeed, to be only at tife dawn of an art not only of a most fascinating character, but with a great future of national usefulness before it. Nor is the field of fish culture limited to the family fish-pond or to private cultivation; by far the more important side of pisciculture, or piscifacture, as the French first called it, is that which bears on the question of an abundant, certain and cheap supply of food fishes for our teeming populations. In our country fish is rarely abundant and cheap, except during an accidental and profitless glut; and while nearly all other articles of human subsistence have been growing more abundant and cheaper, fish, on the whole, has been getting scarcer and dearer.

Here, then, we have presented to us a very interesting economic problem, with remarkable possibilities of beneficial development ; and it is perhaps due to this, and to the stimulation of the great International Fisheries Exhibitions held at Berlin, Edinburgh, London, New Orleans, and elsewhere, that among the few subjeets of domestic or commercial interest which bave not been suppressed by the domination of "Irish affairs" in recent years, fish culture has been steadily making way. The Irish " Nationalist" is a being of omnivorous instincts, but it would probably baulk the ingenuity of the most versatile member of that party to discover in the innocent sejence of ichthyology any design against his country.

In view of the encouraging successes of other nations, more especiatly America, of which more hereafter, in the development of aquaculture, and of the obvious possibility of emulation of these examples, why, it may, well be again asked, is fish so dear? Fish is almost alone among the commoner commodities of life scarce and dear in this country. Only the rich and well-to-do can always have it; yet the existence of great magazines of fish food all around our coasts, our drafts on which are but small, is admitted on every hand. The wonder is increased when it is considered that these stores are of perennial growth, and capable of practically unlinited extension at comparatively small expense. Unlike agriculture, ocean fish farming, or aquaculture, is free to all, is subject to no rent, is exempt from rates or taxes, and requires neither tilling nor manuring in the sense applicable to land husbandry. Why, then, are these valuable possessions so little utilized? Why do the British public, though in chronic grumble about the price of fish, still submit to this grievance? It is the present object to offer some elucidation of this matter through a description of the present condition and prospects of the interesting and rapidly-advancing subject of pisciculture. The science of aquaculture embraces various other matters, but here it is proposed to restrict ourselves to a consideration of its bearing on our food and game fishes, and the subject naturally divided itself into two branches, viz. :--

## 1. Private fish culture for domestic requirements, recreative purposes, \&c. ; and

2. Public fish culture, conducted at the public expense, for national and commercial purposes.

In case the benefit derived from fish culture in the past, and the advantages expected from it in the future, may still be viewed with doubt in any quarter, it may be well to formulate some of the objects aimed at, and then to describe the benefits which may reasonably be oltained from an intelligent and liberal-spirited interpretation in practice of these objects. References will be made to the history, progress and present position of the systems of fish culture in other countries as well as our own.

Although our object is chiefly to describe the advances of fish culture in the most recent time, and its capabilities of further benefisial development, readers who are interested in the subject will be willing to have some short account of its past history. Everybody knows in a general way that the art of angling, and of tish capture at large, and possibly the art of artificial fish-breeding, too, in the crudest fashion, are of the highest antiquity. But though a few leading and favourite works, such as Walton's inmortal classic, which has now gone through more than one hundred editions; Sir Humphrey Davy's charming
'Salmonia," Christopher North's "Noctes Ambrosiane," and several of the more reputable manuals on angling, are extensively read, not many persons outside the circle of the knights of the angle, or the profession of ichthyology, are aware of the immense body of literature which exists upon these subjects. A distinguished living American pisciculturist recently stated that his library contained upwards of 2,000 volumes relating to fish and fishing, and that he regarded his collection as far from complete. The late Mr. Alfred Denison, who was well known as one of the most enthusiastic of anglers, was the fortunate possessor of an almost unique library of augling works, which numbered over 3,000 volumes. In the "Bibliotheca Piscatoria" of Westwood \& Satchell (1883) 3,158 editions and reprints of 2,148 distinct works are registered. And still new works on piscatorial subjects come in great abundance from the press of nearly every nation.

Antiquarians of the piscatorial type have claimed for angling, with perhaps less reliability than enthusiasm, that it was almost contempormeous with the advent of man. It is at least frequently mentioned in the earlier portions of Holy Writ. Fishes take precedence of terrestrial animals in the Mosaic account of the genesis of life; and fishes were, in the nature of the case, the only form of life which suffered not from the Deluge. The readings of ancient Egyptian walls and monuments have revealed many allusions to angling and representations of hooks, spears and nets, showing that this people werer anciently acquainted with some of the modes of fishing still practised, rude and simple though their implements were, as compared with the number and elaboration of the fishing requisites of our day.
"That the practice of casting into the brook," says a modern writer, "had its origin in necessity, the mother of so many inventions, can hardly be doubted; but it is equally clear that the refined skill exhibited in this pursuit in the present day has been derived from leisure and the love of sport, aided by the more delicate gear which modern ingenuity has invented for the deception of the finny race.'

Between the rude and clumsy implements depicted on Egyptian tombs or Herculaneum pillars, and the ingenious and elegant production of the fishing tackle factories of our day ; between the Vivaria of the Romans or the fish stews of the middle ages, and the splendid fish farms and stations, with their scientific equipments of our day, there is indeed a long step.

Among the ancients the earliest systematic writer on fishing was Oppian, whose Halientica in five books is entitled to rank. In our own country the earliest example of a printed book on fishing is the famous "Booke of St. Albans," by Dame Juliana Berners, the first edition of which is dated 1486, less. than ten years after the first book was printed in England. Dame Berners, who is said to have been Prioress of the Benedictine Nunnery of Sopwell, is unquestionably the earliest writer in English literature on the art of angling. The "1ysporte of Fysshyng," as originally published, was associated with treatises by the same authoress on hunting, hawking, horses, and coat armour, but ere long that part of the conjoined works in which we are here interested was separately republished, under the title "Treatise of Fysshyng wyth an Angle," and since that period this very quaint book has gone through many editions, Of the earliest editions very few copies are extant. Of the third edition (1503) only one copy is known, It belonged to Mr. George Daniel, was sold in 1864 at his sale for $£ 110$, and is now in the Huth Library,

The next book of note on fishing was the first edition of Mascall's" Booke of Fishing with Hooke and Line, and all other instruments thereunto belonging," which appeared in 1590 , but which is notable to us only as containing at that early date some remarks on the preservation of fish in ponds.

These two works, with the "Secrets of Angling," by John Dennys, 1613, and Markham's "Pleasures of Princes," were the only books dealing with angling which had keen published in this country prior to
the appearance of Isaac Walton's "Compleat Angler." Barker's "Art of Angling" indeed appeared two years before Walton's book, and the latter acknowledges his indebtedness to the former in the preparation of his great work; but Barker's smaller work may be said to have ushered in the Waltonian period.

Of the "Compleat Angler" detailed notice is unnecessary. No book in its particular walk of literature, and few in any other department, has had a tithe of its popularity. Originally published in 1653, it has already been more than one hundred times republished, and apparently the demand for it is destined to be perpetual. The popularity of Walton's book in the present day, however, certainly does not arise from its merit as a reliable guide to the art of angling, but rather from its almost perfect pastoral style, and the quaint and restful thoughts permeating its delightful dialogues and reveries. The earlier editions of the "Compleat Angler" are now very scarce. Copies of the first edition bring a very high price. The one in the Gibson Craig Collection, a fine specimen, recently sold, fetched the unprecedented sum of $£ 195$.

Some apology may be necessary for this digression into the domain of angling literature, which, however, will not be further pursued. Suffice it to say that so numerous have been the works published on fish and fishing during the last and the present centuries that at the present time it is computed that in English literature alone there are between 600 and 700 works on angling, and probably about 300 besides, which treat of the propagation of fish, and the management of British and colonial fisheries. The pursuits and pleasures of the knights of the rod and angle may be, and as a matter of fact already are, largely augmented by the aids of intelligent fish culture. It is, therefore, meet that the angler should be here considered, though it must be admitted that his part of the case is a mere fringe of it. Aquaculture embraces very much larger and more beneficent possibilities, and the day is probably not far distant when public fish culture, carried on for the public behoof at the public expense, will receive as much attention in this country as it does in many other countries, notably in America.

Whoever cares to look into this question will find no trustworthy traces of fish culture by artificial or aided means having been practised by the ancients, or even in the middle ages. Reference may, no doubt, be made to the extensive fish ponds or vivaria of the Romans, which, as is sometimes claimed for them, may also have been known in still older times to the Egyptians and Chinese ; but there is no solid ground for believing that any of these nations ever practised or were in any wise acquainted with the modern methods of the fish culturist, who practises his art by manual extrusion of ova from live fish, followed by its artificial fecundation, and all the nice details of management through the embryonic stage, and the infantile and juvenile periods of fish life.

The mode of pond culture practised by the ancient Egyptians and the later Romans, just averted to, was in reality not fish cultivation, but fish capture, such as is known to the present day in the lagoons of the East. It consisted in merely driving fish by natural means into prepared water enclosures or vivaria some of which were of vast extent, where the stock of impounded fish could be drawn upon at pleasure, and replenished from time to time by fresh drafts from the ocean. In much the same manner were managed the smaller ponds and fish stews of a later period in our own country, of which abundant remains--but little or nothing but remains-are to be found to the present day all over Englind. These remains are specially numerous where stood the homes of the monks and friars of a former age. Whosoever is curious about this will find, if he looks into the topography of the bygone great ecclesiastical houses, that they were set down with a very discriminating regard to the bounties as well as the beauties of their situation. While their founders had one eye open to the fairness and fertility of the surrounding domain, they generally turned the other to the proximity of some abundant fish, especially salinon. Alas ! that so many of these rivers are now entirely bereft of salmon--indeed, of edible fish of any kind.

The practice of pond culture or the rearing of fish, chiefly carp and gold fish, in ponds for domestic use, has been long in use in Germany, and is still in considerable vogue. All the great land owners--Prince Bismarck, for example-maintain a supply of carp, not only for their own private establishments, but in some cases for commercial gain. Nor is this confined to the larger houses; domesticated carp are very common among the Germans, who have set an example in that respect which has been very successfully copied recently by the Americans. From the eggs of highly-bred carp, originally inported from Germany, the United States Fish Commission have propagated large numbers of that fish, and distributed them to all corners all over the States. In our own country the systematic keeping of fish in confinement for domestic or utilitarian purposes has been in abeyance for centuries. Some fish ponds there always have been, of course; but these have been maintained chiefly for sport, or for the embellishment of the private demesnes to which they are attached. We are again, however, it is hoped-thanks to the impetus derived from recent discoveries in pisciculture- on the eve of a revival of pond culture of fish for domestic requirements. Should there be such a revival, it may be presumed that, being now based on an intelligent alliance of science with practice, it may have the promise of success and stability. Many other varieties of fresh water fish than carp, though now, as regards this country, in a purely feral state, are amenable to a high degree of domestication. Intelligent artificial fish culture, it would therefore seem, may be the means of bringing the family fish pond into as real and common use as the family poultry or bee-house.

The merit of the discovery of the art of artificial fertilisation of the ova of fish belongs to a Westphalian German, named Stephan Ludwich Jacobi, who practised the art as early as 1778 . Some critics have sought to belittle Jacobi's discovery, by the assertion that it was merely the revival of a lost art, formerly known to the Italians, but there would appear to be no good grounds for supposing that artificial fish culture was known to any people prior to its discovery by Jacobi in the middle of the last century. To him it came undoubtedly as an original invention, and as such he is entitled to the credit of it.

The importance and widely-reaching possibilities of this discovery were at once apprehended, though it was not until long afterwards that it was brought into extensive use even by the countrymen of the discoverer. By Jacobi's own family it was practised for many years, and they would appear to have had correspondents in England and France, as well as in America. The relations of Jacobi the elder with England seems to have secured him a pension in 1771 from George II. Though the art thus discovered in Germany about the middle of the last century has been slowly developed, it can be traced in Italy in 1791, in France in 1820, in Great Britain in 1837, in Norway in 1850, in the United States in 1853 and in Canada in 1863. It is, however, only within the last twenty years that under alarm as to the economic condition of many of the world's greatest tisheries it has been taken up by any nation (with the single exception of France, perhaps) upon a great seale, and under official auspices, as the only feasablo means of reparation of improvident and wasteful use of those fisheries, and of maintaining in the future a full supply for every possible
public requirement. That public fish culture is equal to this will be seen later ; but, in the first place, some account of the processes of artificial fish propagation, as it is now practised, and of its application to private fish culture, will here be given.

The last two decades have seen the establishment, on a commercial basis, of a considerable number of private artificial fisheries in our own country, and by this means, so far as regards inland private fisheries, all requirements are being supplied. From these fish-farms, too, somewhat extensive contributions of ova have been made to our Australian and New Zealand colonies, with a view of solving the problem (still unsolved, we fear of acclimatization of salmonide in these waters. We have also had interchanges of ova with our American cousins. All this has been accomplished through private enterprise exclusively. It has been limitéd to non-migratory fresh water fishes and several varieties of salmonide-what are generally known as game fishes. But these are no more than the outworks of this great matter. So far as Great Britain is concerned, the culture, by artificial help, of ocean fisheries has had no existence. In that field we are, at the present time, quite outpaced by other mationalities. All the successes and all the honours have fallen to foreign pisciculturists.

Like many great operations, the fertilisation of the ova or eggs of fish is an exceedingly simple though delicate process. Nothing more is required than care in the selection of healthy, mature fish in a ripe condition $\rightarrow$ that is to say, ready to spawn in the natural manner-and some caution and gentleness in performing the operation. The operation itself consists in the passage, with more or less pressure, of the operator's hand down the abdomen of the female fish, thus extruding the ripe ova into a shallow receptacle, and afterwards suffusing the ova with the milt of the male fish obtained in the same manner. So far, if this process is carefully executed, there is almost no risk of miscarriage.

In early practice a good deal of water was thought to be an assential admixture in the fertilising process, but now what is called the dry method-a discovery of Wrasskie, a Russian pisciculturist-is in all but universal practice. Under the dry method, where little water is used, the percentage of fertilisation is much greater than under the former plan. If skillfully manipulated unfertilised eggs should not exceed 5 per cent. The rationale of this discovery which, though made in 1854, was not known out of Russia for a good many years afterwards--is that the spermatozoa or vital principle of the milt is much more powerful and active, and that for a longer period, when undiluted with water than when, as formerly was done, both it and the ova were submerged under several inches of water in the fecundating vessels.

It has been ascertained that ripe milt, if, when obtained, is at once excluded from air and water, may be kept alive for several days, an obvious advantage of this being that it is thereby unnecessary to hurry the process of impregnation. Some of the milt may even be saved for use on another day. It follows from this most interesting fact that, without removing the parent fishes from their homes, a cross may be effected between fish frequenting waters far apart. It may even be possible some day to effect changes of this vitalising material with our American brethern for the extension and healthy cross-breeding of some of our and their more valuable fish species. On this subject, Mr. Livingstone Stone in his "Domesticated Trout," makes these amusing remarks :-
"In consequence of the discovery that all mature eggs are impregnated by coming in contact with ripe milt--the fish, both male and female, being taken at random-we are compelled to admit, however unwillingly, that the origin of fish life, in artificial impregnation at least, is wholly a mechanical affair. The mere mechanical mixing of the ripe milt of any male and the ripe eggs of any female creates the germ of life, and perpetuates the race; all previous considerations of pairing off among the fish, or of this or that one selecting its mate, counting for nothing. The fish of either sex has no choice and no knowledge as to the individual through whom its progeny shall be generated. The female fish may become a mother without ever having seen her mate, and the male may become the father of innumerable offspring without ever having seen the mother. Whatever margin of uncertainty the unimpregnated eggs of the old system might have afforded for the conjecture that empty eggs were the consequence of mismating on the part of thefish, or rather of the manipulator, there is none left now. Mechanical contact of eggs and milt, indiscriminately taken, produces all the results that mutual affection and choice of mates could accomplish. There is now no possible place Ieft for sentiment in the connubial relations of trout that are artificially spawned.

Having secured a supply of properly impregnated ova, the next step in the process of fish raising is to place it in the hatching boxes. Since the days of Jacobi, Shaw at Drumlanrig, and the earlier experiments at Stormontfield, on the great Scottish salmon river Tay, the advances in the knowledge of fish culture have included many improvements in the apparatus employed in hatching. But one must repair to Germany or America to see fish hatching on the largest scale. Our own hatcheries are as yet limited to the propagation of fresh water fish and anadromous salmonidæe, but they include several establishments which in their special line of work have almost no rivals. The splendid fish farm at Howietoun, near Stirling, is a notable example, upon which its owner, Sir James Maitland, Bart., has bestowed the greatest pains, and no little expense, to render it what it is-the most scientific and complete, though perhaps not the most extensive, fish farm in the world. Beginning in an experimental way, and on a small scale, some years ago, Sir James has made many investigations into fish cultural science, and has successfully solved some knotty problems relating to hybridisation and other subjects. He has gradually extended his operations, until he is now in a position to supply, and does supply, his wares to all parts of the world to which the fish culturist's art has yet extended. Scarcely less complete are Mr. Armistead's well known fishery on the Solway, and the Stormontfield and Dupplin hatcheries, in Scotland; and in England, those of Mr. Andrews at Guildford, Mr. Capel at Crays Foot, the National Fish Culture Association at Delafore Park, and the Midland Fish Culture Establishment at Malvern Wells. A peculiarity of the last mentioned establishment - ...which was conducted till his death with great spirit and suceess by Mr. William Burgess-is, that, for a small charge, parcels of ova are received from any quarter, and there hatehed out, the owners receiving their parcels back in the condition of fry.

The first and most indispensable requisite of successful hatching is an unfailing supply of pure water. For hatching purpose spring water is considered best, because of its purity, equable temperature and small liability to freeze. Speaking here of hatcheries on a small scale for limited objects, whether for the stocking of private lakes and streams or family fish ponds, the hatchery should be located in a place accessible to it ready and steady water supply. The hatchery itself may be very simple and inexpensive, and in extent what you require it to be--from the single box, hatching only a few hundreds, to a multiplication of boxes, eapable of turning out hundreds of thousands.

Various forms of hatching boxes have been devised and bronght into nse, some constructed of wood, some of slate, iron, fireclay, de. In large permanent estahlishments it is, no doubt, desirable to have the incubating and other apparatus as durable as possible; but in small hatcheries, for limited service, there is nothing better or more economical than wood, well charred on the interior sides to prevent fungus, the most deadly foe of the fish culturist. The boxes are of rectangular shape-elongated to suit the situation. When gravel is used as a bed for the eggs it must be previonsly thoroughly well sealded with hot water. In practice, however, the use of gravel is now much discarded in favour of glass grilles, which werefirst introduced by M. Coste, the eminent French pisciculturist. These grilles or gratings are composed of thinglass tubes, extending across the hatching box, and placed side by side, with sufficient closeness as to support the eggs in rows in the hollows between the tubes. The great advantage of this system is its cleanliness, and its facility for segregation of the eggs, so that over and under and all about every individual one there flows an equal, properly aerated and unceasing current of water, so essential to successfnl incubation.
$V$ arious other methods of batching have been tried, some of them very ingenious, but none have in practice been found better than the system just described. The principle of some has been an upward, and of some a downward, current. Mr. Ainsworth, an ingenious Anerican, is the author of a sort of hatching engine in which breeding fish may freely enter, but cannot leave till they have fulfilled their functions. This invention is somew hat on the lines of the mechanical poultry layer, with which our American friends amused us somewhile ago. All such inventions and mechanical aids, while very ingenious and probably not impossible contrivances, have been doomed to failure, however, before the simplicity, naturalness and economy of the prevailing method.

We have not space to enter at length into all the subsequent processes of fish rearing-the incubation of the embryo, lasting in the case of trout about fifty days, and about ninety days in the case of salmon ; the alevin stage, being the period of about four weeks after hatching, during which the young fish subsists on the sac or yolk of the egg whence it issued, and to which it remains attached; the fry period; the yearling period; the two-year-old period ; and, finally, the adult age--deeply interesting as the life history of fish is. Nor would these details probably be of much interest to the non-professional reader, who is not yet to some extent educated in the art and bitten by its fascinations. To such as wish to study the scientific principles of artificial fish culture, however, there are many excellent worksavailable, by British, American, French, German, and other authors.

The amateur or domestic fish culturist requires for his guidance only a few simple rules, reduced to careful practice, and an ordinary supply of patience. His apparatus may be of very simple description. From one of the larger fish farms ova have, it is stated, been supplied to purchasers of every class, from Royalty to the schoolboy, and in all quantities, from many hundreds of thousands to the contents of a single box, thus illustrating the simplicity of this art as well as its growing interest among all classes. It is limited neither to the professional culturist, who pursues his vocation on a very large scale and on commercial lines, nor to the wealthy landowner, who desires in this way to stock or renovate his waters and sets up a private hatchery for this purpose. It may be taken up by the budding naturalist schoolboy, who, it may lee, has secretively robbed the nest of a member of the finny tribe-as be has often done of the feathered tribe-and has transferred his spoil to a box or tub with a tiny rill flowing through it, and watches with great interest and delight the development of his delicate but clever little friends; or it may become an appanage of every household where there is a stream of pure water, and turned to profit with as much ease and certainty as the rearing of poulty and bees for family use ; and certain it is that the fish fancier will derive no less interest and amusement from his art than the poultry or bee-fancier does.

It has already been said the apparatus required for domestic fish rearing may be very simple and inexpensive. The present writer has been concerned for some years with the rearing of Salmo Levenensis (the celebrated trout of Loch Leven) and Salmo Fontinalis (American brook trout) for the purpose of stocking certain virgin waters, and improving existing trout in certain others. Ova for this purpose have been procured from the famous Howietoun fishery. Although the situation involves a journey of about forty-eight hours, with much jolting over railway and road, the ova being carefully packed according to the latest knowledge, have invariably arrived in perfect condition, with hardly a dead specimen in the lot of some 30,000 or thereabouts. Here the subsequent hatching and alevin life have been effected in the domestic laundry (which is, of course, not in ordinary use at that time), in three or four hatching boxes surmounting each other, and supplied by the water of the laundry pipe, which, flowing into the nearest end of the uppermost box, overflows at the other end into the second uppermost box, and so on till it issues at the farther end of the lowermost box.

Reference has been made to the capability of domesticating and taming tront and other fish now in a feral condition. At Howietoun fishery many of the trout are said to be able to recognise their attendants and to answer to call or signal. Into the vexed question how many senses fishes jossess-whether they can hear and smell as well as feel, taste and see-we shall not here enter; but there is at least no room to doubt that by touch, taste and sight-of which latter sense they have a most acute endowment-fish can be trained to a high degree of donestication and familiarity with man. In the cases in the writer's experience referred to in the preceding paragraph, the young fish became wonderfully tame. As a precaution against the camibalistic propensities of the larger native tront in the lake for which they were being reared, they were, after leaving the hatching boxes, placed in intermediate ponds or nurseries for two year before being turned at large. While in these ponds they not only followed their attendant all around, but came without frar and took food from his hand.

As to the conveyance of ova and young fish from one place to another, so well is this now understood that ova can be sent in specially constructed boxes to any part of this country, with absolute safety under ordinary and obvious precautions ; while with the aid of the ice and refrigerators, it can also be sent with comparatively little risk to any part of the world. For example, the Howietoun fishery successfully exported last year, to the order of the New Zealond Government, over half a million of salmon ova obtained from the Tay, Forth and Tweed rivers, and in 1887 sent a similar quantity to the same quarter, which also arrived in good condition. Then, as regard the transportation of live fish, this, by means of scientifically constructed tanks, aided by the use of ice, can be done with a minimum of risk to all parts of this country with fish not exceeding two years of age. So far, the difficulties of transporting older fish to long distances in this country, or of sending fish of any age abroad in large numbers, have been found insuperable. A consignment of live tench and perch in tanks was made to Japan in February, 188\%, by the late Mr. Burgess
of the Midland Counties Fish Culture Estalishment, but we have not heard its fate. In , Japan the subject of fish culture appears to be recejving considerable attention, both from the Government and private persons. Its waters are said to be peculiarly well adapted for aquaculture, and the young fish are fed on wheat, flour and the chrysalides of silk worms.

Additional interest in the means of transportation of fish has recently been aroused by an "invention " of an American gentleman, who thinks this can be done successfully by hemetically sealing them in versels partly filled with water. As it is stated that tests of the invention have been made by one of the professors on the United States Fish Commission the matter would appear to have received some serious consideration, but it does not wear a likely look. It would, ierhaps, be too much to way that we shall nevar attain to the means of transferring fish of any age or size from localities widely apart-probably by some adaptation of the compression of air-and no invention could be more valuable ; but it must, we fear, be admitted that as yet we have had no approach to this.

With regard to the all-important matter of feeding of fish kept in confinement for domestic purposes, or in nurseries, till they are fit to defend themselves from all attacks, whether of their natural enemies or foes of their own species, it may be best to refer the reader to the various manuals on the subject. But here it may be briefly stated that after the young fish have passed the alevin stage, till which period they require no subsistence but that of the sac or ova from which they have sprung, they are in the nest or fry stage generally fed several times a day with finely divided yolk of egg ; afterwards with liver and milk curd ; and still later with vegetable, or meat or shellfish diet, such as vermicelli, finely triturated raw horsefiesh or clams, or with any other available food of similar character. At Howietoun, where several millions of ova are annually hatched, and aroportionate number of fish of all ages have to be fed, the flesh of a considerable number of horses, and a very large quantity of shell tish are annually consumed-the latter being given to the larges sud fish. Similar provision for feeding is made at every fish farm. The writer, having aceess neither to horse-flesh nor shell-fish, has found venison a very good substitute when finely divided. Besides this, the fish depend largely on natural supplies of food both at the bottom and surface of the water, and much may be done to augnent and improve these natural supplies by the selection of sites for ponds supplied by water rich in natural food for fish, and by a judicious stocking of the ponds with aquatic plants suitable for fish rearing.

The preceding remarks have related chiefly to "Private Fish Culture" and to its bearings on domestic economy, and the stocking of private fisheries for purposes of sport. This is what may be called the recreative and minor side of the case. The political economist would regard it as the mere elements or outer rim of a great question laden with potential bemefits to the great eonsuming publie of the most important kind. Let us now try to set forth what is miderstood by "Public Fish Culture," and what its present position is both at home and abroad.

What is here signified by "Public Fish Culture" is the cultivation of food fishes carried on for the public needs at the public expense. Its legitimate sphere is the adequate stocking of public waters with valuable fish, and the maintenance of the same-in which fisheries the public interest is universal, and no individual or private rights exist. The scope of acquaculture is, it should be said, not restricted to food fishes, but, in the words of one of its ablest exponents, "is now understood to signify the exploitation of all products of sea, lake and river, including the capture of whales, turtles, vearls, corals and sponges." The present intention is, however, to limit the application of these remarks to such products of the ocean, lakes, and rivers as are really valuable for human food. Doubtless, the whale is a most precious animal, whose preservation is most desirable. Whale oil is a very valuable commodity, and whalebone is nearly invaluable, selling, as it does at the present time, at over £2, 000 per ton. Every one knows how precious to the epicure is the turtle; how beautiful and valuable are pearls and corals; and how useful are sponges. But these, not being regarded as necessary wants of the public, may here be left out of our account. We must, however, here allude for a moment to one of the latest feats of aquaculture in connection with sponges, which are now being successfully raised by means of cuttings, just as land plants are. A new industry, to which the Austro-Hungarian Govermment has extended its protection, has been created on the coast of Dalmatia by this method, first discovered by Professor Oscar Schmidt, of the University of Gratz, of multiplying sponges by breaking off and transplanting pieces of living sponge. Attempts have been made to transplant live adult sponges from the bottom of one sea to that of another, but, so far, the success of this experiment has not been encouraging.

Nutwithstanding the interest in commercial fisheries which was aroused by the International Fisheries Exhibitions held in Berlin in 1880, in Wdinburgh in 1882, and in London in 1883, it is still improbable that more than a small minority of the British public at least ever associated the ocean with the land as a fifld fitted and prepared for a gieat cultivation of food. And yet it really is so. There are in the great sea expanses of unexplored and virgin water capable of yielding prodigious stores of fish food, just as there still are on the land immense tracts of unpopulated country, now mere wastes, but capable by cultivation of abounding returns of fruits of the earth. When the creative fiat went forth man was awarded dominion over the sea and all therein, just as much as over the land; but just as he must win the gains of the soil by the sweat of his brow, so must he reclaim the harvest of the sea loy unceasing and intelligent methods of labour.

Further, all or nemrly all the conditions and methods of land cultivation have their analogues in the ecomomic cultivation of the waters. The sounds and shoals and banks in the ocean are the great fish farms; the ocean-going fishing craft are the necessary farm offices; and the various appliances of fish capture are the complements of our scientific implements of land husbandry. Many foreign substances are in the present day applied to the soil for maintaining or renovating its fertility, and we do, or should do, something like this for our fish farms by the cultivation of algee and other forms of aquatic vegetation upon which breed and live those minute organisms which so largely contribute to the support of fish lif. . When with regard to the land reparative measures are neglected, its fruitful elements soon become exhausted. We can easily do the same to our ocean food possessions. We have too often, alas, done so already by a long comse of improvident and wasteful reaping without adequate nursing or building up By judicious interbreeding and preservation of the fittest we have enomously improved our agricultural stock; and by a like process, though not yet to an equal extent, we have done the same with some kinds of aquacultural stoek, and have demonstrated that similar treatment may be extended to all. Scientific and provident farming ashore is
careful never to miscrop or overcrop, and is alive to the value of the practice of fallowing. Scientific and provident farming afloat will in time equally recognize the imperative need of these rules of good husbandry.

In several important respects the aquaculturist has advantages over the agriculturist. He has a free, hand to sow and to reap where he wills. He is under no lord of the soil, and knows nothing of "Coercion" Acts or legislative vexations of any kind. He is hampered by no private rights. His husbandry exacts less personal attention, and his crops do not suffer from atmospheric influences, and, when obtained, they are quickly realised. And, above all, he sits, or rather sails, rent and taxation free.

But what use have we made of these bountiful oceanic provisions? Have we taken advantage of them as we have in these later times of the fruitful qualities of the land". Clearly not. Though we go far afield for bread and beef adequate for our teeming and ever-increasing millions, we have hitherto strangely overlooked or neglected the possibilities of relieving the demands of subsistence by a better cultivation of our marine food farms. We have been strangely passive under the ever-growing difficulty and cost of procuring sufficient supplies of fish, while it has been known that by the adoption of rational and adequate methods of fish culture and of fish capture we may indefinitely increase and consequently cheapen our national fish supply.

It may be asked, What are these rational and adequate methods? The reply is, that artificially aided fish culture is capable of increasing fish supply to a practically unlimited extent. There are four known methods of fish culture, viz. :-1. By pond culture ; 2. By transplantation of sexually mature fish ; 3. By transplantation of naturally deposited spawn; and 4. By artificial extraction and incubation of spawn. It has already been shown that by the last-mentioned means complete control of the reproductive functions of fresh water and anadromous fish, such as the salmon, has been acquired. In the present day these kinds of fish can and are being multiplied to any required extent on many inland fish farms with all the certainty of a science. The remainder of our space will be devoted to a short review of the other methods of pisciculture above stated.

Necessarily, the cultivation and increase by artificial means of migratory and pelagic varieties of fish is attended with greater difficulty than is the case with non-migratory fish. Our knowledge of the lifehistory of many ocean-going fishes, and even of the salmon, when it repairs to the sea, is still far from complete. Many of these wandering fish do fortunately, however, once every year approach the land or enter into sounds and shallows, for the purpose of breeding, and opportunity is thereby given to aid or protect the generation of these species. Some other kinds, which literally cast their seed upon the waters, are much less amenable to piscicultural control, but with regard to these nature has herself provided a safeguard against extermination. Their fecundity is so inconceivable that were it not for wholosale destruction of their spawn from natural causes, as well as the depredations of species upon species, not only all the arts of man would fail to make any practical inroad on their numbers, but the sea itself would cease to give romm for them. It has been calculated that of some kinds of fish not more than one in 500,000 rraches adult life, and that for every full-grown oyster upwards of $1,000,000$ die.

Thus it is that though the fertility of many kinds of oceanic fish surpasses comprehension, they are, nevertheless, so reduced in numbers by the operation of various natural causes-the predatory instincts of other species-and the wasteful arts of capture practised by man, that great difficulty is often experienced in obtaining an adequate fish supply for human needs. Some species would seem, indeed, to have been really exterminated, and others have narrowly escaped the same fate. Th.: salmon itself, though now better protected, not so long ago seemed in danger of extermination, and has actually been completely destroyed in many places where it formerly abounded. Such, also, has been the fate of the oyster, lobster, and other mollusca.

In considering the best remedial measures for decayed fisheries, and the economic extension of the whole fishing industries, a controversy has arisen among experts as to the necessity or value of protective legislation. In Great Britain the positive side of this question is led by Dr. Francis Day, who is a strenuous advocate of close times and legal control generally; while the negative view is as firmly held by Professor Huxley, who sees no good in protective Acts of Parliament, or, as he puts it, "keeping the wolves off during the lambing season will afford not much protection if you withdraw shepherd and dogs during the rest of the year." In the United States of America, which at the present time leads the van of fishery
tters, the Chief Commissioner of Fisheries, backed by public opinon, is averse to restrictive laws, and no . uch enactments there exist. We take this to refer to sea fisheries, however, and must assume that none of trese authorities are wholly opposed to protection of non-migratory fish during the fish-breeding period, the local habits of which would expose them to the danger of extinction. Fishes of anadromous and pelagic habits, however, could not be caught at all if not when they enter our rivers or approach our coasts to spawn. Nor can it matter at what season a fish is killed if it is killed, at all before it spawns. Here, however, pisciculture steps in and says all such considerations are superceded by its intelligent practice.

Our own nation cannot yet be quoted for the best illustrations of the power and value of public fish culture. On the contrary, we are, with respect to national recognition of this great question, almost at the foot of the scale, though by means of private enterprise, as has been shown, considerable progress has been made in one branch of the subject. We have been left behind by more than one nationality, but as the United States of America have outdistanced all others, a short account of what has there been done may be the best means of describing what may and should be done for national encouragement of pisciculture.

In America, as elsewhere, long neglect and improvident methods of fishing had seriously diminished the yield and value of many of the public fisheries, and the outlook was sutficiently gloomy when, in 1871, Congress appointed a Commission of Fish and Fisheries, whose duties were thus defined : "To prosecute investigations with the view of ascertaining whether any and what diminution in the number of food fishes of the coast and the lakes of the United States has taken place; and, if so, to what causes the same is due; and, also, whether any and what protection, prohibitory or precautionary, measures should be adopted in the premises." The late Professor Spencer Baird, secretary of the Smithsonian Institution, a biologist and scientist of the first rank, and the author of many learned works, was appointed Chief Commissioner. To Professor Spencer Baird, it may here be mentioned, the grand prize of the International Fisheries Exhibition at Berlin, in 1880, was awarded, as "the first fish culturist in the world.'

Previous to this, it should be stated, several American States had made appropriations of money for the purpose of investigation and experiment on the lines of the Congressional Commission, and most of the States have followed, and vied with each other in liberal co-operation in the general work of the Oummission.

The scope of the Commission, it will be seen, included a systematic investigation of the waters of the United States; the life history of their food fishes, and of the foes and friends of the same; the ihfluence of rents, temperatures, and other physical phenomena on the welfare of fish. It included also a review of Wrious methods and seasons of fishing then in use, and how far these had tended to the depletion of certain teries. That there had been a very serious depletion of some American fisheries, and that measures for $r$ repletion were urgently required, was speedily ascertained by the Commission. It accordingly at gave consideration to measures for improving these fisheries-the multiplication everywhere of iting valuable food fishes and the introduction and acclimatisation of others.
i fartherance of these objects, and liberally supported by his Government, the Chief Commissioner staff lost no time. Their labours have been more largely conducted along the North Atlantic coast ewhere, for there the most important sea fisheries are located; but stations have also been planted Pacific coast, and the great inland lakes and rivers. At the present time about twenty of these each with its separate skilled staff, laboratory, hatching apparatus, \&c., are in full operation in Umited States; and some idea of the magnitude and usefulness of their work may be gathered facts as that during the first elwen years of the operations of the United States Fisheries thesion no fewer than $341,096,071$ fish were distributed from these stations among pablic waters, and the year 1885 alone, among many other distributions, $92,000,000$ eggs of the whitefish were hatched ributed. Operations on the same gigantic scale have been carried on continuously by the ion, and have extended to over thirty species of fish and mollusca, including brook, lake and rout ; Atlantic, California, and land-locked salmon; striped bass and sea bass; whitefish, shad, kmelt, herring, cod, haddock, alewife, mackerel, pike, perch, grayling, carp, tench, goldfish, \&c.; buter, clam, \&c.
Whustrating the thoroughness of the work of the American Fish Commission, a few words may be om the pen of Professor Brown Goode, one of the members of the staff, and himself a leading rist :
twelve years the Commissioner, with a party of specialists, has devoted the summer season to the shore at various stations along the coast from North Carolina to Nova Scotia. A suitable g been selented, a temporary laboratory is fitted up, with the necessary appliances for collection In this are placed from ten to twenty tables, each occupied by an investigator, either anofficer nission or a volunteer. The regular routine of operations at a summer station includes all the tivity known to naturalists, collecting along the shore, seining upon the beaches, setting traps not othervise to be obtained, and scraping with dredges and trawl the bottom of the sea, \&c." American Commission has also prepared careful life histories of the principal fishes; and in connection with fish culture has been a special object of study. The influence of the cf the water and of storms upon the local movements of fish have been investigated and Fish-ways to facilitate the running of fish over natural obstacles have been constructed. Many valuable improvements in the apparatus of fish capture and fish breeding have been brought ch as gill-nets floated with covered glass balls, for the taking of cod, thus obviating the use of the necessity of bait. mstruction of incubating apparatus, with special adaptation to the physical properties of the inds of fish spawn, has had special attention. The eggs of fish are classified by ichthyologists warieties :- (1) Eggs non-adhesive, and too heavy to float, such as those of salmon and trout; (2) heavy, but adhesive, such as those of the herring, \&c. ; (3) semi-buoyant eygs, like those of the
 hitetish ; and (4) free floating eggs, like those of the cod and mackerel. The first of these kinds a boxes and on trays or glass grilles, as has already been described; the second on twigs or "o which they adhere. The other classes require somewhat different treatment, owing to the or cirrying on the process of incubation while the eggs are in suspension ; but this has been met s contrivances for the impounding and safety of free floating ova, while still keeping up that gitatien or circulation of the water which is necessary for successful hatching. For the hatching of the lobster an ingenious automatic jar, the invention of Colonel Macdonald, who is better onnectios with his improved fish-ladders, is now in successful use. c plants, won which flourish water insects and mollusca, which in thrnare fed upon by the fish, freely introdused into American fish nurseries. Three or four steamers and several sailing craft, tted up for fish cultural work, have been placed at the disposal of the Commission. For the and safe convejance of fish and ova from the various distributing stations, specially constructed rs, fitted with relrigerators, \&c., are run at reduced freights by the various railway companies. information has been collected, and instruction given, as to the curing and packing of fish for


Space forbids the giving of further details of the active work of the United States Fish Commission. results have been eminently successful and highly gratifying to the Government, which originated and peg liberally supported the work. The field of operations has by no means yet been covered, but the Pready derived have beer most marked. Rivers, such as the Sacramento, which, owing to immodCesteful fishing - the direct result, probably, of the invention of fish canning-had been greatly we been marvellous reconped, so that even the canneries cannot now use up the available supply. of salmon from the Sacrarnento has risen from $5,000,000$ to $15,000,000 \mathrm{lbs}$. annually. The yield the Potomac has heen trebled, and the same account is given of the Connecticut and other of the lakes of the interior. From the Pacific coast alone no less than $81,302,400$ lbs. of salmon last year, the prime value of which amounted to $£ 1,812,800$. In short, it has been put beyond by such endeavours as have been so well carried out by the United States Commission on wheries it is easy to sustain and to extend to almost any degree the supply of this leading sod. Full information respecting the work of the American Commission, and the general proculture in that country, has been extensively diffused by means of the bulky annual report of ion, and many monographs and special reports by members of the staff and other experts. ta time the work of the American fish culturists has received the highest commendation from on the subject all over the world.

The United States of America have surpassed all competitors in the liberality, intelligence and sucses: of their fish cultural operations ; but other nations have given the matter considerable attention, and masy are now awakening to its great importance. Before recrossing the Atlantic a glance may be made at th work done, and still being carried on by Canada. Here there are twelve large hatcheries or stations, whicl reared and distributed throughout Canadian waters, from the commencement of their operations, in 1869, $t$ 1384, nearly $400,000,000$ of fry, and this work has since been continued at the rate of over $100,000,000$ eg hatched every season. The results of this have been a very marked improvement of the Dominion fisherion especially in fresh waters. A notable example is the Fraser River, which, having been depleted of almon to an alariaing extent through reckless over-fishing, stimulated by the demands of the canneries, has beed again rapidly restocked through cultural operations. She has likewise bestowed much attention on th arrest of destructive lobster and oyster fishing, and to the restoration and future protection of these valdy able fisheries. At Dildo, Trinity Bay, Newfoundland, 5,000,000 young lobsters, which had been reaned o cod livers, were recently turned into a newly-erected fish farm. This farm has been prepared for the tatof ing and rearing of young cod, $200,000,000$ millions of which it is capable of holding at a time; but ham been completed too late last season for this purpose, is temporarily used to rear these five millions formm. lobsters.

Among European mations greater attention has been given to fishery questions by Germany, mamand Norway and Holland, than by others. There is a German Fishery Union, devoting itself chiefles, fain propagation, and a German Fish Commission, supported by $G \in$ vernment, whose functions are chieffy gatory of sea fisheries. In Germany the domestication of carp, goldfish, \&c., has been practised foe centuries, and is turned to commercial profit as well as household use. Many of the greater landow among whom Prince Bismarck may be instanced-derive a considerable profit from this source. Very cessful revivals of carp culture in ponds and small waters have been made in the United States, andrun where, from introductions of Germanstock. The chief seat of German pisciculture is at Humingen, in A mos, now by the fortunes of war a German possession, but which was originally established by the Fremach Hevernment in 1850 under Professor Coste. Here public fish culture was first systematically practiedid and here are r:ised supplies for replenishment of the rivers of the Fatherland.

The sea fisheries of France are of great extent, At Boulogne alone it is cenculated that the rabus yield of fish is equal to the flesh of 40,000 bullocks; but for political and perhaps other reasons Fremed fil culture has for some time been in rather a languishing condition. Formerly France took the lead; bort get has been deprived of her leading establishment at Huningen, and though she has founded another at Fepin in the Vosges Mountains which promises well, further time is needed for its development. In Framederd attention is now being given by means of the allotment system to ostreiculture, and the results gap an very encouraging. French fishermen are among the most intelligent of their class. A slight but instance of this is the attachment of small electric lamps to their gill-nets for the attraction of $\boldsymbol{A}$ ( Be is an idea which is probably destined to considerable extension, since it is well known that fish madij attracted and deluded by artificial lights.

In Norway, Sweden, Holland, Denmark, Austria, Italy, Switzerland, Puland and Russ, momas las for long been more or less bestowed on pisciculture, and the subject is at the present timas active, mainly in proportion to the extent and situation of available fishing grounde. In the country M. Wrassky, the discoverer of the dry method of fecundation of fish eggs, superintends tant fish cultural establishment, under Government auspices, at Nikolsk in Novgorod, which is hatching about $2,000,000$ ova every season.

In China and Japan priwitive methods of fish culture have been practised for time out of but now, in the latter country at least, the amual value of whose fishings is about $£ 7,000,000$, three times that of Scotland, all the modern methods of tish culture have been imported, and worked on a commercial scale with the encouragement and aid of the (iovernment.

Finally, we come to the condition of the fisheries and of the fish culture in out own couft scarcity and dearness of fish are with us matter of frequent complaint, and hore, if way whet, fidy ito thought every effort would be made, through public as well as private channele, to maint in aifatad the productiveness of our public fisheries. It has been shown by convincing prods that fisk of over that slecies can and are being by artificial help propagated and multiplipd elsewhere for public nowis, itin "qually true that though now and then there may be a brief glut of fish in this or that lowal marker, det to an accidental, or it may be, a cul uable cause, the masses in this country are still most inodequately faged with this form of food. Here, surely, is a clear and imperative national duty, yes our Gove hitherto been almost wholly indifferent to it. By prohibitory legislation we hav laboured to 2 and 48 herring on our coasts and the salmon in our rivers, and have only produced a state of matte offshore and inshore fishermen are in deadly opposition to each other, with dimunishing takes ling returns as the result. But of scientific investigation into the decay or stagnation of tisheries, or of enlightened measures for their recuperation and extention, wf have as yet done practical value. We do not possess a single public hatchery or nursery for the propagation an tion of fish. We have, within the past few years, establisher two or three small marine poorly equipped, and scarcely seconded at all by skilled observations at sea, as they ouyht feeble attempts at scientific investigation of certain tishery problems have been necently Scotch Fishery Board, but little practical good has come, or could come, from an enterprise so very popet furnished.

It is a saddening reflection that we can afford every year, with never a donbt or grudge, mang wade of money for purposes of war, and so very little to render the first necessities of life more aboystaty accessible. We have at last a Department of Agriculture, languishing and ineffective though but in the hardly less important domain of aquaculture we may be said to be nationally dohergar a Could we devote the price of a single warship to the development of our fisheries upm lines ably within the sphere of government, how great would be the stimulus to these national how immense the henefit to the people. Surely the time may not be far distiont when th revival of legislation directed to full satisfaction of the elementary wants of our race, and wh the foremost results of this, the question of a full and cheap supply of wholesome fish for food wise and adequate treatment from the nationai Lxecutive,


[^0]:    ＊Note．－For further details see pages 68，102，115， 159 and 191.

[^1]:    * The contents of this table was not published in the report of that year (1883).

[^2]:    *. It must be borne in mind that this sum does not represent the incomes of the fishermen, as they invariably combine farming with their fishing ventures.

[^3]:    Percentage of increase $6 \cdot 2$.

[^4]:    *Traps

[^5]:    * The valut of these comutien inchates also valur of fish not emmeraterl in the ere colmuts. Ser Comity Retums.

[^6]:    * Inspectors used different prices.

[^7]:    * Nopre-The smoked herring were put $\quad 1$ ) in large boxes at 00 cents.

[^8]:    * $100,000 \mathrm{lbs}$. winninish included in these estimates.

[^9]:    150,000 bushels tom cod, 525,000 included.
    " 48 of these are verveux. One of these Eel weirs is valued $\$ 3,000$.

[^10]:    "But few persons have any idea of the magnitude of the salmon fisheries of the Pacific coast States and the territory of Alaska. From the latest dates available, we learn that there is a total of sixty-two salmon canneries, excluding thirty canneries located in British Columbia. Of the former, twenty-four establishments are located on the Columbia River, and on the Oregon and Washington sides respectively; ten are located at various points along the Oregon coast; seven at varions points and places in the new State of Washington; nine in California, and thirty-six in the territory of Alaska. Here is an industry which has been wholly developed to its present great proportions within less than a quarter of a century, the capital of

[^11]:    * The writer has since learned from Prof. Neikon that 20,000 is below the average.

[^12]:    * The letters referred to above will be found in this report under "Success of Fivi Culture," page 4].

