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SPECIAL REPORT

ON

THE FISH AND FISHERIES OF MANITOBA

BY

PROFESSOR E. E. PRINCE

Dominion Commissioner of Fisheries

OTTAWA
GOVERNMENT PRINTING BUREAU
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THE FISH AND FISHERIES OF MANITOBA

BY PROFESSOR EDWARD E. PRINCE, F.R.S.C., ETC., DOMINION COMMISSIONER OF FISHERIES,
OTTAWA, MEMBER OF THE INTERNATIONAL FISHERIES COMMISSION.

INTRODUCTION.

Elisee Reclus regarded the lakes of Manitoba as shallow remnants of an ancient inland sea which now exist because the compact rocks below will not allow the water to flow away into the depths below but retain it as though each were still a natural lake basin. The moisture, he thought which falls from the atmosphere is retained in these depressions, evaporation does not take place rapidly, and the slopes towards the sea are not sufficiently inclined for the tributary rivers to pour down to the ocean all their surplus waters. Geographically they are the western members of the great Lake system, that chain of vast inland seas which border the southern margin of the great Archean shield, in whose immense northern basin lie the waters of Hudson bay. Geologically, they belong to another system than the eastern great lakes, and are all that remain of the extensive post-glacial Lake Agassiz which geologists claim to have had an area of not less than 110,000 square miles. They are a northern expansion of the Mississippi system of waters with which on the east (south of the Lake of the Woods) and on the west, near the Cypress Hills, there is still connection by muskegs and marshy streams. Great deposits of alluvium have increased the shallowness, and the valleys of the Red riv. and Assiniboine are entirely alluvial formation, these sediments, as the late Dr. George M. Dawson said, 'constitute the richest wheat lands of Manitoba.'

I.—THE FISHERIES.

PECULIAR FEATURES IN FISH CURRING.

The fish fauna is not rich in variety of species, or indeed of families, yet it is singularly interesting as much from the forms which are missing as from those which it includes. Thus the two remarkable Ganoida, *Lepososteus*, the Gar Pike, and *Amia calca* the Bow-fin or lake Dog-fish, so abundant on the eastern Great Lake Waters are absent, and indicate that the fish fauna is of recent origin as compared with the Ontario lakes. The cartilaginous Ganoida, families of sturgeons are present, but are no doubt migrants from the sea by means of southern river channels. The great lake trout appears to be absent, and the lake whitefish, commonly called lake herring, *Argyrosomus artedi*, has not been recorded in the tullibee, *A. tullibee*, often stated to be a hybrid whitefish, and weighing one to three pounds, is plentiful. Two species of the typical whitefish of Canada, *Coregonus clupeiformis*, the most valuable species commercially, and *C. labradoricus*, occur in Manitoba waters.

IMPORTANCE OF MANITOBA FISH.

It has been justifiably claimed for the fishing industry of this prairie province that they are the greatest fresh-water fisheries in the world. This fishery was
carried on by the native Indian tribes for food for themselves and their dogs, but the
officers of the Hudson’s Bay Company at their numerous posts in this region depended
upon fish very largely, and since 1812, when the first white settlers were brought to the
banks of the Red river by Lord Selkirk, a regular fishery has been pursued which has
grown to enormous dimensions during the last thirty years.

COMMERCIAL KINDS OF FISH.

The species of principal importance are the unsurpassed lake whitefish (Coregonus clupeiformis), the pike-perch or yellow pickerel (Stizostedion vitreum), the
sturgeon (Acipenser) and the pike or jackfish (Lucius). The whitefish of Manitoba
especially of Lake Winnipeg have a special reputation in the markets of this continent
and the caviare and flesh of the sturgeon from these waters have ranked very high.
The supply of sturgeon has seriously declined, but the relative importance of the
principal species may be judged from the following figures:

<table>
<thead>
<tr>
<th>Kinds of Fish</th>
<th>1888</th>
<th>Value</th>
<th>1898</th>
<th>Value</th>
<th>1897 98</th>
<th>Value</th>
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<tr>
<td>Whitefish</td>
<td>2,320,000</td>
<td>$966,000</td>
<td>3,963,000</td>
<td>$1,084,933</td>
<td>3,965,000</td>
<td>$2,256,670</td>
</tr>
<tr>
<td>Pike-perch</td>
<td>141,500</td>
<td>5,900</td>
<td>1,343,000</td>
<td>53,721</td>
<td>3,965,000</td>
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<tr>
<td>Pike</td>
<td>311,000</td>
<td>8,290</td>
<td>639,073</td>
<td>23,210</td>
<td>1,380,000</td>
<td>81,325</td>
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<tr>
<td>Tullibee</td>
<td>18,750</td>
<td>650</td>
<td>339,110</td>
<td>3,594</td>
<td>1,380,000</td>
<td>48,300</td>
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</table>

RECENT EXPANSION.

During the last twenty years the annual value of the fisheries of the province has
risen rapidly, partly owing to the exploitation of new waters not before commercially
fished, and partly owing to the higher market value of the food-fishes in recent years.
Thus in 1887 the total value was $119,084; in 1897 $201,126, and in 1907 it was
$906,815. While a proportion of the catch is sent to local and to eastern Canadian
markets, the greater part, fully 75 per cent, is sent to the United States’ markets,
certain large foreign fish combines having undoubted control of the handling of these
supplies of Canadian fish.

AREA OF FISHING GROUNDS.

The total area of the waters fished is not less than 20,000 square miles, the three
largest lakes, Lake Winnipeg (9,460 square miles), Lake Winnipegosis (2,080 square
miles), and Lake Manitoba (1,775 square miles), exceeding the Netherlands in extent,
but other lakes, St. Martin, Dauphin, Shoal, Swan and Waterhen, contribute their
quota, these ranging from 100 to 200 square miles, while Moose (552 square miles)
Cedar (285 square miles), Playgreen (223 square miles), and other more distant lakes,
though beyond the provincial boundary, must be included in the Manitoba fisheries,
all the catches being sent down to the main shipping points in the province. It is
interesting to note that the Manitoba lakes are exclusively in Canadian territory and
are not shared, as are the Great Lakes to the east, with another country. Hence, while
Lake Superior is over three times the area of Lake Winnipeg, Huron twice, and Erie
almost of the same area, yet the superficial extent of the Canadian portion of these
eastern waters does not greatly exceed the total area of the Manitoba fishing grounds.
LARGE ENTERPRISES CARRIED ON.

To develop the fishing industry on an adequate scale, in waters so vast, large capital was essential. Fishing companies were organized, with fleets of steam tugs, immense outfits of nets, ice-houses and stores, refrigerators, &c. Fishing on a limited scale has always been carried on by the Indians and Indians, and the numerous Icelandic settlements have assiduously pursued the fishery especially through the ice in winter. But even so recently as 1885 the Winnipeg board of trade stated that the fishing industries of the province were only in their infancy, and undoubtedly with proper safeguards against depletion these industries, which have increased like the population of the province, more than six fold during the last twenty years, await still further development.

PRODUCTIVENESS OF WATERS.

The productiveness of the waters of the province is proved by the fact that from 1880 to 1894, 4,000,000 pounds of whitefish were shipped from Manitoba in 5,329,000 pounds of sturgeon, including a large quantity of caviare, much of it exported to Germany to be sold as the best Russian product.

ALLEGED DECLINE OF FISHERIES.

Like all fisheries, those of the province have been subject to fluctuations, some, such as the sturgeon, having alarmingly declined, while others, like the pike-perch or pickerel fishery, have greatly expanded. The whitefish supply, in the opinion of many, has declined, and the large annual catch, in 1886, exceeding 5,000,000 pounds, is, it is held, kept up only by more persistent fishing and the use of excessive amounts of gear.

DEPARTMENTS OF THE INDUSTRY.

All fishing operations are carried on under license from the Dominion government, and under the supervision of a staff of Federal fishery officers who have authority to enforce the laws and regulations under the Dominion Fishery Act.

The parties who carry on fishing consist of (1) large fishing companies in which United States firms have very large interests; they operate in the northern parts of Lake Winnipeg and the more distant lakes, chiefly in summer, and in extensive areas where fishermen without capital, tugs, fish-houses and refrigerators could not take or handle the fish, (2) Settlers, largely Icelanders, with a smaller proportion of Austrians and Germans, who fish in summer in small boats and on a vastly more extensive scale through the ice in winter, mainly in the shallower southern parts of Lake Winnipeg and in the smaller lakes, (3) Indians and half-breeds who fish from their reserves, largely for food, but also for sale, especially sturgeon. In the rivers, such as the Red river, settlers and others fish with seines, &c., for pickerel or pike, perch, catfish, gold-eyes (an excellent fresh water herring), perch and coarse fish.

STATISTICS OF MEN AND GEAR.

It is estimated that at least 6,000 persons are more or less engaged in the fisheries, but the actual number of fishermen is nearly 2,000, as compared with 850 twenty years ago. In 1887, it may be noted, there were 7 steam tugs, 550 tons total, valued at $26,500, and 65 fishing boats, 118 tons, valued at $6,785, whereas there are now 22 tugs, of 1,031 tons total tonnage, valued at $132,000 and employing about 150 men, and in addition 530 boats, valued at $24,000, with crews totalling up to 1,800 men. Fishing with baited lines, fyke or hoop nets, &c., is extensively pursued, and
the lakes are principally coarse fish, the present annual catch of which amounts to no less than five million pounds.

TRANSPORTATION OF FISH.

The cleaning of the fish, icing, &c., are done at various points on the lakes, such as Spider island, Black river, Eagle island, Poplar river, Beren's river, Snake island, Bull Head, Horse island and Warren's landing, each resembling a busy village, with wharfs and crowded dwellings, the last-named centre being about 400 miles from Winnipeg city. About ten years ago fresh fish in broken ice were brought from Selkirk island, north end of Lake Winnipeg, and shipped from Selkirk town in refrigerator cars, were preferred in some United States cities to the frozen fish heretofore exported, and a large business has since been maintained. The main catches conveyed by the tugs and sail-boats to the various islands referred to, after being cleaned packed and iced are brought down to Selkirk in the case of Lake Winnipeg, and to the town of Winnipegosis in the case of Lakes Winnipegosis, Cedar, Moose, &c.

SYSTEM OF FISH FREEZING.

From over a hundred of these remote establishments, with plants valued at nearly $250,000, the principal summer catches have been received at the refrigerators, that of the Dominion Fish Company's at Selkirk, said to be the largest in Canada if not the largest on the American continent, having a capacity of two million pounds, though many times that amount passed through the freezing rooms in a single season, the fish being neatly laid on flat trays, subjected to a temperature of 15° F. below zero, and exported by the carload when the markets are favourable. The ammonia process is that adopted, the ammonia being forced by powerful engines into vacua, thus reducing the temperature, and the cold gas is then driven through circulating pipes, which pass along the insulated store rooms, where a temperature of 20° below freezing can be readily attained, but the usual temperature is about zero. Recent changes in the demands of the great markets appear likely to cause the frozen fish to be superseded by the iced fish referred to above, and there can be little doubt that the quality and texture of the fish are maintained in better state by icing than by the ammonia freezing process.

DOMINION HAS SOLE CONTROL.

Unlike the fisheries of Ontario and the eastern provinces and British Columbia, in which each province has property rights, the property and jurisdiction are in Manitoba solely in the hands of the Dominion government, and the Minister of Marine and Fisheries, Ottawa, issues licenses, authorizes restrictions, close seasons, &c., for the preservation of the fishery resources. As an aid, of an effective kind, the federal government has erected several fish-hatcheries (at Selkirk, Beren's river, Winnipegosis, &c.) and vast quantities of fry of whitefish and other valuable species are planted each season from these establishments.

II.—NOTES ON THE FISHES OF MANITOBA.

Apart from their commercial interest the fishes of the province are of scientific importance from the fact that they form a fish fauna distinctly marked off from that of the great lakes and eastern waters and have nothing in common with the Pacific fish fauna. None of the ancient fresh-water types such as the gar-pike (Lepisosteus osseus, Linn.) and Bowfin (Amia calva, Linn.) occur, though sturgeon of two species
are found, but the sturgeon is doubtless primitively, an anadromous ocean fish. The
great-lake trout (Cristiromer namaycush, Wallis), the speckled char or brook trout
(Salvelinus fontinalis, Mitch.), the lesser whitefish (Argyrossomus artedi, LeSueur), the
sea salmon (Salmo salar, Linnaeus), as also the black spotted trout (S. Clarkii) of Alberian
waters, the inconnu of the Mackenzie, and various Arctic and Pacific salmon and
tROUT are absent, and bear out the geologists view that the Manitoba system of lakes
and rivers is unconnected with the eastern and western Drainage systems, and is
really the remnant of a northern expansion of the Missouri and Mississippi system
with an outflow to the south. The presence of the gold-eye. (Hiodon chrysops, Richardson), an ally of the Clupeidae, a very plentiful and excellent food-fish, empha-
size the separatness of this aquatic area, while the presence of the sturgeon and of
the meky or lake ling, (Lota maculosa, LeSueur), indicates connection with the
sea such as the geologists have demonstrated occurred owing to subsidence at various
epochs. Such universally distributed species as the pikes or jack-fishes (of which
two species occur Lucius lucius, Linnaeus, and Lucius masquinongy, Mitchell) and both
of exceptionally good table qualities as well as the bearded cat-fishes and carp-like
suckers occur but the glutinous nature of their eggs may explain their dispersion.
The following list of species is believed to include most of the fishes authentically
known to occur, but many other species await discovery in this extensive area of
waters where investigations so far have been fragmentary and inadequate.

LIST OF MANITOBA FISHES.

Family Petromyzontidae—
Ichthyomyzon castanen, Girard. The Northern Lamprey.

Family Acipenseridae—
Acipenser rubrofuscus, LeSueur. The Lake Sturgeon.
Acipenser silurus, Linnaeus. The Common Sturgeon.

Family Siluridae—
Idolurus punctatus, Rafinesque. Channel or Spotted Catfish.
Amiaculus lacustris, Walbaum. Great Lake Catfish or Mathemeag.
Ameiurus vulgaris, Thompson. The Dark Catfish.
Ameiurus nebulosus, LeSueur. Common Bullhead or Horned Pont.

Family Catostomidae—
Ichthyus cupeola, Cuv. and Valenciennes. Buffalo-fish.
Ichthyus bula, Rafinesque. The White or Small Mouth Buffalo-fish.
Catostomus catostomus, Forster. Northern Sucker.
Carpioidae velifer, Rafinesque. The Quillback Sucker.
Moxostoma anisurum, Rafinesque. White-nosed Red Horse.
Moxostoma aureolus, LeSueur. The Mullet or Red Horse.
Moxostoma lesueurii, Richardson. Northern Red Horse.

Family Cyprinidae—
Hybognathus nuchalis, Agassiz. The Silver Minnow.
Hybognathus argyrus, Girard. The White Minnow.
Pimphales promelas, Rafinesque. The Fathead or Bull Minnow.
Notropis bigillatus, Girard. Straw-coloured Minnow.
Notropis hussoni selene, Starr Jordan. The Shiner, Spawn Eater.
Notropis jejunus, Forbes. The Poor Minnow.
Notropis atherinoide, Rafinesque. The Great Minnow.
Hybopsis storerianus, Kirtland. Storer's Minnow.
Family **Hiodontidae**—

*Hiodon chrysops*, Richardson. Western Gold-Eye.

*Hiodon tergisus*, LeSueur. The Moon-Eye.

*Hiodon alboides*, Rafinesque. The Shad Moon-Eye.

Family **Salmonidae**—


*Coregonus labradoricus*, Richardson. Labrador Whitefish.

*Cristyomera namaycush*, Walbaum. Great Lake Trout, Touladi or Grey Trout

*Argyrosomus orbatus*, Richardson. The Tullibee or Mongrel Whitefish.

Family **Esocidae or Luciidae**—

*Lucius lucius*, Linnaeus. The Jack-fish or Pike.


Family **Gastrosteidae**—

*Pygosteus pungitius*, Linnaeus. One-spined Stickleback.


Family **Percopsidae**—


Family **Centrarchidae**—


*Micropterus salmoides*, Lécépède. Large Mouth Black Bass.

Family **Percidae**—

*Stizostedion vitreum*, Mitchell. Yellow Pickerel, Pike-perch or Doré.

*Stizostedion canadense griseum*, DeKay. Grey Sauger or Pike-perch.

*Perca flavescens*, Mitchell. The Yellow Perch.


Family **Sciadidae**—

*Aplodinotus grunniens*, Rafinesque. Sheephead or Lake Drum-fish.

Family **Cottidae**—

*Cottus pollinarius*, Jordan and Gilbert. Olivaceous Miller’s Thumb.

Family **Gadidae**—

*Lota maculosa*, LeSueur. Ling, Burbot, Lake Cusk, Losh and Methy.