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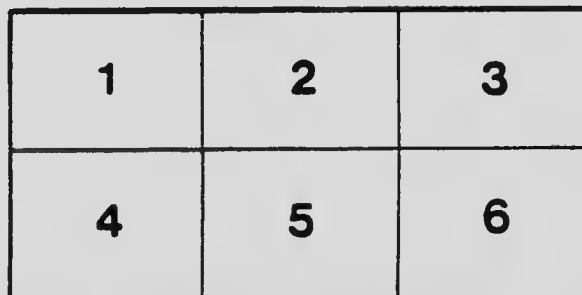
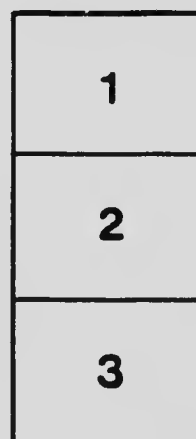
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SPECIAL REPORT

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 Ganoids, *Lepisosteus*, the Gar Pike, and *Amia calva* the Bow-fin or lake Dog-fish, so abundant in 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 Ganoids, the sturgeons are present, but are no doubt migrants from the sea by means of the southern river channels. The great lake trout appears to be absent, and the whitefish, commonly called lake herring, *Argyrosomus arctedi*, has not been recorded. 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 FISHERIES.

It has been justifiably claimed for the fishing industry of this prairie province that they are the greatest fresh-water fisheries in the world. The 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:—

KINDS OF FISH.	1888.		1899.		1907 OS.	
	Lb.	Value.	Lb.	Value.	Lb.	Value.
Whitefish.....	2,300,000	\$ 100,000	3,303,900	\$ 168,193	3,695,000	\$ 258,650
Pike-perch.....	141,500	5,800	1,343,000	53,721	3,995,000	239,700
Pike.....	311,000	8,200	639,973	6,399	2,321,000	81,235
Tullibee.....	18,756	650	359,110	3,594	1,380,000	48,300

#### 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 \$129,084; in 1897 \$261,126, and in 1907 it was \$806,615. 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 (2,086 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 VESSELS 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 tug, immense outfits of nets, ice-horses and stores, refrigerators, &c. Fishing on a limited scale has always been carried on by the settlers and Indians, and the numerous Icelandic settlements have assiduously pursued the fishery especially through the ice in winter. But even so recently as 1896 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 1890 to 1906, 84,000,000 pounds of whitefish were shipped from Manitoba and 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 1906, exceeding 5,000,000 pounds, it is held, kept up only by more persistent fishing and the use of excessive amounts of gear.

## DETAILS 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 5,000 persons are more or less engaged in the fisheries, but the actual number of fishmen 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 1,034 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 takes 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 greatlake trout (*Cristivomer namaycush*, Walb.), the speckled char or brook trout (*Salvelinus fontinalis*, Mitch.), the lesser whitefish (*Argyrosomus arctedi*, LeSeur), the sea salmon (*Salmo salar*, Linn.), as also the black spotted trout (*S. Clarkii*) of Albertan 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 chrysopsis*, Richardson), an ally of the Clupeidae, a very plentiful and excellent food-fish, emphasize the separateness of this aquatic area, while the presence of the sturgeon and of the methy or lake ling, (*Lota maculosa*, LeSeur), 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*, Linn., and *Lucius masquinongy*, Mitchell) and both of exceptionally good table qualities as well as the bearded eat-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 *Petr. myzontidæ*—

*Ichthyomyzon castaneus*, Girard. The Northern Lamprey.

Family *Acipenseridæ*—

*Acipenser rubicundus*, Lesueur. The Lake Sturgeon.

*Acipenser sturio*, Linnaeus. The Common Sturgeon.

Family *Siluridæ*—

*Ictalurus punctatus*, Rafinesque. Channel or Spotted Catfish.

*Ameiurus lacustris*, Walbaum. Great Lake Catfish or Mathemeag.

*Ameiurus vulgaris*, Thompson. The Dark Catfish.

*Ameiurus nebulosus*, LeSueur. Common Bullhead or Horned Pont.

Family *Catostomidæ*—

*Ictiobus cyprinella*, Cuv. and Valenciennes. Buffalo-fish.

*Ictiobus bubalis*, Rafinesque. The White or Small Mouth Buffalo-fish.

*Catostomus catostomus*, Forster. Northern Sucker.

*Catostomus commersonii*, Lacepede. Common White Sucker.

*Carpodes velifer*, Rafinesque. The Quillback Sucker.

*Moxostoma anisurum*, Rafinesque. White-nosed Red Horse.

*Moxostoma aureolum*, LeSueur. The Mullet or Red Horse.

*Moxostoma leueuri*, Richardson. Northern Red Horse.

Family *Cyprinidæ*—

*Hybognathus nuchalis*, Agassiz. The Silver Minnow.

*Hybognathus argyritis*, Girard. The White Minnow.

*Pimphales promelas*, Rafinesque. The Fathead or Bull Minnow.

*Notropis blennioides*, Girard. Straw-coloured Minnow.

*Notropis hudsonius selene*, Starr Jordan. The Shiner, Spawn Eater.

*Notropis jejunos*, Forbes. The Poor Minnow.

*Notropis atherinoides*, Rafinesque. The Great Minnow.

*Hybopsis storerianus*, Kirtland. Storer's Minnow.

Family *Hiodontidæ*—

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

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

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

Family *Salmonidæ*—

*Coregonus clupeiformis*, Mitchell. The Common Lake Whitefish.

*Coregonus labradoricus*, Richardson. Labrador Whitefish.

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

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

Family *Esocidæ* or *Luciidæ*—

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

*Lucius masquinongy*, Mitchell. The Maskinonge (erroneously Muskellunge).

Family *Gastrosteidæ*—

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

*Eucalia inconstans*, Kirtland. Brook Stickleback.

Family *Percopsidæ*—

*Percopsis guttatus*, Agassiz. The Trout Perch, Sand Roller.

Family *Centrarchidæ*—

*Pomoxis sparoides*, Lâcepède. The Calco Bass.

*Ambloplites rupestris*, Rafinesque. Green Rock Bass.

*Micropterus dolomieu*, Lâcepède. Small Mouth Black Bass.

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

Family *Percidæ*—

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

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

*Percæ flavescens*, Mitchell. The Yellow Perch.

*Hadropterus aspro*, Cope and Jordan. Black-sided Darter.

*Hadropterus guntheri*, Eigenmann and Eigenmann. Gunther's Darter.

*Boleosoma nigrum*, Rafinesque. Johnny Darter.

*Boleosoma boreale*, Starr Jordan. Northern Darter.

Family *Sciænidæ*—

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

Family *Cottidæ*—

*Cottus pollicaris*, Jordan and Gilbert. Olivaceous Miller's Thumb.

Family *Gadidæ*—

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



