

Conservation
of  
Fish, Birds and Game

Commission of Conservation
Canada

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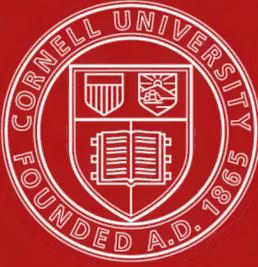
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Commission of Conservation

Constituted under "The Conservation Act," 8-9 Edward VII, Chap. 27, 1909, and amending Acts, 9-10 Edward VII, Chap. 42, 1910, and 3-4 George V, Chap. 12, 1913.

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Deputy Head and Assistant to Chairman

MR. JAMES WHITE

Commission of Conservation
Canada

*COMMITTEE ON FISHERIES, GAME AND
FUR-BEARING ANIMALS*

CONSERVATION
OF
FISH, BIRDS AND GAME

Proceedings at a Meeting
of the
Committee, November 1 and 2, 1915

1916
THE METHODIST BOOK AND PUBLISHING HOUSE
TORONTO

**Committee on Fisheries, Game and
Fur-Bearing Animals**

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DR. CECIL C. JONES

Members :

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HON. GEO. J. CLARKE

HON. O T. DANIELS

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HON. J. A. MATHIESON

DR. HOWARD MURRAY

DR. J. W. ROBERTSON

HON. W. R. ROSS

OTTAWA, Canada,

March 1, 1916

SIR:

I beg to submit herewith a report of the proceedings of the Committee on Fisheries, Game and Fur-bearing Animals, at their meeting on November 1 and 2, 1915.

For convenience, the various addresses are not here presented in the order in which they were delivered, but have been rearranged according to subject. The whole compilation is now issued under the title of "Conservation of Fish, Birds, and Game."

Respectfully submitted,

JAMES WHITE,

Deputy Head and Assistant to Chairman

SIR CLIFFORD SIFTON, K.C.M.G.,

Chairman,

Commission of Conservation,

Ottawa

TO FIELD-MARSHAL, HIS ROYAL HIGHNESS PRINCE ARTHUR WILLIAM
PATRICK ALBERT, DUKE OF CONNAUGHT AND OF STRATHEARN,
K.G., K.T., K.P., ETC., ETC., GOVERNOR GENERAL OF CANADA

MAY IT PLEASE YOUR ROYAL HIGHNESS:

The undersigned has the honour to lay before Your Royal Highness the attached report on "Conservation of Fish, Birds and Game," which is a compilation of addresses delivered at a meeting of the Committee on Fisheries, Game and Fur-bearing Animals, of the Commission of Conservation, on November 1 and 2, 1915.

Respectfully submitted,

CLIFFORD SIFTON,

Chairman,

Commission of Conservation

OTTAWA, March 2, 1916

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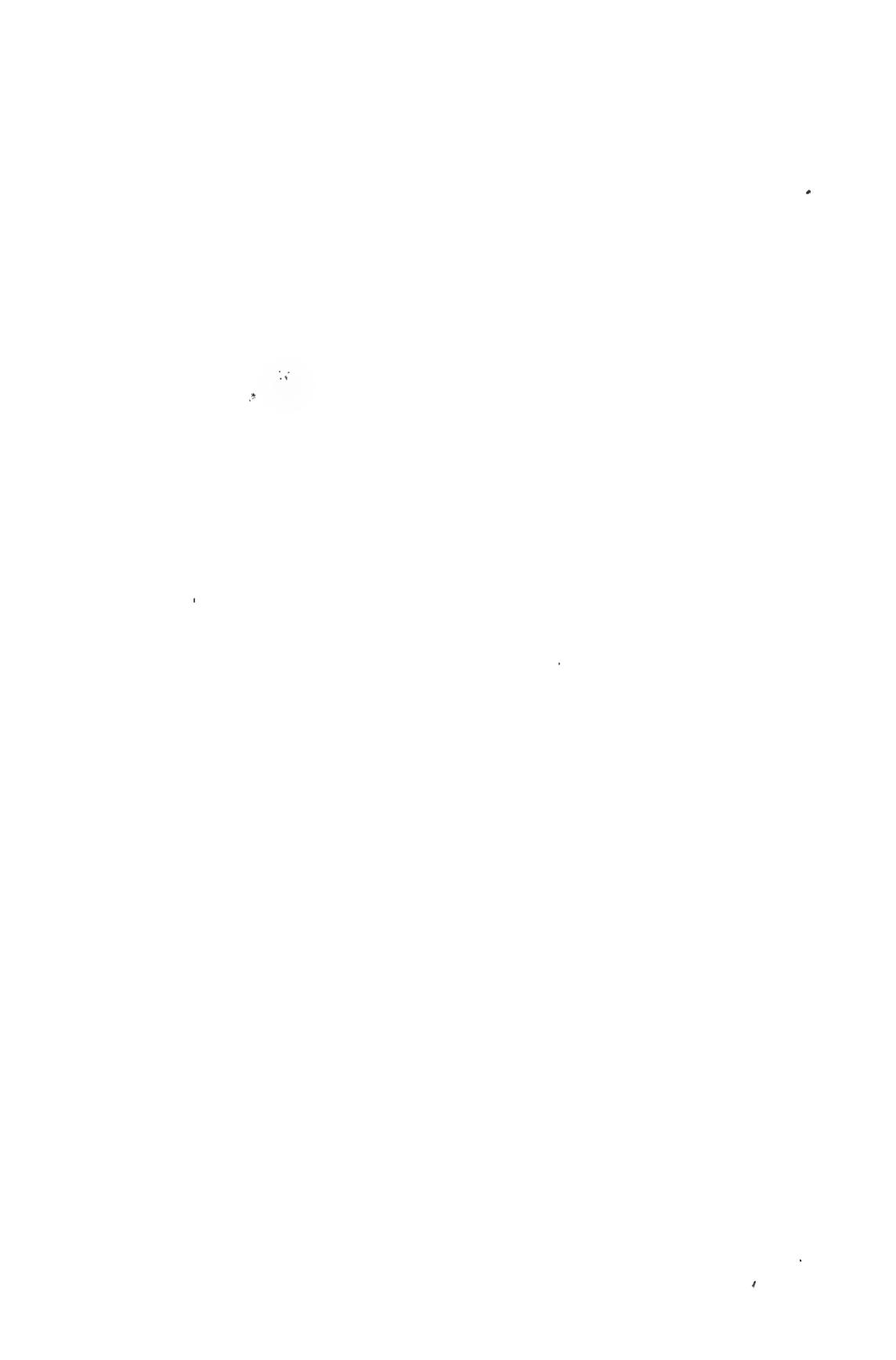
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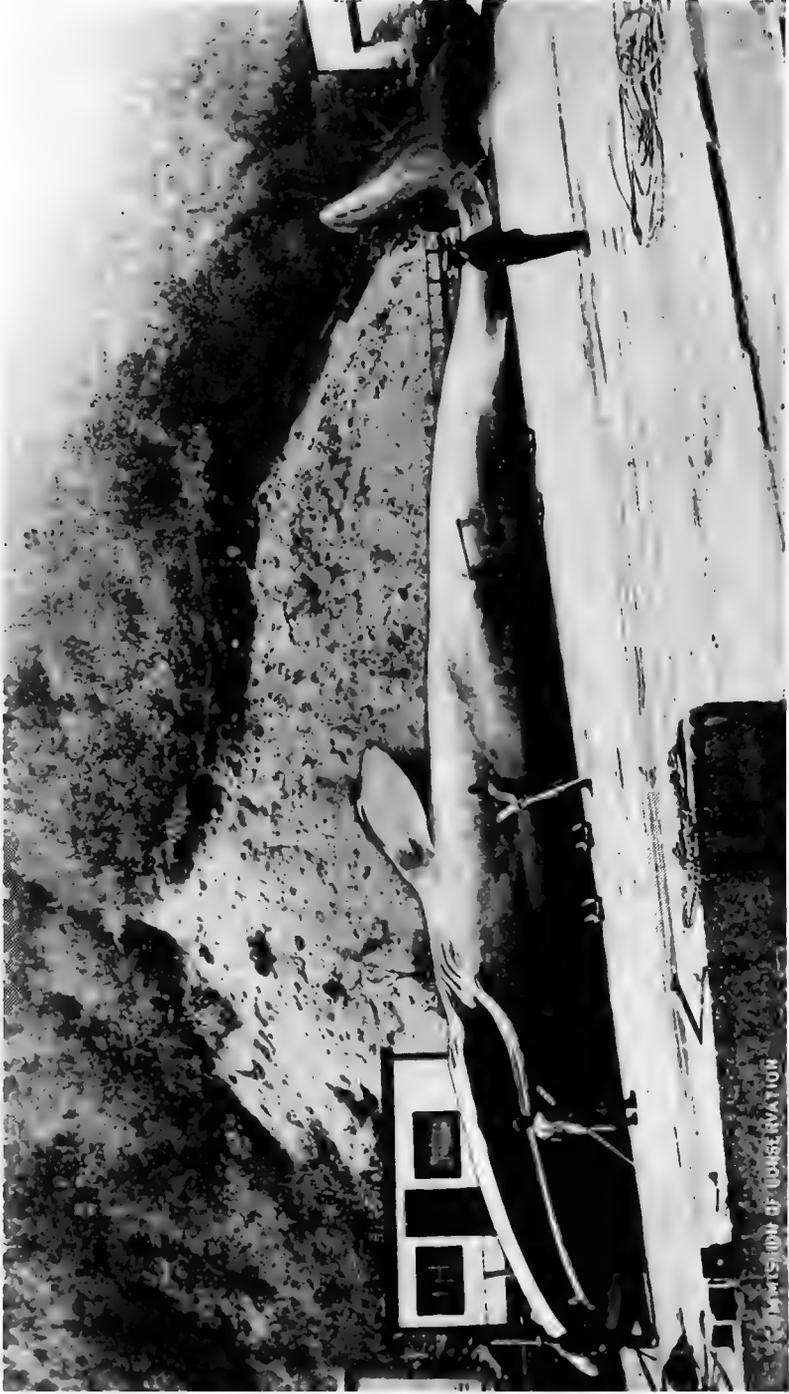
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A Large Hump-back Whale, 82 feet long

COMMISSION OF CONSERVATION

Proceedings of the Committee on Fisheries, Game and Fur-bearing Animals

A MEETING of the Committee on Fish, Game and Fur-bearing Animals of the Commission of Conservation was held in the Board Room, Temple Building, Ottawa, on November 1 and 2, 1915. The following members of the Commission were in attendance:

Sir Clifford Sifton, Chairman of the Commission

Dr. C. C. Jones, Chairman of the Committee on Fish, Game and Fur-bearing Animals

Hon. A. E. Arsenault, Summerside, P.E.I.

Hon. O. T. Daniels, Attorney-General, Nova Scotia

Mr. A. A. Lefurgey, representing Hon. J. A. Mathieson, Premier, Prince Edward Island

Dr. Howard Murray, Dalhousie University, Halifax, N.S.

Dr. J. W. Robertson, C.M.G., Ottawa, Ont.

Dr. C. C. Jones, Chairman of the Committee, presided. In opening the meeting, he said:

Gentlemen: The first item on the programme is the Chairman's address. My purpose will be mainly and almost altogether to connect up the work of this meeting with the work of the meeting of 1912 and with the general work of the Committee before that meeting and from that until the present time.

**Special
Meeting of
Fisheries
Committee
Needed**

The Committee on Fisheries is perhaps slightly different from the other Committees owing to the fact that we have very few members other than *ex officio* members of the Commission, who very seldom attend the Annual Meeting, and, for that reason, it has been rather difficult

to have a meeting of the Committee during the Annual Meeting of the Commission. It was very difficult at the first Annual Meeting, at which the Committee was appointed in its present form, to have a meeting of the Committee, and it was largely for that reason that we had the meeting in the summer of 1912. Since then, we have had Committee meetings in connection with the Annual Meeting but they have proved unsatisfactory and we have felt that we were not accomplishing as much as we desired. So it seemed best to have again a special meeting of the Committee on Fisheries, Game and Fur-bearing Animals and this meeting has been called that we might gather information regarding the subjects with which we have to deal and perhaps do more to advance the interests of the Committee than we could at the time of the Annual Meeting. The Assistant to the Chairman of the Commission and his staff have prepared a splendid programme and doubtless we shall find that the meeting will be of great interest and also of great value.

**Progress
in Oyster
Fisheries**

The first subject to engage the attention of our Committee and a subject which was considered at the 1912 meeting, was that of a possible arrangement between the Provincial Governments and the Dominion Government with respect to the oyster fisheries, with the idea of leasing areas that private companies might carry on oyster cultivation. Shortly after the Committee was formed an understanding was reached between the Federal Department of Fisheries and the Government of Prince Edward Island whereby leases were made of bottoms where oyster farming was carried on in the Island. Later, that arrangement was extended to the other Maritime provinces, Nova Scotia and New Brunswick, with the exception of certain specified sections of the latter. Thus, since that time, a good deal has been done in the way of the formation of companies to carry on oyster farming along the shores of the gulf of St. Lawrence, Northumberland strait and various other sections of the Maritime provinces. During the Meeting of the Committee in 1912, we had with us Dr. Stafford, who had been employed for some time by the Biological Board in connection with the work carried on by them. His paper proved very interesting to those of us who were present. His address was somewhat technical, as he is a biologist and not definitely associated with the practical work of oyster culture. However, his chief idea seemed to us to be capable of practical application. He had ascertained and followed the life of the oyster from the egg through the larval stage until it was deposited as

spat, and he claimed it was quite possible for a fairly intelligent man, a man who would be interested in oyster culture, to determine quite definitely the time at which the spat would be deposited and therefore the proper time for putting out cultch to which the spat would become attached and, in time, develop into the mature oyster.

In connection with that work, he was asked to prepare a somewhat more lengthy statement and that statement was issued by the Commission as a report entitled *The Canadian Oyster*. That work, however, was also rather technical and perhaps not quite so much in a practical way came from the paper of Dr. Stafford as we hoped for. At that meeting this resolution was carried:

“Resolved that the Dominion Department of Marine and Fisheries be urged to carry on demonstration and research work looking towards improved methods of oyster culture, especially with reference to the proper time of putting out cultch in order to procure the necessary supply of spat, and also to carry on further demonstration work in connection with the formation of oyster beds in grounds not now productive of oysters and to assist in the introduction of improved methods in live oyster beds.”

As I suggested, very little has been done with respect to the first part of that resolution, the ascertaining of the proper time of putting out cultch, and the further extension of Dr. Stafford's paper with the idea of its practical application. The latter part of the resolution, the demonstrations in connection with the formation of oyster beds in grounds not now productive of oysters, has perhaps come somewhat under the domain of the work carried on by Capt. Kemp, who is an employee of the Federal Dept. of Fisheries, and it might be suggested that more work along this line be done through the special activities in connection with the Dept. of Fisheries. The matter of further resolutions in this connection or further consideration of the subject of oyster culture might naturally come before this Committee when the time for resolutions is at hand.

**Steam
Trawling**

A second topic discussed during the meeting in 1912 was the matter of the employment of steam trawlers in connection with the fisheries on the Atlantic coast. It was suggested that it would be advisable to limit the field of operation of these trawlers and that they should be prohibited from interfering with the work of the shore fisheries. It was felt that the contention of the fishermen, with respect to the injuries by steam trawlers, was not altogether borne out, and that their opposition was largely due to the fact that steam trawling interfered with their occupation rather than to any damage to the fisheries themselves. Although

no resolution was passed, it was deemed advisable that the operation of the steam trawlers should be restricted to a certain extent. The whole subject was, however, in a chaotic condition and it was not thought advisable to take any definite action in connection with it. Since then, the Canadian government has taken action and limited the field of operation of steam trawlers to twelve miles off shore. There was also a very important investigation being carried on by the Bureau of Fisheries at Washington. That investigation has been completed and the results have been published. The United States authorities suggest that international action be taken to limit the field of operation of steam trawlers along the Atlantic coast. Thus, our chief purpose in connection with the discussion at the meeting of three years ago has already been carried out; the field has been restricted and the United States report has been published. It might be well to consider whether we should urge that international action be taken; although I presume that such action will be considered apart from anything we might propose in that connection.

**Planting of
Whitefish
Fry**

Among other subjects discussed at the meeting of 1912 was a paper on the whitefish industry, by Mr. M. J. Patton, at that time Assistant Secretary of the Commission. In that connection this resolution was moved—I wish to read these resolutions in order to connect the work of this meeting with the work of the former meeting:

“Resolved that this Committee, while recognizing and appreciating the value of what has already been undertaken by the Department of Marine and Fisheries, urge upon the Dominion Government the necessity of planting, at the earliest practicable time, whitefish fry in lake Superior and in lake Huron and Georgian bay in sufficiently large quantities to prevent the depletion of those waters.”

A considerable addition has been made, I understand, to the operations of the Dept. of Fisheries in connection with the planting of whitefish fry. I asked Mr. A. Donnell, of the staff, to ascertain just what had been done in this respect. We have ascertained that the total number of fry deposited in the Great Lakes region in 1912, the year in which our Committee met previously, was 64,000,000. In 1913, the number had been increased to 137,000,000, of which 20,000,000 had been deposited in lake Superior. We felt at the time that the planting of fry in lake Superior was essential to the proper development of the whitefish industry in the Great lakes. In 1914, the number had been further increased to 175,500,000, of which 26,500,000 had been deposited in lake Superior, and, in 1915, the number was still further increased to 281,600,000, with 28,000,000 deposited in lake Superior,

54,000,000 in lake Huron and 40,000,000 in Georgian bay. Thus, the procedure suggested in that resolution, and advocated also in the paper of Mr. Patton, has been carried out very largely and possibly no further action is necessary along that line.

Also in connection with Mr. Patton's paper this resolution was moved:

“Resolved that the Department be requested to publish each year in its Annual Report a statement, in readily available tabular form, of the number of fry of various kinds of fish deposited by it in each stream and body of water where such are planted in Canada.”

This has also been carried out. In their Annual Report the Department is now publishing just the information asked for in connection with that resolution, so that our recommendation has been fully met.

**Fisheries
Expert
Required** The only other resolution passed at the Meeting was this:

“Resolved that this Committee considers it necessary that an expert official be appointed to the staff of the Commission of Conservation to carry on investigations and report upon all matters respecting fisheries, game and fur-bearing animals.”

It is not necessary to say very much regarding that except that means were taken to appoint an expert in 1914. Mr. White went to England with authority to engage such an expert as was called for by that resolution, but the outbreak of the war in August and the subsequent financial stringency led us to decide that the appointment of an expert in connection with the Committee should be postponed for the present. We hope that such an official may be appointed when the war is over and the financial stringency has been somewhat relieved.

**Other
Fisheries
Questions** Other matters considered during the Committee Meeting of 1914 were in connection with lobsters and shad fisheries, and especially a paper by Dr. Murray advocating proper means of curing, packing, grading and branding fish. In connection with the latter subject, an Act has been passed by the Dominion Government, *The Fish Inspection Act*, which, to some extent, covers the ground. I am advised that there have been many difficulties in connection with the working out of the Act which, however, are being gradually relieved, so that we may assume that good work is being done along this line and that further effective work will be done. In time, therefore, we expect to have a workable Inspection Act in connection with our Federal Dept. of Fisheries.

Consideration of Game At our 1912 Meeting, which I have covered in these brief statements, our time was almost entirely given to the consideration of the fisheries. We are, however, a Committee on Fisheries, Game and Fur-bearing Animals, and it has been thought advisable at this meeting to devote a considerable portion of our time to the discussion of problems in connection with game in Canada. With that end in view, several gentlemen have been asked to read papers in connection with the various problems dealing with game laws and the preservation of game in the Dominion of Canada. We have all felt, I am sure, that it is rather pathetic that in a country so new as Canada there should be so little wild life, that wild life in Canada, especially bird life, should compare so unfavourably with that of countries in Europe in the same geographical situation but which have been settled for thousands of years. Wild life is there far more abundant than it is in Canada even at the present time. With the example of the United States before us—a bad example, especially during their early history, and in the western states—the preservation of game and the proper administration of game laws in this Dominion would seem to be one of the very important things to which this Committee might devote its attention. Of course the administration of the game laws is in the hands of the provincial authorities but we are in a position to advise them and to ask them to consider various matters looking towards the protection of game, just as we have been accustomed to do in connection with the Federal Administration. We have all looked with a good deal of interest at the work that is being done at present in the United States towards retrieving the bad management of their early history and the effort now being made towards restoring their game and administering their game laws properly. We are now looking to the men there to advise us as to methods of best carrying forward the work of preserving our game in Canada and of administering our laws properly here.

One subject that I think we ought to consider in connection with the proper preservation of game is the possibility of eliminating the market hunter and the marketing of game. More injury is done to game by the market hunter being allowed to destroy game in wholesale quantities and sell the result of his work, than by any other possible means and, if some method can be devised of restricting his operations, it would certainly be the most effective way of preserving our game in Canada.

Another point is the setting apart of preserves for game, as has been largely done in connection with our forests. But still greater



Lower Jaw and Mouth Cavity of Fin-back Whale



Fleet of Herring Boats, New Brunswick

efforts could be made along the line of increasing our game preserves and administering the preserves properly.

**Treaty re
Migratory
Birds**

Another matter which is coming before the attention of the Committee is the proposed Treaty concerning migratory birds, the International Treaty which is proposed to be put into effect by joint action of the United States and Canada in order to restrict the slaughter of the migratory birds, especially in their northern haunts during the summer season. If this Committee can further the ends of that proposed Treaty we should, without any question, do it. It seems to me a most important matter.

In connection with the work of preserving our game in Canada, a great many organizations have been formed in the past year or two and it might be possible for the Commission of Conservation to be to some extent a clearing house for the activities of these different organizations, that we might sum up the work that is being done, present it in a tangible form to the proper authorities, and also investigate what is being done in the various provinces.

**Fur
Farming**

The third subject, with which this Committee deals, is that of fur-bearing animals. This work is important, and we have done something along that line. At the Meeting of the Committee in 1912, a Resolution was passed appointing Mr. J. Walter Jones to acquire information regarding the possibilities of fur farming in Canada. His results were published in a report which met with very great demand and which ran into a second edition. The matter principally dealt with was, of course, fox farming, with Prince Edward Island and the Maritime provinces generally, as the centre of the industry. The results of the work have been spoiled, to a certain extent, by the wild speculation that took place a few years ago in connection with the numerous joint stock companies, but it is rather fortunate that that speculation has been stopped as quickly as it has and there is little doubt that eventually there will be an important industry on a definite business basis in connection with fur farming in Canada.

I thought it best to review the work of the Committee of 1912 and to gather up the ends of the work covered by that meeting as a preliminary for the work of this meeting.

Brief Remarks on the Work and Aims of the Commission of Conservation

BY

SIR CLIFFORD SIFTON

Chairman of the Commission

GENTLEMEN: I regret that, as my time is pretty well occupied, I am not able to give myself the pleasure of being present at your sessions. I must depend for accurate information on reading the report of the addresses afterwards and I shall give myself that pleasure when the papers are reported in the Proceedings of the Committee. I called mainly in order to congratulate you upon your success in bringing about this meeting.

**Importance
of Chairmen
of Committees** Dr. Jones will remember that, when I suggested that he take the chairmanship of this Committee, he was over-modest in his estimate of his capacity satisfactorily to fill the position, and I can assure you, gentlemen, that I had to exercise some pressure upon Dr. Jones in order to induce him to accept this responsible position. I expressed the idea to him then, as I have expressed it to the members of the Commission once or twice since the work of this Commission started, that there was a good deal of danger that it might degenerate into a one-man-power affair. That is to say that, on account of the fact that I was the only resident executive officer, there was a great danger that it might degenerate into an organization which would be directed altogether by myself and that, as a result, the activities would be very greatly limited because one man's power is very limited, no matter how good his will may be. To the best of my ability I have tried to avoid that by asking the Chairmen of Committees to exercise their functions as far as possible independently of me; that is to say, to follow their own lines of policy and to develop their own work. I am satisfied that only in that way could we have achieved as satisfactory results as we have in the course of our work in the last four or five years. We can look back now and see where we have accomplished very great and satisfactory reforms in connection with the affairs of Canada. In this particular branch of the fisheries, there have already been some substantial

results of our activities and I am quite sure there will be much more substantial results in the future, as the result of the discussions which are taking place from time to time under the direction and by the experts of this Committee.

**Coöperation
Necessary**

One of the departments of public work which it struck me some years ago was suffering from lack of coöperation was that of the fisheries. The Dominion Department of Fisheries, with which our friend Prof. Prince has been identified for many years, was doing its best but, in many cases, conflicts of jurisdiction and legal difficulties of one kind and another arose. Of course, when anything of that kind arises, the officials find their hands tied and, without assistance from the outside, it is impossible for them to make progress. The discussions which have taken place here have to some extent assisted in removing some of these misconceptions, misunderstandings and legal difficulties and I understand that we shall see still further progress in that direction.

The main principle in our action, in all the branches of our work, has been to get the people together who know most about the subject and to remove as far as possible, by personal contact and discussion, the misunderstandings and difficulties which prevented progress and, as a result, to bring about coördinated action along certain lines which is likely to produce practical results. We have been pretty successful in that respect in some particular departments, notably in connection with the question of fire protection in our forests. In this respect we have achieved a work which it is almost impossible to believe has been accomplished in four or five years. In other branches of our work, such as that of the Committee on Lands and the Committee on Minerals and others, there has been very substantial, practical and useful work and this work in nearly every case, in fact I might say in every case, is due to the intelligent direction of the work by the Chairman in charge of the Committee.

And now, Mr. Chairman, it has been one of the characteristics of our meetings that we have not wasted much time in discussion of general principles and I am not going to violate the rule by continuing the discussion on these lines now. I congratulate you and the members of the Committee very heartily upon the holding of the meeting and the work you have done in connection with it.

Practical Problems in the Fish Business

BY

D. J. BYRNE

President, Canadian Fisheries Association

MR. CHAIRMAN and Gentlemen: When requested by your Committee recently to deliver a short address on the practical problems connected with the sale and distribution of fish, it occurred to me that you had indeed given me a wide latitude; the practical problems are so many and so varied that they might well be a task beyond my ability.

The difficulties, connected with the production and distribution of perishable fish products, include the quick and proper handling at points of production as well as the transportation to inland centres and the distribution therefrom, through regular sources, to the consumer.

IMPROVED METHODS OF FISHING

Old Method of Trawling

In recent years much progress has been made in improving the methods of taking the fish, especially in deep sea fishing for what are known as ground fish, including cod, haddock, flounders, witches, hake, pollock, etc., by the introduction of steam trawlers, several of which have been operated during the past few years off the coast of Nova Scotia. Formerly the catch was almost entirely secured by fishing vessels operating dories, from which trawls were set, each trawl carrying from 1,000 to 1,500 baited hooks, ganged to the main line at intervals of from 3 to 6 feet.

Frequent Scarcity of Bait

The frequent scarcity of bait and the difficulty experienced in securing same, very often caused the complete cessation of fishing and at such times the fleet, numbering from 50 to 100 vessels, might be held in port for weeks, due to lack of bait. This trouble was partly overcome by the establishment of bait freezers, subsidized by the Government, where bait could be frozen and carried to provide a supply during any temporary scarcity, but this difficulty has not been entirely overcome and will exist at certain seasons of the year.

Prevalence of Dog-fish Another source of annoyance and loss to the fishermen is the prevalence of the dog-fish, which appears at certain periods of the year in large schools and, while this pest lasts—at times from two to six weeks, the length of time varying in different localities—the fishermen will not set their trawls for cod, haddock, or other food fishes, because the dog-fish destroys any other species on the trawls and, when taken, also damages the trawls to such an extent that they become practically a total loss.

The establishment in recent years of reduction plants at principal points has made it possible for fishermen to use special trawls for taking dog-fish, which are sold to the reduction plants and by them converted into fertilizer. This has helped, to a large extent, to remove one of the greatest terrors of the deep sea fishermen, but the trouble still exists and at times is the cause of heavy losses to the fishermen, through the loss of their gear.

Prevalence of dog-fish also affects fishing from shore-boats, which, as the term implies, operate in bays and inlets near the home port. Dog-fish always run in large schools and they not only chase all other kinds of edible fish, but destroy nets, trawls and other gear used by fishermen when plying their hazardous trade.

Danger from Storms Frequent storms and gales prevailing along the coast are very often a source of loss, since the fishing fleet is compelled to remain in port until these storms subside, because it is not only dangerous, but practically impossible, to do any dory fishing while they last. This refers to the method of fishing with vessels, carrying from 6 to 12 dories, each dory manned by two fishermen, who bait and set the trawls from these frail craft, lifting the lines to remove the fish and rebaiting at intervals of from three to six hours, according to the locality and the prevalence of fish on the banks where they operate.

After lifting the trawls, the dories return to the vessel with their catch, which is then gutted to remove the entrails and packed in ice or salt, which will keep it in good condition until the vessel returns to port.

Introduction of Steam Trawlers With the introduction of steam trawlers, using the otter trawl, a bag-like contrivance made of strong rope and weighted to keep it near the bottom, many of the above disadvantages have been avoided. The otter trawl is dragged at a considerable distance behind the vessel, which steams at slow speed and is stopped from time to time in order to lift the trawl

and remove the fish to the deck of the vessel. This method obviates the necessity of using bait and also permits fishing to be carried on during stormy or rough weather, so that the supply is more regular, although the cost of these steam trawlers, as well as the expense of operating them, is necessarily much higher than the apparatus required by the older method.

**Trade in
Codfish**

A large and profitable trade has been carried on for nearly two hundred years in our Canadian codfish, which, for foreign markets, is cured by salting and drying. These fish find a ready sale, not only in the various Mediterranean ports, but also in the West Indies, Brazil and other South American countries. Large quantities of codfish, haddock, hake and pollock are also salted and partly dried for the requirements of the United States markets; while on the Pacific coast, during the last 30 years, there has been built up a very large and profitable fishing industry in connection with our Pacific salmon, which are now exported to nearly all parts of the world in cans; a lucrative trade has also been developed in mild-cured, pickled salmon, quantities being exported to Central European countries, while in more recent years another important business has been built up in the handling of fresh and frozen halibut and salmon. Large cold storage plants have been established, where the fish are frozen promptly after being taken, and are later shipped in refrigerator cars to all parts of Canada and the United States, while within the past few years some trade in frozen fish has been developed for export to Europe.

**Fishing
on the
Great Lakes**

On our Great lakes there is a very large fishing industry carried on, not only during the summer and fall months, but also in mid-winter, when the fish are taken through the ice and, owing to climatic conditions, can be transported long distances without requiring expensive methods of refrigeration. They are frozen naturally as soon as taken from the water and are shipped to various centres in the United States, especially in the Western states, although there is a growing demand for Canadian lake fish in Eastern markets also.

I regret to say that the greater portion of the Canadian lake-fishing business is controlled by United States firms and this is due to the fact that more than 90 per cent of the total output finds its market in the United States.

TRANSPORTATION

Danger of Deterioration We are mostly concerned here with the fishing trade and distribution of fish, as it affects Canadians, and in this connection the question of transportation becomes a very important factor. Owing to the great distances which our fish products have to be carried, also to our sparse population, the cost of handling and delivering to the centres where these fish are consumed is necessarily high. During the spring and summer months and until cold weather sets in, a large portion of our fish have to be transported by express at very high rates, which frequently amount to as much as, or more than, the initial cost of the fish at the point of production.

In former years, when transportation facilities were not what they should be, it was of frequent occurrence that the quality of the fish became seriously affected while in transit, due to the methods, or rather the lack of methods, by which they were carried. I am pleased to say that conditions in this regard have improved very materially and, with better transportation facilities, it is now possible to have fish transported great distances in comparative safety, so that they reach the distributing markets in first-class condition.

Refrigeration During Transit Refrigerator cars are supplied at important shipping points for the transportation of fresh and mild-cured smoked fish. These cars are provided with bunkers or ice chests at either end of the car, which are filled with ice, to which salt is added at shipping points and, through the medium of icing stations placed along the lines of the railway companies, the supply of ice is renewed from time to time, thereby providing regular cool temperatures during the time they are in transit.

As an instance of this method, refrigerator cars containing fresh halibut are shipped regularly from Pacific Coast points, such as Vancouver, Steveston, New Westminster and even as far north as Prince Rupert, to cities in the East like Toronto and Montreal, and, although the fish are in transit from 4½ to 6 days, if in fresh condition when shipped from starting points, they reach destination in good salable condition.

Iced refrigerator cars are also provided at Mulgrave and Halifax, N.S., as well as at St. John, N.B., for carrying fresh fish to points in the interior. It is thus possible to move cars of frozen and smoked fish from Mulgrave and Halifax to points as far west as Winnipeg and Calgary, during the months of September, October and November, without any deterioration in the quality of the contents.

Shipment by Express Unsatisfactory While good facilities are afforded for the shipping of fresh and frozen fish in car-lots, there is still room for improvement on small shipments which are carried by express, because the express companies' methods are not modern; they do not supply any refrigeration, but simply carry the fish in the same car with other goods and, as these cars are heated, the quality of the fish is very often impaired by the time it reaches its destination.

The express companies, who do a profitable business in carrying fish from many points, should be compelled to provide suitable refrigeration, and it has been demonstrated that by dividing the express car, one portion can be equipped with bunkers for ice, thereby ensuring conditions as safe as in refrigerator cars which are used in the freight service.

Assistance from Government While on the subject of transportation, it would be well to mention the great assistance rendered by the Government to the fishing industry and the many advantages derived therefrom. Realizing that cost of transportation by express increases the price of fish to consumers at points far distant from the source of production and thereby curtails the demand, our Dept. of the Naval Service arranged to pay one third of the express charges on all fresh or mild-cured, smoked fish, with a view to increasing the sale and consumption of fish at inland points.

The results obtained far exceeded our most sanguine expectations and the increased sale of both fresh fish and smoked fish, such as haddies, fillets, etc., which are cured from fresh fish, and are consequently highly perishable, has been so great as to justify the expenditure. The payment of one third of the express charges by the Government is intended to reduce cost and thereby foster a greater demand for fish, so that consumption will increase to a point where carload lots can be forwarded, in lieu of smaller quantities, it being assumed that when the business has been developed to a point where carload lots can be handled, the question of transportation charges will right itself, because the larger quantities will secure lower transportation rates. The Dominion Government assumes responsibility for one third of the express charges, on Canadian fish only, from the Atlantic coast to all points as far west as Toronto and from the Pacific coast as far east as Winnipeg, but, when the quantity in one shipment amounts to 20,000 lbs., which is the minimum weight for a carload, this Government assistance is withdrawn, for the reasons which I have already stated.

Unfortunately this plan has not always worked uniformly well, and I have in mind instances where carload lots shipped by express to

Montreal, from a point of shipment in Nova Scotia, were charged at the full express rate for smaller quantities, when the express company learned that the Government would not pay one third of the charges, in view of the fact that the shipment amounted to a sufficient quantity for a carload lot. In my opinion express companies should be compelled to quote a lower rate on carlots than they charge on smaller shipments, because it is not always possible to use the freight service in view of the distances traversed and consequent length of time the fish must be in transit.

DISTRIBUTION

Present Method of Marketing The method now obtaining for marketing fish is to ship quantities to centres where distribution can be made most readily and under best conditions; in most of the large cities the wholesale firms have modern cold-storage facilities for the safe handling and carrying of fish, and these, in turn, distribute to retailers in their various cities, as well as to small towns and villages within a certain radius. Before re-shipping, the fresh fish are packed with ice in suitable carriers and are delivered to the retailer within a few hours, the time varying according to distance. During the winter months the fish can be carried safely by freight, but, during a large portion of the year, it is necessary that transportation be made by express to insure prompt delivery.

Retail Fish Trade It might be said, in connection with the distribution to the ultimate consumer, that the methods now obtaining vary to such an extent as to leave no room for comparison. While it is claimed by some that the distribution of fish to consumers should be made from special fish shops, or markets, it must be remembered that this is not possible while the demand is of limited proportions and, in my opinion, much larger quantities will be consumed by obtaining the widest possible distribution through the medium of dealers handling other commodities, provided, of course, that sufficient care and attention is given to the handling of such a highly perishable product as fresh fish.

In our country the sale of fish has not assumed anything like the volume that should obtain, not only in view of the fact that fish is an excellent substitute for high-priced foods, like meats and poultry, on which prices are continually advancing, but also because fish is nutritious, containing all the necessary properties, and should become a staple article of food in our Canadian homes, instead of being, as at present, an occasional substitute or, in some cases, a compulsory change from the regular menu. No great difficulty has to be

overcome in obtaining this wide distribution and thereby increasing the consumption of fish, since the butchers' shops and other stores where perishable products are sold are compelled to have a supply of ice, this being the only requisite for handling fish in a satisfactory manner.

It has been proved beyond doubt by the distinct success achieved by the Dept. of Fisheries that fish can be handled in departmental stores in the large Canadian cities, as well as in a great many cities of the United States and, this being the case, it is only necessary for the dealers who wish to develop a trade in fish with their customers, to set apart a small portion of their store or shop where they should place a suitable refrigerator box, preferably with a glass cover, in which the fish can be kept and inspected. By packing in crushed ice, a desirable temperature may be assured and flies and dust kept away, so that the fish may be kept in good condition up to the very minute that it reaches the consumer. Besides the refrigerator box, all that is necessary is a block on which to cut the fish and a special scale for weighing them, so that a fish department can be installed with very little expense, while providing all that is required.

Economical Substitute for Meat By careful methods in the handling and distributing of fish from its source of production, through the wholesale and retail dealers, an economical and appetizing article of diet can be supplied that will help to do away with the oft-heard complaint about the high cost of living. If we can succeed in educating the public to the value of fish as a regular food supply and as an economical substitute for meat, we shall not only furnish our Canadian people with an excellent food at a comparatively low cost, but we shall at the same time help to develop one of our great natural resources.

EXPORT OF FISH TO ENGLAND

Shortage due to the War I might say in connection with the exporting of fish and the progress that has been made, we are at the present time negotiating, or rather we have been through our Canadian Government, with the Imperial Government in England to help take care of the tremendous shortage in the fish supply on the other side. Last August an inquiry came from the Dept. of Agriculture and Fisheries in London, through the Colonial Secretary, Rt. Hon. Bonar Law, to our Dept. of Trade and Commerce. Sir George Foster and the Hon. Mr. Hazen, after consulting with some members of the Canadian Fisheries Association, placed the matter in

our hands and I am pleased to say there are now in transit to England—in cold storage of course—samples of various kinds of Canadian fish which amount to about five cubic tons. It is hoped by the introduction of our fish, which are being sent now to provide against temporary scarcity, that it may be possible to develop a regular trade with the Mother Country in many of our Canadian fish which are not known over there and, if we succeed in doing so, it will be of immense advantage to our fisheries, because it is not a question of shortage in supply or difficulty in procuring the fish with us here in Canada.

Enlargement of the Market Our difficulty has been the shortage of a market and, if we can enlarge our market, we shall at the same time not only increase the production but we shall reduce the cost of producing, because, as you will understand, the fish can be produced in larger quantities at lower cost. At the same time, in August last, the Canadian Fisheries Association made a request of the Dept. of Trade and Commerce for the appointment of a Commission of practical men to proceed to England and study the requirements of the trade there to find out in what lines the shortage existed and what we could supply. We have not yet succeeded in obtaining this Commission but we have not yet given up hope; what the fisherman lives on mostly is hope; he is always hopeful, that is what keeps him going.

VALUE OF CANADIAN FISHERIES

Encouraging Increase Another word in connection with our fisheries with respect to the value. The increase in the value of Canadian fisheries within recent years has been phenomenal. Whereas, until a few years ago, the annual value was \$20,000,000, it is now from \$30,000,000 to \$35,000,000, and, as I have said, there are immense possibilities for increasing that value. The value of the British Columbia fisheries alone, as taken from the Government records, amounts to nearly \$12,000,000 for the past year. In Nova Scotia it amounts to \$8,000,000; in New Brunswick to \$5,000,000; in Ontario, practically all lake fish, to \$2,750,000; in Quebec province to \$2,000,000, while in Manitoba, Saskatchewan and Alberta the value is about \$1,000,000. In the Prairie provinces new lines of railway are developing areas containing immense lakes that have never been commercially fished, and the production in that region will be increased tremendously.

Work of the Conservation Commission I might say in conclusion that I did not know exactly what was required. I thought that to speak on any commercial problem might not interest the Commission, as you are more interested, to my mind, in the conservation and, where the source has been affected, in the replenishment of supplies. I am pleased to give any publicity that I have at my command to the problems of the fishing industry, which I have very closely at heart. I believe that the Conservation Commission, by promoting the propagation of fish through the hatcheries in our Great lakes, as well as in its work in connection with the lobster and salmon fisheries, is doing a great work. It is a matter of fact that, in some of our western lakes that were considered practically depleted a few years ago, there is now a good supply of fish, and it is due solely to the hatcheries the Government established, which have not only taken care of the shortage but have rather increased the quantities in those lakes.

PROF. PRINCE: I, of course, take an intense interest in the subject which Mr. Byrne has brought before us, and desire to congratulate him on the very succinct and condensed manner in which he dealt with a very large subject and the orderly way his points were taken up. We all know that he has done herculean work on the Fisheries Association, which was started not very long ago, and great things are likely to follow from the work of that organization. What our fisheries needed, both on the seacoast and in the interior, was a better understanding amongst those engaged in the industry, better methods of coöperating with the Government and, indeed, a reorganization of the methods of handling this great industry.

I do not intend going over very many of the points Mr. Byrne has brought before us, because I think they, in a sense, explain themselves, and some of them are points which I myself have urged, very much like a voice crying in the wilderness, for many years. One point struck me as particularly good, namely, that all methods of transportation and supply of fish will not improve the situation unless the fish are handled properly in the first instance. You cannot make a good fish out of a bad fish. If the fish is not properly handled in the first instance—and there is no commercial commodity which has been so badly treated in the first stages—you cannot place it in the market in proper condition. Fishermen, I regret to say, are prone to ill-use the product which they draw from the sea; in fact, they seem to delight in knocking the fish about and jumping on them in a manner that no other product could stand. I have been shocked to see the way fresh

fish have been handled by fishermen, their appearance destroyed and their food qualities deteriorated. So, when Mr. Byrne tells us that the methods of handling fish in the first instance have been improved, that there is an approved, a quick and an efficient system, I think it is a matter for congratulation, and it will be a splendid thing if more can be done in this direction, so that the merchant, when he receives fish from the fishing boats, may be sure he has a product that has been properly handled and treated, and with which he can deal with confidence that it will reach our tables in good condition. But I defy any man to knock fish about in a fishing boat, ship it a long distance and have it arrive at our tables fit for food.

The reference to the dog-fish pest also struck me as an important point, and it is of special interest to me because I am chairman of a Committee of the Fisheries Board which, during the last month or so, has gone thoroughly into this dog-fish question again, and we hope to report very soon as to what is yet to be done with this terrible pest, which is such a source of loss to our fishermen and to all interested in the advance of the fishing industry.

Mr. Byrne's paper was extremely practical and there are many suggestions in it we should take to heart. I feel considerable pride in the fact that I have had something to do with some of these movements to which Mr. Byrne referred. Many of the things which are being done now are matters which I urged upon the Government, but which it seemed very slow to take up; I remember telling Earl Grey, who was active in fostering our industries, that there were two things lacking in our fishing industry, one being organization amongst the men handling the fish, and the other, strong public opinion backing up officers of the Fisheries Department in their work of enforcing the law as to close seasons and other regulations. When such infractions took place it was too often the case that the public seemed to sympathise with the violator. If a man shipped a lot of illegal lobsters, everyone—sometimes even heads of universities were not free from blame, and in this, Mr. Chairman, I am not casting any reflection upon yourself—seemed to sympathise with the poor fisherman, forgetting that he was thereby injuring the public and the public resources.

I would like to ask Mr. Byrne a question with regard to the shipping of fish from the retail merchants to customers in small refrigerator boxes. Are they used in sending the fish to its destination?

MR. BYRNE: You refer to the method of distribution from the wholesale dealer, who receives the fresh fish in large quantities and car lots, to the retailer. In the city the fish are packed in a box to be

delivered to him. In the country they must be packed for shipment by express. But the point I wished to make in my paper was that at the present time, a great many of the dealers who handle fresh fish, the retail dealers, treat the fish part of their business as a rather necessary evil. The trade is not very large. The public do not seem to be educated to the value of fish as a food. There is an occasional demand, perhaps on Friday, for fish, and they have to satisfy that demand and are rather reluctantly compelled to handle fish, so that frequently they throw them on a heap in the corner, perhaps in the window where the flies and heat get at them and, by the time Friday comes, the fish are not really in fit condition for food.

I suggest that any retail dealer handling fish should have a refrigerator box—whether it is elaborate or not does not matter so long as it serves the purpose—and preferably with a glass cover so that while the fish will be protected from heat, flies and dust, they can still be seen. If this were carried out, he would have his fish at least under a fairly good method of refrigeration while in his possession and his customers would be more sure of getting food fit to eat. I am sorry to say that, at the present time, the greater portion of our fish is handled in a haphazard manner, and I think it helps to keep down the demand that should exist among our Canadian people for fish—such a demand as now exists in European countries. In the British Isles there is more fish per capita used in a week than is used in Canada in two months, and in Germany and all other European countries the quantities of fish consumed, particularly among the working classes, to whom it appeals as an economical food, are enormous. It does not seem to interest our people here. They do not seem to know the value of fish as a food. What we have to do is to educate the public to appreciate it.

My reference to shipping in boxes was to the shipping from the wholesaler to the retailer at a country point or in a small town. In the city the retailer has to handle the fish and he must have his own refrigerator box. No wholesaler could undertake to supply the box to him.

DR. JONES: Would it be possible in shipping fish in small quantities by express, to have special refrigerator boxes for shipping the fish, or would the addition of express upon the box to be such that this would be an impossible method?

MR. BYRNE: It would be possible, I think, with better express arrangements. I have tried to show in my paper, without being vindictive, that we get very little assistance and can hope for very little

from the express companies, and, if we ship a package which has to be returned, such as you mention, the express companies would make us pay full express rates for taking back the packages. So the cost of doing it that way would be rather against increasing the demand for the sale of fish. We are all interested in increasing the sale, since we have an ample supply and only a limited demand.

HON. O. T. DANIELS: Like Prof. Prince, I have been very much interested in the paper and, I may further add, that in the province of Nova Scotia, and I suppose also in the province of New Brunswick, we have been very much interested in this legislation in respect to trawlers. I was, therefore, glad to have mention made of their use with reference to curing fish, and I can very readily see that Mr. Byrne's view has been along the line that probably we should get better fish from the trawler for the purposes of the market than from the method heretofore in use.

MR. BYRNE: I would not wish it to be understood from the remarks I made in connection with trawlers that I was putting forth the view that the fish from trawlers was better fish than what was produced by any other method. I really think the very best fish is what we call the shore fish—that caught by the shore fishermen. They go out early in the morning and come back the same day. These fish are caught on lines; they are put in the boats and, if they are handled carefully, are the best possible fish. The fish caught on trawlers are always more or less bumped about. The trawl is dragged on the bottom and very often the fish reach the market with hardly any scales on, showing the rough handling to which they have been subjected. The trawl is hauled up and all the fish dropped out on the deck. All this tends to soften the fish and take away from its good qualities. I would not wish to be quoted as claiming that the trawl fish are better than the boat fish. I do not think they are. What I did claim for the trawlers was a more regular supply, that fishing can be carried on at all times when it would not be possible to carry it on in smaller craft, and that, therefore, the market can depend on a regular supply of fish on certain days or at certain times, and that the trawlers can operate regularly throughout all seasons of the year even when the dog-fish are running, when there is a scarcity of bait and when the weather is stormy.

DR. JONES: In connection with the experiment of shipping fish to the Old Country, is that altogether fresh fish?

MR. BYRNE: The request of the Board of Agriculture and Fisheries was for fresh fish, but after making an exhaustive study of the matter,

it was decided that, owing to the length of the time they would be in transit, it was out of the question to ship fresh fish to England. They would be in transit at least ten or twelve days and you could not hope to ship fish and have them land in good condition after that length of time. So the samples sent over were fresh fish frozen and packed in cases, mild-cured fish, haddies, kippers, fillets and bloaters. These are frozen. These fish were brought to Montreal and we put them into our own cold storage. Last week the *Corsican*, which has suitable cold-storage accommodation, took these fish aboard into another cold room, so they would be practically in cold storage from the time they were cured until they reach Liverpool. It has always been a source of annoyance to me to see the poor service we get compared to the service given to the fish trade in England, where fish trains run ahead of express and mail. Here, the fish train runs last—and the fish trade are treated along the same lines.

MR. COWIE: I have little to add to what Mr. Byrne has said. He has read us a very comprehensive paper, and I am sure it has been of great interest to the Committee. Coming from a man who is directly engaged in the business and who is so prominently engaged therein, it must be looked upon as a very excellent contribution to the addresses and papers of the Conservation Commission.

In connection with this question of the good or bad quality of the fish taken by steam trawlers, I agree with Mr. Byrne that the finest fish we have landed on our shores here, as well as on the shores of the British Isles, are the fish that are taken by hook and line near the shore. Trawling, of course, brings us huge supplies of fish and, as Mr. Byrne has said, ensures steady supplies. Vessels can be sent to sea and come in on certain days; contracts can be made with inland centres and fish supplied just like any other commodity that can be produced at will. But the quality of the fish is quite another thing. In the trawl net all kinds of fish and all kinds of material from the bottom of the ocean are mixed up together. Sometimes a net is in the water and is dragged for two or three hours at a time. The fish are all rolled over each other and they become scaled and sickly looking by the time they are brought on deck. Sometimes these vessels go so far to sea that they are out a couple of weeks, and often the bulk of their catches, when they make these long voyages, is in such bad condition that they have to be split and dried and cannot be used for the fresh-fish market. Of course I do not mean to say that trawl-fishing could not be utilized to advantage on the coast here, seeing that a good quality of fresh fish could be readily landed as they have not very far to go to sea to get a

decent supply. I thank Mr. Byrne and congratulate him on the very excellent paper he has read to us this morning.

MR. LEFURGEY: With regard to the question of the local consumption in Canada, I think there is a great chance for improving the market in that regard. I know that in nearly all the small centres, in the Maritime provinces anyway—and I think that the people who have lived in small towns there will bear me out—the consumption of fish is comparatively small. Right in the Maritime provinces, in many towns, it is almost impossible to go down to the market, except occasionally, and get fresh fish. I do not know where the fault is, whether or not it is on account of the lack of education among the people as to the value of fish as an economical food. Possibly an improvement in the education of people in this respect might very well remedy that condition and possibly the local condition of the trade might be improved, so that dealers would be induced to deal regularly in fish and keep it in proper condition. I think that is a point that might help to increase the consumption to a large extent. The fish from Prince Edward Island is shipped straight through and does not reach the small centres regularly, so that the people of the community cannot get a regular supply of fish. In many instances the local dealers handle it without even a proper ice box, and it is impossible to handle fresh fish and deliver it in good condition after it has been kept for four or five days under such conditions. There is a field for a vast increase in the consumption of fish in Canada. If in the first instance we could educate our people to the value of fish as a food product and encourage the local dealer to keep a fresh supply on hand, getting it in at least twice a week, undoubtedly there would be a greatly increased consumption and our people would receive a better food product. There are very few people in our communities who have been properly educated as to the value of fish as a diet, say two or three times a week, as an article of staple food consumption. I think a great deal can be done in this way, much more than we can possibly hope to accomplish by the foreign exportation of fish to meet English orders.

What would be the difference in the cost of sending our fish to the English market as compared with the cost of fish caught in English waters?

MR. BYRNE: This question involves several others. I think I am quite safe in saying we could not compete with the British product for fresh fish. The British Isles use vast quantities of fish. They are produced and run to market quickly and we could not produce them nor

market them there in competition; but what we could do is to carry out the object we now have in view. Since the outbreak of war, a great many trawlers that formerly operated in the North sea have been taken by the Admiralty. Some have been sunk, some are engaged as mine sweepers, and this has caused a very perceptible drop in the fish supply. In fact, the shortage, if I remember correctly, amounts to 60 per cent of the normal supply. When you have such a shortage it is a very serious matter where fish is an important article of diet. As the Imperial Government appealed to our Government to secure supplies of fish in Canada to make up this shortage, we have sent over samples of fish, some fresh frozen, but mostly prepared and frozen. We hope that a market may be developed for some of our Canadian fish, which are of very high quality. Our Canadian kippers, bloaters, haddies and fillets, when properly cured, will compare favourably with any and, if this tremendous shortage in Britain continues, we can supply the deficiency. It is simply a question of taking care of their shortage during the war and possibly we may establish our product in the English market to such an extent that there will be a preference for at least some varieties.

It is rather difficult to speak positively respecting transportation. The times are abnormal, freight rates are increased by the war risk and the charges for shipping in refrigeration or cold storage on board steamers are practically three times what they were before the war. At the present time the cost of transportation would not fall much short of a cent a pound, shipping in refrigerator chambers, and you have to add to that the insurance and war risk.

MR. LEFURGEY: The main point is the possibility of opening a market in England for Canadian fish products, that are not now used in the Old Country, and that opening a market under present conditions might help us to establish a permanent market for the class of fish which they have not used over there in the past.

Prof. Prince referred to illegal fishing of certain fish products, lobsters for instance, and to the general apathy of the public in regard to illegal fishing. I do not think there is so much apathy of the general public in regard to illegal fishing; I think there is probably a little carelessness in regard to keeping to the regulations by the people who are dependent largely for their living on the fisheries. The packers, the fishermen and the people who are dependent upon them are the ones who are careless about the regulations. This arises, I think, not so much from an apathy or from a desire to evade the fishery regulations as from the fact that in many localities, the regulations now in force do

not satisfy the fishing public and, while we have had a Royal Commission who have established certain regulations and certain close seasons for fishing in many places, I do not think it meets with the approval of the fishermen or the packers, and from personal observation, I do not think that, in some sections, at least, it meets the real requirements of the situation. Different seasons call for different treatment as to the length of time during which fishing should be permitted. For instance, on the north of Prince Edward Island the fishing season commences fairly early, but there was a period of nearly a month in the early spring of this year, when, owing to ice conditions, the fishermen could not get out and set their traps and, on the south side, the fish did not strike in to the fish boxes. Under such conditions the packers, after going to a great deal of expense in equipping themselves for a catch of fish and to keep their factories in operation, feel that the conditions at those times should be met by a special regulation, and I think that possibly, if there was an advisory board who would take into consideration conditions of such a nature as that and change the season to suit the conditions arising, the situation would be very much improved. I think it would do away with a great deal of dissatisfaction among the fishermen and would tend to do away with a great deal of illegal fishing that possibly goes on at the present time. If this matter were taken up with the fisheries officials, some such adjustment as that might very well be made and certainly it would be a satisfactory thing to all concerned in fisheries protection.

PROF. PRINCE: Respecting the shipping of fish for long distances, quite a considerable quantity of fish goes to Australia and New Zealand from Scotland. I saw finnan haddies in Melbourne and Adelaide that had arrived in splendid condition from Scotland. The Scotch people are very patriotic in regard to fish and must have Aberdeen haddies. We could send Aberdeen haddies from Canada much more readily than they can be sent from Scotland and there is a possibility in such countries as Australia and New Zealand for quite a business in that direction.

MR. FEILDING: There is one question I should like to touch upon. We are continually hearing of the cheap food side of the fishing industry. I have only been associated a short time with the fishery administration of this country, but I fail to find what I have always hoped to find, namely, fish put on the market at such a price that the workingman would look to it as he would to meat. I am living at Barrie, forty or fifty miles from Georgian bay. There is an excellent train service to Collingwood. A travelling fish salesman comes around once a week and retails off his stock. He says that he buys his fish direct from the

tugs in Collingwood. If that is true somebody must be making more than they have any right to make out of the commodity. The class of fish he deals with is largely the so-called lake trout and whitefish. We never get pickerel as he cannot put them on the market in good condition. He purchases the stock from the tug at the usual market price at Collingwood, which is somewhere around five to eight cents according to the season and quality of the fish. I have never seen it in Barrie under twenty cents a pound. It is nearer twenty-five cents a pound, which appears to be an unreasonably high price for a commodity that is advertised as being a cheap food. I do not know whether Mr. Byrne could explain who receives that profit. Is it the distributor or the express company, or who is it?

MR. LEFURGEY: It is also an unsatisfactory method of retailing the fish, taking it around in that way.

MR. BYRNE: I am a wholesale dealer and if I could make anything like the profit that this buyer in Barrie makes I should not be a wholesale dealer, I should be a retired merchant—long ago. The trouble I touched on in my paper is that, when you get an article of food for which there is not a large demand and towards which the public show a certain apathy, you will find that the man handling it makes out that it is a lot of trouble to handle it, that he runs a risk of loss on it and that he, therefore, has to put the price up. The man in this case is charging twenty cents for what cost him from five cents to eight cents. If it is shipped by express, then the retailer is getting an exorbitant profit. The same condition exists in many centres; the retail dealer, partly because he has not a big trade in fish, assumes that he is entitled to big profit and charges too much for it. Fruit is sold throughout Canada at lower prices than it was sold for years ago. It is cheaper because of greater demand, larger consumption, greater production. Then, in the same way, in the fish business, if we get a larger consumption, it will bring down the price.

I have been endeavouring to persuade the Government to start a campaign to educate the public respecting the value of fish as food. If that were carried on it would remove a lot of prejudice. This prejudice, some of it well founded, arises because people do not get fish in good condition, and it tends to decrease the demand. If we can get a campaign of advertising what will be the result? What did it do for the Canadian apples last year? What is it doing for the Canadian farmer this year? There is a greater field in the case of fish and, if we could induce the Government to undertake such a campaign, it would be a great thing both for the fish industry and for the public.

We have been trying to induce the Government to make a nation-wide advertising campaign in Canada as to the value of fish as a food. I am quite sure that Mr. Lefurgey is right in his reference to shipping to England. Our market is Canada and we can produce and deliver fish to the people of Canada, if they will take it in quantities, and they can get fish cheaper than any other staple food. Mr. Feilding did not mention whether there are several of these hand carts from which fish is peddled or whether there is only one and the man has a monopoly.

MR. FEILDING: He has the whole fish trade in a town of about 7,000 people.

MR. BYRNE: It is an exorbitant price because he is charging twenty cents for what he pays the fishermen five to eight cents. That is an unfair profit. He will try to justify himself by the fact that there is not much sale and he is bound to take risks. People should be educated to eat fish, not in the cities alone but also in the small centres. It is in the small centres that good fish cannot be obtained, but, if delivered regularly and in good condition, and if the people were educated respecting the value of fish as a food, conditions would be greatly improved and the stores in the small towns would handle the product properly.

Technical Education in Relation to Fishermen's Occupations

BY

JAMES W. ROBERTSON, C.M.G., LL.D.

MR. CHAIRMAN and Gentlemen: Before stating some of the advantages which would come to fishermen and to the fishery interests from better education, and before outlining a plan whereby such education might be provided, I would like to say a word or two as to what the nature of education is.

What is its aim and main purpose? In many quarters its chief purpose has been regarded as the abolition of illiteracy, or the training of boys and girls to read and write and reckon. Certainly that would be a highly inadequate explanation of what is needed and what real education must do for boys and girls and the community. Let me give a brief statement of the least it should accomplish. It should fit persons for their occupations as contributing earners; it should qualify them for their duties as citizens and trustees of life, and make them ready for such opportunities of service as may come to them as individuals. To put it in other words, adequate education should provide a series of experiences arranged in such sequence that through them boys and girls, men and women, would become intelligent, continue healthy, develop ability and willingness to work and live agreeably and effectively, severally and in coöperation with others, cherish high ideals of character and follow good ideals of conduct.

For the most part the education of the race in all nations has been gained through the occupations followed by the people. The processes have been slow and very costly. I do not mean costly in money spent but in lives wasted, opportunities missed, and the hindrance of real progress towards satisfaction and happiness. All the processes of education, whatever its form of organization, consist of series of experiences which bring about changes in individuals. The changes which are sought by intelligent teachers and leaders are those represented by the change from ignorance to intelligence, from helplessness to personal ability, and from the utter selfishness of the very young child to public service for the common good.

Education for Occupations

While education has been obtained through the experiences of occupations, the first form of organized education was to prepare individuals for special occupations or callings. Organized education is now being extended to serve all occupations and all classes of workers. The occupations followed have always occupied a large place in the drama of life. If all the world is a stage, then the occupation by which the player earns his living has a very large influence upon the character of the play. The severest charge brought against the modern school and college education is that it does not provide fair play for those who are to follow the constructive and conserving occupations, such as farming, fishing, manufacturing and housekeeping. Complaint is sometimes made that those who seek provisions for special education for workers are disposed to materialize and debase education, which the complainers suppose should be regarded only as a theoretical and scholastic preparation for life. On the other hand it seems to some of us that an education planned to prepare for life without regard to qualifications for the occupation to be followed will fail to accomplish its purpose, whereas a formal education definitely planned to qualify individuals for occupations will thereby become the best means for preparing them for their whole life.

Importance of the Fishing Occupation

Fishing is one of the ancient and primitive occupations of mankind, and it is also one of the fundamental employments of a large proportion of the population of Canada. Passing reference may be made to at least one notable man who gained qualifications for his later life through the management of a boat, the handling of a gill net, and even control of a drag-seine net in the sea of Galilee. St. Peter, who became the preëminent fisher of men, was first a fisherman as a contributing earner in his community. The occupation has always been followed by hardy, courageous, intelligent and adventurous men; perhaps it is to be credited with the development of these qualities. The question now is whether the conditions of such worthy men cannot be greatly improved, their powers enlarged, and their outlook improved by education, directed especially to qualify them to follow their occupations in the very best way.

The economic importance of the question is revealed by the fact that the annual value of the fisheries of Canada is some \$31,000,000 to \$35,000,000. The numbers of men employed are about 84,000 in sea fisheries and 10,000 in other fisheries. These represent a population of about 470,000 persons. The value of education to them is to be measured by its effect on their standards of life and the satisfactions they

derive from their activities, as well as by the profits which accrue to themselves and to the country from their industry.

Work of Department of Fisheries Work, having definite and important educational values, has been done in recent years by the Dept. of Marine and Fisheries. The provision of better means of transporting fresh fish in good condition to the large centres of consumption, and the information concerning, and illustrations of, good cooking have increased the demand and thus tended to better the price and enlarge the consumption.

Educational Value of Inspection Inspection, which helps to standardize packages, has both a commercial value and an educational influence upon those who are connected with the occupation. That is all good work and in the right direction. It has been comparatively easy to do. It has had to deal with only a few people and these usually all willing and anxious to have such things done. However, great losses are still caused by careless handling of the fish, faulty cleaning, imperfect curing and unsuitable packing. As instances of the result of such methods the fact may be mentioned that, whereas Norwegian mackerel sell for about \$15 per barrel, Canadian mackerel, quite as good when first taken from the water, sell for about \$6 per barrel. Scotch herring are in demand at from \$10 to \$15 per barrel, while Canadian herring are in the market at from \$3 to \$4 per barrel. The Norwegian and Scotch fishermen have had opportunities for practical training, in other words for education for their occupations, whereas the Canadian fishermen have been left to follow antiquated methods.

Need for Modern Methods They need and would readily accept and profit by such forms of education as would develop intelligence, ability and cooperating will in carrying out the processes connected with all these parts of their business. Present methods, however, while they may have met past situations, are not suited to present conditions of transportation and markets nor to the exacting demands of present consumers. The recognition of a need for change is itself a step in advance. That recognition has been frankly met by the fishery authorities, by commercial interests and by consumers. There is also coming into definite view a recognition by the fishermen themselves of a need for change in their methods. They, more than most men, are slow of heart to believe in new methods and instinctively suspicious of the theoretical—as they think unpractical—and educated leader. The problem now is how to catch the fisherman in the net of



Fish Hatchery in Marine Laboratory, Bay of Nigg, near Aberdeen, Scotland



Net-making and Net-mending Room, Fisher Lads' Institute, Grimsby, England

recognition and of personal interest. The educators, as fishers of men, must use some suitable bait and it must take the form of something the fishermen can see as being directly for their good, something in the nature of a practical demonstration, which will win their interest and secure their acceptance. It must also have as its spirit something they can feel as touching their interests, the prospects for their children and their future welfare. In brief, it must be carried forward for them by enthusiastic young men who believe they have in that field of service a mission worth while, a great cause to advance.

Fisheries Schools in Other Countries We can learn a good deal from what other countries have done. The Netherlands have eight schools for fishermen and two school ships. The classes are attended by young lads from ten or twelve years of age and by men who have had years of experience at their jobs. France has eight special schools for fishermen and courses on fisheries and fish culture in four hundred elementary schools around its coasts. England has fifteen schools for fishermen, whose courses are chiefly directed to provide instruction in navigation and the handling of the gear of fishing boats. The institution at Piel* near Barrow-in-Furness, provides special short courses for selected fishermen. Each course lasts for a fortnight and the Education Committees of the County Councils grant \$25 to each fisherman who attends. Such men, when they go back to their localities, become centres of influence and enlightenment among their fellows. A somewhat similar course is provided in Scotland in one or two centres. Selected fishermen attend such courses for one week only. They receive a scholarship, sufficient to pay their travelling expenses, and \$5. They also exercise a very direct and helpful influence in the fishing community when they return. Japan leads all other nations in the provision it has made for the training of this class of its people. It has two

* "In the Biology course each man is supplied with a good student's microscope, having coarse and fine adjustments and $\frac{1}{2}$ in. and $\frac{1}{4}$ in. objectives, a hand magnifying glass, scalpels, scissors, dissecting needles, glass slides and cover-glasses. The material for investigation and instruction is supplied by the laboratory in a fresh state. It consists of the economic food fishes and shell-fish. An account of their life histories, food and habits is given and illustrated from preparations and live material. Living fish eggs, showing the changes in development during incubation from day to day, are examined under the microscope. Lantern demonstrations giving a *résumé* of the work are given at the end of each week. The course lasts a fortnight with five hours' daily instruction.

"The Navigation course for trawlers is pretty much the same as the work required by the mate of a deep-sea vessel—chart work, rule of the road, lights, signals, sextant and compass, laying down courses, etc. In combined Navigation and Biology we give $2\frac{1}{2}$ hours to Biology and 3 or 4 hours to Navigation, daily."—Extract from letter from Mr. Andrew Scott, Marine Laboratory, Piel.

See also Appendix IV.

central institutions attended by some 500 or 600 students annually. Each takes a three-year course and the graduates are employed afterwards in directing and developing the fisheries of Japan and the different areas where fishing is carried on. Perhaps that fact explains the very large share which the Japanese have captured of the halibut and other fisheries of our Pacific coast. Our plan must be to train the more intelligent young fishermen as instructors, and our methods must be of such a nature that the interest of these young fishermen will be gained. When that is accomplished, they will soon find means of adding to their equipment whatever more is necessary.

What should be Done in Canada? How shall we go about it in Canada? I would suggest that, first, the Government undertake the publication of suitable bulletins, freely illustrated and very simply and clearly worded; second, that the Government should provide demonstrations by means of travelling instructors at suitable centres. Short courses, suitable for selected leaders from all fishing localities, should be provided thereat. In addition to these provisions, courses in nature study having to do with the fisheries should be given in all public schools in fishing communities. Then, in the organization of the fish hatcheries and in the management of them, provision should be made for the training of men in that special branch of service. Finally, winter schools should be inaugurated wherever ten or twelve persons could be induced to attend, each with courses for young fishermen (*a*) in fishery subjects and (*b*) in navigation and boat machinery. It should not be beyond our capacity to provide such opportunities by the hearty and cordial coöperation of the Dept. of Fisheries, the provincial departments of education, bodies of public-spirited citizens, and the trustees of public schools concerned. All that could be done in this direction would accrue to the national welfare through the conservation of the fisheries themselves and, best of all, through the improvement of the conditions and the betterment of the outlook of the fishermen and their families.

MR. FEILDING: No one is more interested than I in this proposal for the education of fishermen. I have advocated it for many years. Ten or fifteen years ago I wrote a paper for the International Fisheries Conference on the same subject. During the past few months I have been doing some work for the Ontario Government in connection with fisheries conservation work in some of the inland lakes and, in each case, have invited fishermen to meet me and discuss some of their many

grievances. But one outstanding fact is the extraordinary amount of ignorance amongst them of their own business. I have had cases where I have tried to ascertain the proportion of males to females on the spawning beds at certain periods. I could not get any information on points like that. They did not use their eyes on anything outside the practical points of extracting the fish from the water. The advantage or disadvantage of using certain sizes of nets is another thing on which there is extraordinary ignorance. In one case on an Ontario lake, two men were fishing alongside one another, one with a $4\frac{1}{2}$ in. mesh and another with a 6 in. mesh. Nothing could make the man using the $4\frac{1}{2}$ in. believe that he would be better off with the 6 in., although the man using the larger mesh was getting bigger and better fish and at the end of his season had shipped a greater weight of fish. The man with the small mesh is extracting immature fish which he should leave in the water for a year or two and thus get a better product. Then, particularly in some of the out-of-the-way places, there are so many fishermen who are absolutely illiterate that it is difficult to know how to begin. I think this is largely the fault of the elementary schools. There also seems to be, at certain points, an undesirable element which is difficult to handle, yet I feel quite sure that, if the problems are brought before them by an enthusiast, we can get great improvements along these lines.

MR. COWIE: Just one word in connection with the teaching of fishermen. As I understand it, in the European schools for fishermen they are taught more of navigation and questions of a scientific nature than the actual work in connection with the use of a line or a net. For instance, before I left Scotland, the Fishery Board had arranged to bring a few leading fishermen from every fishing community to its hatchery at Aberdeen for one week for the purpose of imparting to them scientific knowledge of fish life, with a view to sending those men back to diffuse the knowledge in their various communities. Again, at Grimsby, Eng., they have a school for fishermen, but it is devoted, I think, entirely to the teaching of navigation and probably to some instruction as to the science of fish and fish life. In Germany, I understand the schools are chiefly devoted to subjects such as wireless telegraphy, the use of motor engines in fishing boats and the use of chart and compass and navigation generally. It is a very difficult problem to handle the instruction of fishermen in the actual work of fishing and the handling of fish. To a certain extent we have done something along these lines. For instance, I have written some pamphlets in a simple, straightforward way, describing to the fishermen how they could

make better catches of mackerel and herring and how they would obtain them in better condition at the proper season of the year. Tomorrow, I hope to read a paper on what we are doing with regard to instructing them in the salting, curing, packing and grading of pickled fish, or such fish as are marketed in barrels and hope to note one of the reasons why our cured mackerel sells for so much less than Norwegian mackerel. In these countries to which Dr. Robertson referred, do they teach the actual work of fishing as well as the arts of navigation?

DR. ROBERTSON: There are schools of navigation and schools of navigation and fisheries. The kinds of instruction vary. The school at Grimsby is one of the former type. There, the young man is supposed to undergo a five years' apprenticeship on the boats, thereby gaining plenty of practical experience, so the need there is to teach navigation, the rules of the sea, etc. On the other hand in the schools of France, the instruction for one class of pupils deals with the arts of navigation, and for another deals entirely with the life history and movement of fish, the catching of fish and methods of curing and shipping. The young men who are attending these schools go out on the boats with the fishermen and thus learn the practical part of the business. There is a third kind of instruction, which we could adopt, namely, the kind represented by the short course at Piel, England, where they take men successful in the fishing trade and give them a two weeks' course especially on the life history of fishes.

MR. COWIE: They are doing that at Aberdeen.

DR. ROBERTSON: Yes. That gives them new knowledge of fish. They often dissect as many as four or five types of fishes in a fortnight and they get instruction on the life history of the fish.

I cannot lay too much stress on the importance I attach to those bulletins with illustrations. I think most highly of the publication in large numbers of illustrated bulletins on the producing industries of Canada. I believe it is the cheapest and the best possible way of helping to make Canada. When I was head of Macdonald College we had visitors from many countries. Some of them were distinguished people, whom I invited to address the students. On one occasion a Russian woman came to Montreal and asked if she might visit the college. She was sent by the Russian Dept. of Agriculture to study methods of teaching women domestic science, etc. I said that I should like her to talk to our students. She said she did not speak English very well but she would try. She went on the platform, took out a small bulletin and struck it hard on the top of the desk. She said:

“That is a bulletin by Dr. Robertson, on ‘How to Keep Poultry in the Best Way for Profit.’ It has been printed by many hundreds of thousands of copies and sent all over Russia. That happened many years ago and, to-day, Russia sends to England more poultry than any other country and is beginning to exceed Denmark in the egg trade. Russia grows poultry as it is described in Dr. Robertson’s bulletins with plenty of pictures.” I tell you that because I think the fisherman is not less susceptible of instruction and improvement than the moujik of Russia.

MR. COWIE: In connection with what Mr. Feilding said about the fishermen, I take it he referred to the fishermen on the Great lakes. There they are possibly an ignorant class of people. But I rather take exception to that when speaking of some of the fishermen around the shores of Nova Scotia. It would be difficult to find any working class in any part of Canada that has more intelligence than some of our fishermen in that province. On the bay of Fundy there is a community of 2,000 or 3,000 people. They have splendid homes, and own twenty or thirty motor cars. Men who reach that stage of comfort with regard to living and enjoyment of life, have fairly well mastered their profession. I simply mention that fact as showing that our sea fishermen, at least, cannot be classed as ignorant or uneducated. For instance, you cannot tell some of the lobster fishermen very much about the lobster. They know how to handle it, and I, for one, would not undertake to tell them anything about the lobster that I supposed they did not know.

MR. FEILDING: My remarks only apply to certain stations on our lesser lakes. I would not class within the category of ignorant men the fishermen of a place like Port Stanley or Port Maitland. I mean away in the backwoods of Ontario.

MR. LEFURGEY: While the remarks of Mr. Cowie may apply to some places in Nova Scotia, I think that in Prince Edward Island, especially where they can only fish during a short season, it requires a longer period for these people to get motor cars, particularly in the Island, where they are opposed to motors. There is a great deal of necessity for education and the fisherman is a hard man to approach and educate. Distribution of pamphlets is perhaps the most effective way of reaching him. I think that it is absolutely necessary that we should have some further instruction to fishermen; that we should have some schools to which we could send a certain number of fishermen from the different localities who would thus become interested

in the treatment of fish, the necessity for the preservation of the fisheries and kindred matters. Our people do not understand that. In the lobster and other fisheries they do not understand the necessity of preserving the supply; they do not understand the need of preserving our oysters by proper regulations and the necessity of preserving the lobster by short seasons and by the regulation of fishing. If some of these men could be taken to a school and given a course of education and if you could thus obtain a certain number of leaders in the different fishing communities who could explain to the others, there would be, together with the pamphlets distributed among the fishermen, an inspiration to the fishing public of these communities to follow the lead of the men who had studied the subject and who were close enough to them to bring the lessons home.

HON. A. E. ARSENAULT: I have been interested myself in the fisheries for some years past. One of the greatest necessities is the education of the fishing population in regard to the preservation of the fisheries. One of our greatest difficulties with respect to the oyster is the prejudice of the fishermen. They say, in regard to the oyster, "You have opened up our grounds to leasing and, in the case of the lobster, you have shortened our season. You are giving us nothing in return; you are doing everything for the farmer, he is a particular pet of yours, you give him money and send out papers to him, but for us you do nothing." Some demonstration stations would go a long way towards instructing the fishermen in the necessity for a short season and the necessity for taking a larger view. If they think that the fish are theirs and that it is for them to take them at all times of the year, regardless of whether they will become depleted by over-fishing, great mischief must result. That has been the trouble with some of our fishing industries; they have suffered from over-fishing. This applies especially to the oyster on our Island, in reference to which I shall have something to say later on. Now that a beginning has been made, even if it be only the starting of stations to educate the fishermen as to the necessity of putting up better fish and marketing it in better condition and of preserving the fisheries, a great deal should be accomplished. I trust that the beginning made here to-day will not end the matter, but that it will be taken up and that something will be done. Fisheries Institutes along the same lines as the Farm Institutes would interest the fishermen and bring them together to talk their business over. I trust that we shall see some practical results from this discussion.

The Herring Fishery of Canada

An Account of Recent Scientific Researches on the Atlantic Coast

BY

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Dominion Commissioner of Fisheries, Ottawa

THAT Canada should possess one of the most wonderful herring resources in the world in her Atlantic and Pacific coastal waters, but that her herring industries should rank as wholly inferior in value and reputation, has been an anomaly difficult to understand, and still more difficult to explain. Why is it that Scottish and Norwegian herring should have such a high reputation that the herring fisheries of these two countries approach the total value of the whole of Canada's fisheries? According to the answers frequently given, the quality of our Atlantic and Pacific Coast herring, in a fresh condition, is very inferior. If the raw material be of poor quality, it cannot be expected that the manufactured or cured article should take rank with a superior Scottish or Norse product. It is, however, an erroneous assumption that the fresh Canadian herring are not of the very best quality.

Canadian and North Sea Herring Fishery

In comparing the Canadian and Norwegian herring fisheries, we notice: (a) That large herring constitute the main portion of the catch in Canada, due doubtless to the large mesh of nets in use (2½ in. and 2¾ in.), but in the great fisheries of Norway, thousands of barrels of younger herring, the esteemed 'fat' herring, are taken, and these have brought for centuries the greatest returns to the fishermen. (b) No Canadian herring fishing is carried on far from land; whereas, in the North sea, the most valuable herring fishery is conducted in the open sea by means of drift nets, and the coast fishing is comparatively insignificant. In Norway, as in Canada, all the herring fishing was coast fishing, until some successful experiments proved that the finest herring could be caught off the coast, and now hundreds of thousands of barrels are taken by drift nets each year.

Initial Experiments by Mr. Cowie In 1904, a scheme of investigation was initiated by the Canadian Government, chiefly to discover the existence of schools of 'fat' herring, to prove that drift-net fishing in the open sea was possible, and, lastly, that the quality of the fresh herring in Canadian waters was not inferior to the fresh herring of Europe. Mr. J. J. Cowie, a practical expert from Scotland, after four years' investigation, accomplished the most promising results. He used drift-nets from a Scottish steam drifter, "No. 33," which is still engaged in the work of the Dept. of the Naval Service. Single catches of 20 to 30 and up to 60 and 70 barrels of herring were taken in a single night by Mr. Cowie, and these were cured in the Scottish fashion. Dr. Hjort, a Norwegian fisheries expert, after reviewing these early experiments, expressed his satisfaction with the work that had been done. To make a commercial success of our herring industries, expert investigation on a much larger scale was necessary. Mr. Cowie's work, on the whole, received little encouragement from the fishing population or from fishing firms on the sea coast. Indeed some strong opposition was experienced, though certain firms, including the Whitmans of Canso, the Wilsons of Halifax, and the firm of Bell-Irving and Co. on the Pacific coast, took the matter up in earnest and attempted to develop a herring-curing industry on the Scottish lines.

Three difficulties were encountered by these pioneers in the herring-curing enterprise:

- (1) Scarcity of labour, lack of fishermen, curers, etc.;
- (2) Impossibility of obtaining a staff of herring girls (gutters);
- (3) Uncertainty in the supply and alleged great fluctuations.

Where are the 'Fat' Herring of the Gulf? Practically no fishing seems to be carried on in Canada with the object of catching the younger, smaller, 'fat' herring. Only a few barrels of younger herring are caught in the bays for use as bait. Where, then, are the sizes of herrings which correspond to the Norwegian small 'fat' herring? Are they, as is the case along the Norwegian coast, mainly confined to some special areas, or are they in the open waters outside or inside the gulf of St. Lawrence. Do they anywhere occur in such quantities and under such circumstances that a new fishery of supreme importance could be developed? That the younger stages or immature herrings must occur in larger quantities than the larger and older ones is obvious. Possibly the younger year-classes are less numerous in a special year or shorter series of years, but, during a longer period of

years, it is evident that older herring must be much reduced in number, in comparison with the younger individuals. From the study of the growth of the Newfoundland herring it is evident that the three-, four-, five- and six-year-old herring, which to a larger or smaller degree may belong to the immature 'fat' schools, must possess the esteemed qualities of the Norwegian 'fat' herring which are caught by hundreds of thousands of barrels. This opens up a vast field for interesting scientific and practical investigation to solve such questions.

It is above all things necessary to discover the schools and determine the migrations of the esteemed 'fat' herring and, in practice, to adopt better methods of capture and of handling, curing, and packing, so that our Canadian herring industry may rise to the front rank in the herring fisheries of the world.

SCIENTIFIC HERRING RESEARCHES UNDERTAKEN

Invitation to Dr. Hjort In order to solve the problem of bringing Canadian herring up to the standard of the Scottish or Norse product, it was necessary that certain preliminary questions should be decided, and Dr. Johan Hjort, Director of Norwegian Fisheries, was invited by the Biological Board to come from Norway to conduct investigations on lines similar to those which he had followed with success in Norwegian seas. Hon. J. D. Hazen, Minister of the Naval Service, and Mr. Desbarats, the Deputy Minister, took great personal interest in this proposal, and strongly approved of the investigations which were conducted in the autumn of 1914 and during the summer of 1915.

Problems Presented Dr. Hjort decided that the following questions required investigation:

- (1) Is there only one race or type of herring on the Atlantic coast of Canada, or do several races exist in these waters?
- (2) Is the rate of growth uniform, or can different types of growth, varying according to environment, be distinguished?
- (3) Is the annual renewal of the stock of herring constant, or are there great fluctuations as in Europe, that is to say, are there fluctuations in the number of individuals belonging to different year-classes?

European fishermen have observed that herring are dissimilar in many important features, and differ in size and quality at different times in different parts of the sea. The conclusion followed that, in the North sea, for example, a great number of various local races of

herring occurred, migrating only in restricted areas and that they congregated in dense schools at the period of ripeness. At such times, which may be termed "times of seasonal schooling," the fishing operations can be carried on profitably and successfully.

Methods of Research Dr. Hjort's investigations in Canada must be regarded as of a preliminary nature, but they show some results of great interest. Limits of time and opportunity rendered it necessary to confine the investigations to certain main features, and, in studying the specimens of herring obtained, the features regarded by Heincke as the most important received special attention. These were:

- (a) Number of fin-rays in the dorsal fin;
- (b) Number of fin-rays in the anal fin;
- (c) Number of keel scales behind the ventral fins;
- (d) Total number of vertebræ;
- (e) Number of first vertebræ with hæmal arch.

For the study of these characters, samples of fifty to seventy-five individuals were selected from the following localities: the west coast of Newfoundland; the gulf of St. Lawrence, especially Magdalen islands and Northumberland strait; the Atlantic coast of Cape Breton, especially west of L'Ardoise; the Atlantic coast of Nova Scotia, especially near Lockeport; the bay of Fundy, and of Gloucester, Mass.

During 1915, Dr. Hjort continued his work, assisted by Prof. Willey of McGill University, Dr. Bjerkan of Bergen, Dr. Huntsman of Toronto, Dr. J. W. Mavor of Wisconsin and a Norwegian captain. Their report is now in preparation.

KNOWLEDGE ACQUIRED BY INVESTIGATIONS IN THE NORTH SEA

Distribution of Herring Scientists have urged two extreme opinions with regard to the distribution of herring in the North sea, namely, (1) a great migration of one vast school, and (2) the limited migration of a number of local races. Variants of these two theories have been much discussed. On the whole, writers have, since the time of Linnæus, distinguished between different races or varieties of herring, and Nilsson determined that two great types could be distinguished off the coast of Norway, namely, the outside oceanic herring (*forma oceanica*), and the inshore or coast herring (*forma tænensis*), which has a larger eye in proportion to its length than the ocean herring.

Seasonal Rings of Growth in Scales Experts have found that the concentric rings on the scales of fishes correspond with their growth, but Dr. Hjort, in his study of the west coast Norwegian herring, found a great variation in the rate of growth, the most rapid being in May, June and July, while growth frequently ceases in winter. Hence, when examined under the microscope, broader bands, called summer lines, are seen on the scale, while the winter rings appear as sharp lines or ridges. Thus the rings or zones of growth on the scale show, not only the number of seasons passed by each fish since it was hatched, but also the rate of growth during the several periods. An instrument has been devised by which the scale is shown enlarged, and tangents, drawn parallel to each other and extending to a lateral perpendicular, enable the length of the fish to be drawn proportionately for each period of growth.

Life History of Norwegian Herring The methods adopted and the results are beyond question. In Norway, these methods showed that the young fry undergoing development in the ova, laid on the sandy bottom of the inshore banks off the west coast, escape soon from the eggs and are then carried northward along the coast by the Gulf stream. They spread all along the extensive range of the coast, and, without question, these small fish undergo further development in northern waters. In the autumn, when they are 8 to 10 centimetres (3.2 to 4 inches) in length, and two-thirds of a year old, they begin to make their appearance in the seines. At New Year, they reach a size of 12 to 15 centimetres (4.8 to 6 inches). These are the small herring which are caught along the whole Norwegian coast.

In the third year they develop an abundance of fat, and remain in this state, mainly in the summer and autumn, till the genital organs develop. This begins from the third year, but, usually, in the fourth or fifth year in the south, and in the fifth and sixth year in the north.

The mature individuals then separate from the immature, 'fat' herring, and begin to migrate southwards along the coast till they reach the schools of mature, large herring, with which they intermingle.

Composition of Adult Schools Among these many different sizes of herring, from the young fry up to the mature and oldest fish, we find several groups, differing either in biological respects, or in regard to habitat and manner of life. It is therefore impossible with herring to make at any one place, or at any one time, a selection from the individuals in the sea, sufficiently representative to reveal

accurate conditions as to the composition of the mass. In each catch we find individuals, which may be representative with regard to size and age of the biological group, *i.e.*, the mature herring, to which they belong, but not to the whole stock of herrings. It is necessary, therefore, to take many samples from different schools of fish at different places, endeavouring to combine the resulting observations, so as to form, as it were, a complete picture. Moreover, it is in some respects impossible to find any standard by which to judge of the respective quantitative values of the different groups, even though it may be possible accurately to determine the composition in point of size of each separate group. The investigations of the different biological groups of herring have shown, however, that repeated study from season to season can give a most valuable general idea of the variations and fluctuations in the preponderance of the different ages of year-classes within the different groups, *e.g.*, within the 'fat' herring and spring herring groups.

The combined study of the statistics of the fisheries, the catches of the fishermen, and the fluctuation with regard to the year-classes, in the most important groups of herrings, have proved sufficient to demonstrate that the cause of variations in the fisheries is to be found in the great fluctuations in the number of individuals occurring in the larvæ and fry developed in the different years—fluctuations, that is to say, in the year-classes.

PRESENT STATE OF KNOWLEDGE IN CANADA

Separate Schools may Mingle A comparison of normal scales of the different types of Canadian herring, shows a marked difference in rate and manner of growth. Most marked is the difference between the Newfoundland herring and the Magdalen Island herring. This circumstance is very important, as both these types occur in the gulf of St. Lawrence, though not in precisely the same areas of that sea. Among the Magdalen Island herrings, a few individuals were found showing a growth very similar to that of the Newfoundland herring, and their scales were so characteristic that they revealed themselves most clearly. In those areas of the sea, where two or more very different types of herrings meet or intermingle, it may be possible, therefore, to ascertain the extent of the intermingling between the different schools, and the areas of distribution and migration of the different types. The gulf of St. Lawrence seems to provide the most excellent conditions for investigations of this kind.

**Similarity of
European and
Canadian
Herring**

The results of Dr. Hjort's investigations are an important addition to our knowledge. The interesting series, or systems of types, which have been determined by the investigations in Europe, have been proved by him to have, on the western side of the Atlantic, a close parallel, both with regard to racial characters and rate of growth. This addition to our knowledge justifies a few remarks regarding the conditions under which the different types live.

The Irish and the Nova Scotian herrings—distinguished by their excessive growth, their spawning in the autumn, their more numerous keel scales—both belong to the open Atlantic waters, these waters being marked by a high salinity and more limited changes in temperature during the different seasons.

The Norwegian and Newfoundland herrings, it must be noted, also belong to the open sea, but the water is of less salinity and is mixed with cold, fresh water from the land or from the Arctic. They live under a more marked boreal climate and amidst a typical boreal fauna. The difference between summer and winter is very marked in their surroundings, both with regard to temperature and biological conditions.

The southern portion of the gulf of St. Lawrence corresponds to some extent with the conditions in the North sea on the Dogger Bank area, whose temperature is high in summer and low in winter, though never so low as in Canadian waters. The samples of spring herring from the west coast of Newfoundland are in several respects, in the characteristics of their growth, very much like the Norwegian herrings. We should, therefore, also expect a similar composition with regard to age.

On the west coast of Newfoundland, herrings are caught in the spring, in the summer and in the autumn. The spring herrings are large, with mature roe and milt; they are the spawning schools and correspond to the Norwegian spring herrings. In the gulf of St. Lawrence the herring spawning season seems to be in May, that is, about two months later than on the Norwegian west coast. In the summer some inshore fishing goes on in the bays. The catch consists, according to fishermen, of smaller herring, which are used as bait only. The autumn fishing is a very important one, large herring schools approaching the coast and entering the bays. These herring are large, with the sexual organs developing. They correspond perfectly with the 'large' herring, which are caught in Norway late in the autumn.

The herring of the Magdalen islands live in the southern portion of the gulf of St. Lawrence, where the fresh water from the river St. Lawrence lowers the salinity, where the temperature in summer is high, in winter very low, and where the water is shallow over the many 'banks.'

The Norwegian and Newfoundland herring, which correspond so much in their rate of growth, may also reach their maturity at about the same age. If this be so, it must further be supposed that the spawning schools off the Newfoundland coasts, in some years, must consist of large numbers of smaller and younger, four-, five-, and six-year-old fish, which to a great extent must go through the fishermen's nets and thus escape being caught. The Newfoundland herring, secured during the investigation, consisted of samples from the spring and autumn schools, all of which are large mature fish.

Spring and Fall Herring in Canada The investigations in 1914, which were, on the whole, confirmed in 1915, showed that there is a marked difference between the spring spawners of the gulf of St. Lawrence, Northumberland strait, the Magdalen islands and the west coast of Newfoundland, and the fall herring obtained in the open Atlantic waters off Cape Breton and Nova Scotia. This difference was well known to experienced men engaged in the Atlantic herring fishery, as they caught spring spawners everywhere in the Gulf, and fall spawners off the open Atlantic coast. The fishermen recognized an imaginary line drawn in an easterly direction through a point on the coast of Cape Breton, near the entrance to the Gulf. North of this line all the herring are declared to be spring spawners, and south of the line the oceanic types are fall spawners, but there are known to exist also local spring spawning schools of coast herring.

Bay of Fundy and West Nova Scotia Herring The last-named occur in the bay of Fundy and around the coasts of western Nova Scotia. Gilpin, however, long ago, discovered spawning herring in May as well as in September and October. Herring first appeared in Digby basin about the last of March or the first of April, and spawned a month later. By the 20th May they had left the Basin. On the Atlantic coast of Nova Scotia, Gilpin observed shore herring, about eleven inches in length, early in March and spawning in September and October. It is curious that this corresponds to conditions in the North sea, where coast herring spawn in spring and oceanic herring on the outer banks (*e.g.*, the Dogger bank) in the autumn. It has also been noted that the northern spring spawners have fewer keel scales (averaging 12.5) than the southern fall spawners (averaging

13 to 14), and it is also important to note that the herring on the west coast of Newfoundland have the highest number of vertebræ, namely 56.83 on the average.

The samples of Atlantic Coast (Nova Scotia) herring, taken in the autumn of 1914, proved to be young herring 3 to 5 years old, mainly 4 years old in the Halifax Harbour specimens, while the larger series taken outside ranged from 5 to 13 years old, most of them 7, 9 and 10 years old, fewer 8 and 11 years old, a few 5 and 6 years old, and very few (1 per cent) 12 to 13 years old.

**Southern
Gulf Herring** A study of samples of herring from the southern portion of the gulf of St. Lawrence in May, 1914, shows many more year-classes than in the Newfoundland schools. The four- to five-year-old herring are most numerous, though fish occur 6 to 10, and even up to 17 years old. No single year-class, however, prevails, *i.e.*, not one comprising half the individuals of the whole series under examination. The ten-year-old herrings, so prominent in the Newfoundland schools, are very uncommon amongst the herring from the southern portion of the Gulf.

On the other hand, there is a marked preponderance of the eleven-year-old herrings amongst these Gulf herring. No similarity exists, with regard to the predominance of certain year-classes, between the Newfoundland and the Magdalen Island herrings, just as there is no correspondence, in this respect, between the herrings of the Norwegian coast and those around the British Isles. These different types live, each of them, under special conditions, not only as regards their growth, but also as regards the renewal of their stock. The Magdalen Island herring have also this in common with the North Sea herring, that the fluctuations in the year-classes are smaller than in the Norwegian and the Newfoundland types.

Between the two samples, from the Magdalen islands and from Northumberland strait, there is an interesting difference. The Magdalen Islands sample consists of older individuals than that from the inshore Northumberland strait. It will be necessary to investigate this more closely and to ascertain if this difference is due to the method of fishing or to some peculiarity in their life-history.

Dr. Hjort's material contained no sample of younger, immature herring, from the southern area of the Gulf. It is of interest to note that Mr. J. J. Cowie has drawn attention to the occurrence of schools of younger herring in the Gulf, which he compares with the Scotch 'matjes' or fat herring. From his investigations of their growth it may be anticipated that the smaller and younger herring of this type

must be very similar to the young North Sea herring, and the indications given by Mr. Cowie will therefore be of the greatest interest for further investigation.

Absence of Dominant Year-Classes While, therefore, there are striking parallels between our herring and the North Sea herring, the marked dominance of definite year-classes has not yet been established beyond doubt, and researches continued through a series of years can alone demonstrate the presence, or absence, of such dominance as Dr. Hjort found in Norway, where from 1908 to 1914, the catches were composed very largely of fish hatched in 1904. These fish, four years old, preponderated in 1908, and again, as five-, six-, seven-, eight-, nine- and ten-year-olds in the years from 1909 to 1914, inclusive.

Technical Points Awaiting Determination The spawning areas, the resorts of the young fish and their migrations, the determination of the age and composition of the local runs of herring, coastal and deep sea, and the discovery of the 'fat' or immature though nearly adult, herring, in the vast schools in which they must occur somewhere off our shores, are the points of chief practical moment. Future work will afford this information and the development of a vast herring industry will, in my opinion, inevitably follow the acquisition of this knowledge.

Unutilized Fisheries Resources of Canada

BY

PROF. E. E. PRINCE, LL.D., D.Sc., F.R.S.C.

Dominion Commissioner of Fisheries, Ottawa

MR. CHAIRMAN and Gentlemen: I may claim for the subject upon which I am to speak that it is a very large one although I shall have to treat it in a somewhat sketchy and fragmentary way. Many of the readers of papers before this Commission have also explained that their subject was a large one and I fear that it is a disability that attaches to most fishery questions. They all seem to expand and become large questions. But this matter of the unutilized fishery resources of Canada is one which seems to grow the more you look into it. I promise you this morning that I shall be very condensed and brief in my remarks.

High Value of By-products

It is not necessary to point out to the members of the Commission of Conservation that the utilizing of waste products as a source of wealth has expanded in many industries to such an extent that in some cases the by-products or waste materials have proved more profitable and important than the original product of the industry. In a paper before the Commission in January, Dr. Haanel made reference to coal tar which, he said, had for many years been regarded as a waste product, but on which has been founded one of the largest and most profitable industries in Germany, the manufacture of aniline dyes. Germany, as in so many cases, utilized the discovery of a Lancashire man, Dr. Crace Calvert, who was the first to find these wonderful dye products in coal tar, and I have an interesting little pamphlet published by him in Manchester, I think, in 1845, upon this subject. That discovery has led, as you all know, not only to one industry but to a series of valuable industries, the production not only of colours but scents and flavours used in the manufacture of candies and confections, glycerine and creosote, as well as a variety of other products. These have been the result of Dr. Calvert's discovery in regard to that waste product, coal tar, which was used for forty or fifty years simply as a hot cement for holding together paving stones in the street. Our sawdust waste has

been almost criminal, for it has not only ruined the rivers and injured fish life but it has thrown away material which, to give one example, could have produced ethyl alcohol of high proof at a very low rate, one-third the cost of the production of alcohol from grain.

**Classification
of Unutilized
Aquatic
Products**

It seems to me the time has arrived when we should pay attention to the waste products of our waters and turn them to profitable account. My subject does not only refer to fish, but to all the products of the sea and of our waters generally, which may be turned to profitable account, but which have not hitherto been utilized. These products may be separated under three headings: first, aquatic products at present utilized but of which the value could be vastly increased by better handling; second, aquatic products which are recognized as utilizable but which are not yet turned to account; and third, aquatic products whose value has not been recognized generally as of any importance. The terrible war now raging has called attention to the subject of turning to account all our resources, and fish products and food products generally are likely to realize very much enhanced prices as they become scarcer, so that we ought to take into account all the possibilities of our aquatic industries.

REORGANIZATION OF HERRING INDUSTRY

I should like to say a word or two about the herring and may say first that the so-called lake herring are of course not herring at all. It was suggested a few years ago that a Scottish herring industry might be inaugurated upon the Great lakes. That, of course, is impossible because the so-called lake herring are really a small species of white-fish and wholly unsuited to the Scottish herring methods. The herring industry of the British Isles is one of very great importance. The Scottish herring industry in 1912 reported a catch of 250,000 tons which brought no less than \$10,438,770 or about one-third the total value of our whole Canadian fisheries. As Dominion Commissioner of Fisheries I have felt for many years the paramount importance of reorganizing our herring fisheries in Canada on the lines of the British and Scottish industries and many of you know that I have had something to do with the bringing out of Mr. Cowie, in accordance with a plan which was cordially approved by the Minister of Marine. He brought out a steam herring drifter and crew, with a staff of girls for cleaning, selecting and packing the herring. Most of you know the result of Mr. Cowie's work.

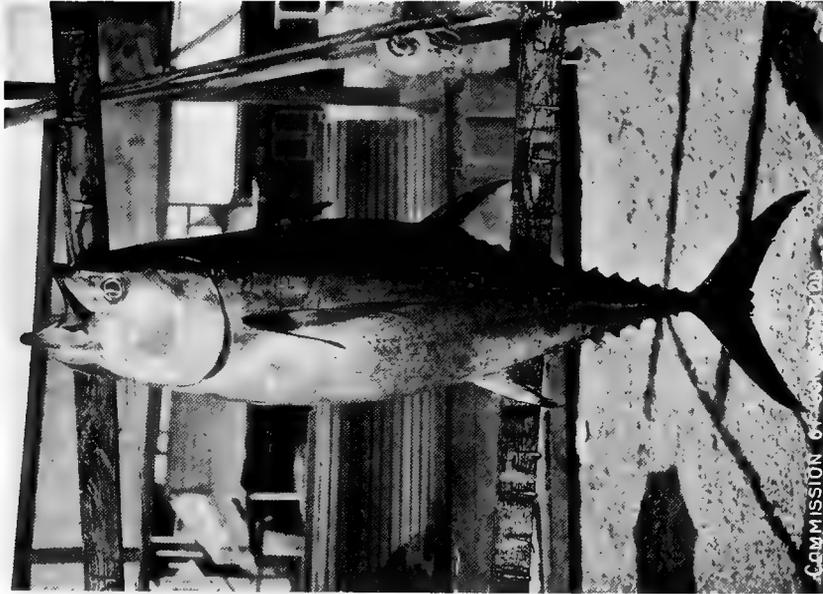
Canadian Herring as Good as British It has been claimed that the Canadian herring could not realize anything like the price of the Scotch and Norwegian fish and it was said among fishing people that the Canadian herring were not the right quality in their fresh condition to make the best herring, so that you could not expect them to rank alongside the Scottish herring. But Mr. Cowie proved abundantly that the Canadian herring when properly handled, would realize the same price as the Scotch herring and instead of bringing \$2.25 to \$5.00 a barrel they could bring \$10.00 to \$11.00. Indeed, I believe Mr. Cowie got \$15.00 a barrel for some herring he put up. Although the experiment was somewhat limited, yet, as Mr. Cowie claimed in his report of 1905, ten barrels put up properly and proving the quality of the fish are as good as a thousand in demonstrating why Canadian herring have not had the repute they should have had in the markets, owing to the careless and unscientific methods of curing and want of knowledge as to how to place the herring in the market. That our herrings are excellent is proved by the fact that, at the present moment, important men from Philadelphia, Chicago, and other great centres—I met them the other day in Halifax—are in the Maritime provinces anxious to see these fish of ours put up in the proper way and are prepared to help in the packing of them. Some Philadelphia firms are now packing our herring in the Scottish style and I met an important Chicago buyer the other day who told me that he was prepared to give an order for 50,000 barrels of Scotch herring from Canada. I hardly like to mention the price, but \$25.00 a barrel was mentioned as possible for the best Scotch herring just now in Chicago. That is like a fairy story now, when we think of former prices prevailing. The main causes of this inferior reputation of our herring are, first, wrong methods of fishing, the fish being taken inshore when in poor condition instead of outside; second, inefficient handling by fishermen, the scales being knocked off and the fish spoiled; third, the curing of the catches by the fishermen themselves which is an unsatisfactory method; fourth, the absence of selection of the fish when packed, poor grading and handling generally, resulting in an inferior product; fifth, the inferior barrels or packages that are used, and the lack of care of the fluid or pickle, which often escapes and leaves the herring dry or, at any rate, much deteriorated.

Improved Methods of Handling Herring The cures for these difficulties I need hardly enumerate. They are that drift nets should be used with the proper mesh, so that fat, non-spawning herring which are not yet quite mature, or full, hard-roed herring should be captured

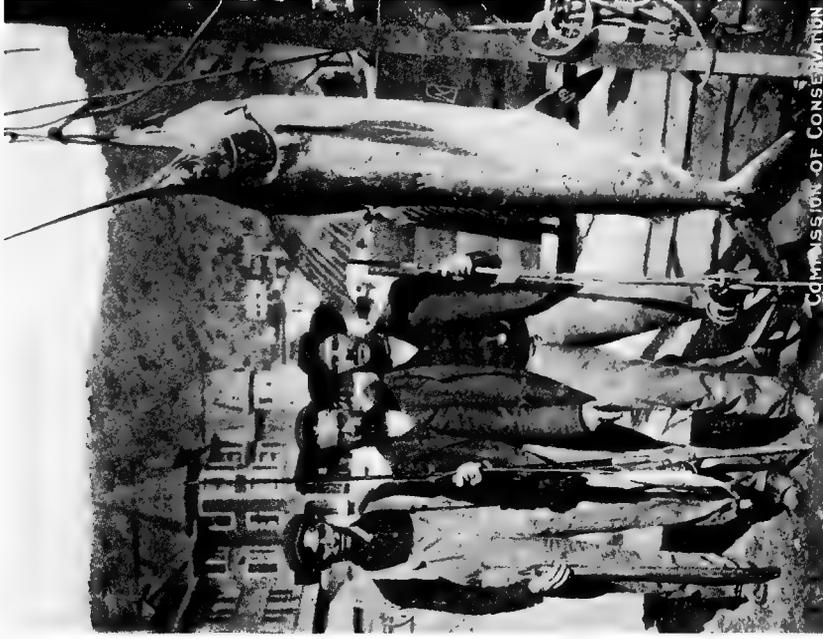
when they are in the outer waters, when they are in the deep sea, and the fishermen should hand over their catches to curers. They should be brought in as rapidly as possible, as few hours as possible elapsing between the capture and the landing, and the fish should be carefully and properly graded and selected. A recognized quality or kind of salt should be used, and the package or barrel should be substantial, tight and well made. But, as Mr. Cowie is to deal with this subject, I need say no more about that. I can only point out that we have in Canada been wasting our sea-herring resources and the waste is deplorable, for no country in the world possesses such a rich herring harvest as is to be found in the waters of Canada. The British Columbia coast abounds even more wonderfully than the Atlantic coast in herring, and the use of these fish has been such that they have realized the poorest price. Great quantities, of course, have been used for bait. In British Columbia, the Japanese have dry-salted them and exported them to markets in China and Japan, yielding very poor returns. I regard it as a criminal waste of a fine fish product. The remedy for this is to enter systematically upon the proper curing and handling of herring according to the methods adopted in Europe. That the herring is a valuable product I need hardly say. One hardly realizes how important it is as a food, but Prof. Hopkins of the University of Cambridge has recently pointed out that the sea herrings of the North Sea contain 18.6 per cent of protein and 3.44 per cent of fat. Fresh, lean beef contains 22.4 per cent of protein and 4 per cent of fat, so you see how well the herring compare even with fresh, lean beef. Here is a case, then, where it is open to us to utilize in a better way a product that we all recognize as of value.

VARIOUS FISH WHOSE VALUE IS IGNORED

Tunny or Horse-mackerel But there are some fish which occur on our shores whose value has been comparatively ignored. Many years ago, during an early tour as Commissioner of Fisheries, I called attention to the waste of the fish called the tunny or tuna, sometimes called the horse-mackerel. I remember at Yarmouth, Nova Scotia, in 1894, seeing a number of these fish thrown on the beach rotting. These were fine specimens of the tuna, some three hundred or four hundred pounds in weight. At various points on the coast I saw these fish thrown away. When I landed finally at Gaspe the first thing that greeted me was the odour of decaying tuna on the beach. No one acquainted with the fisheries, say, of the Mediterranean, would believe that such a thing was possible, that a fine fish like the



Tunny or Horse-mackerel



Sword-fish, 400 lbs. Weight



horse-mackerel was being thrown away in that fashion. I might quote from a great authority, M. Pierre Lemy, who is a large merchant in Paris engaged in the prepared food business; and he said that, after the sardine, which is a prime product in France, the tuna is the fish which is most important as a preserved product. I need not go into the way in which these fish are utilized, but it is sufficient to say that there are several kinds of these fish, the large horse-mackerel, a closely allied species called the bonito and several varieties which have now obtained a market in the United States. Our men are shipping these horse-mackerel, which are really very good eating, and I noticed in a trade paper the other day that there is an upward tendency in the prices for this fish. In 1902, one fish trap at Canso took, in a few weeks, over 40 of these fine fish.

Profit in Sword-fish There is another fish which, fortunately, is now receiving attention, namely the sword-fish. A few years ago such a thing as sword-fish fishery was unknown on our coast. But men began to realize that these fish were in our waters. There is now a special fleet of sword-fish boats engaged in capturing these fish, and this has proved a most profitable industry. In August last year the sword-fish was so plentiful off the Cape Breton coast, especially early in August, that at Ingonish, in Cape Breton island, eighty of these fish were caught. Some boats took from five to twenty-five and they brought from three to four cents a pound from the fish buyer. These fish ranged from 300 pounds to 400 pounds in weight and one was caught inside the Outer Harbour buoy at Sydney, which weighed 565 pounds. At four cents a pound that is quite a return for a fisherman. In Boston or New York, if you want a bit of sword-fish, you have to pay twenty to twenty-five cents a pound. I had some in Boston and it was most excellent. I have known six hundred or seven hundred of these fish to be landed in one day at the fish wharf in Boston and a great quantity of these were from Canada. It is a very paying industry and shows how fish like that can be neglected for many years but now yield such ample returns.

Value of Sturgeon I shall not refer to the sturgeon as there is a paper on inland fisheries, but it is hardly credible that a few years ago I saw sturgeon thrown upon the beach on the St. John river for manure, whereas now it is one of our most valued fish and brings very great returns to our fishermen. I know that, in some cases, good lake sturgeon have brought fishermen as much as a good-sized cow would bring to a farmer. As much as 30c per lb.

has been recently paid for sturgeon in the New York markets, and the weight ranges from 20 up to 100 pounds.

**The Wolf-fish
or Sea-cat** Then there is a fish, which is not at all utilized, called the wolf-fish or sea-cat. There are two forms of this fish, *Anarhichas lupus* and *A. latifrons*, the latter the more northerly form. The fish run from fifteen to fifty pounds in weight, a not exactly eel-like but long fish, quite big and heavy, with perfectly white flesh, whiter than halibut, flaky and delicious. I remember thirty years ago a Scotch fisherman telling me that he had eaten it and it was the best fish that swam. No one who has eaten it will deny that it is very superior. Great quantities of this are caught on our coast and thrown away. I was at Clark Harbour, Nova Scotia, and saw a number of these lying on the wharf, as they were considered absolutely of no value. They are exceedingly good fish, and in the British market—which is the most particular market there is—the wolf-fish is now being sold, although the head is removed and I fancy it is called a very superior cod.

**The Angler
or Goose-fish** Respecting the angler or goose-fish, it is also a very ugly fish, sometimes four or five feet in length. The tail portion, which is solid flesh, is very good. Deprived of the head it also has been placed in recent years on the London market. It brings a good price and is regarded as an excellent fish.

**Demand for
Skates' Wings** The skate is another fish which is caught very plentifully by our fishermen but has never been utilized until recently. I know that one Digby fisherman last year shipped 30,000 pounds of skates' wings to the United States and there is a demand for more.

**Rock-eel or
Mother-of-eels** In regard to this utilization of these lesser-known fish or fish not valued, I may say that the staff at the biological station at St. Andrews, New Brunswick, have for the last two or three seasons been trying on the mess table all kinds of fish and you would be astonished at the result in the case of some fish that people threw away and did not regard as edible at all. There is one fish called the rock-eel or mother-of-eels, a greenish eel-like animal. It is viviparous, that is, produces its young alive, and is altogether a peculiar fish. A large one may weigh a couple of pounds. We found that the rock-eel (*Zoarces*) had white flesh of splendid flavour and our staff declared it one of the best fish they had had on the table. That is a fish that could be utilized; there are great quantities along the shores and it is a product the food value of which has not been realized at all.

**Waste
of Roe**

There is also a great waste of roes or eggs. When fish are cleaned, the entrails, including the ovaries or eggs, are thrown away. Apart from the sturgeon, which produces the high-priced caviare, the eggs of fishes have not, speaking generally, been of any market value in this country. They are not only a most nutritious and excellent food but they are also of importance and value in other ways. They are put up as *rogue* for the French sardine industry and there was quite a demand, as long as the great sardine industry was in a prosperous condition, for this *rogue*, which is really the salted, packed eggs of such fish as the cod, haddock, pollock, hake, the other well-known fish. It is used as a lure scattered in the sea to attract and collect the wandering schools of sardines. The roes are removed entire, packed solid and tightly in barrels after being salted, and bring quite a good price.

THE MENACE OF THE DOG-FISH

And now I come to rather an important subject, namely the dog-fish. The utilization of this fish has formed a subject for very frequent discussion. These fish are found in swarms off our Atlantic and Pacific coasts. They roam the seas like packs of wolves and destroy everything in the shape of fish and fishing gear; they are altogether a serious menace. The Caraqueet fishermen in New Brunswick, in 1903, estimated their loss from dog-fish at \$80,000 for one season and in Boston harbour in 1904 the loss to gear and destroyed fish was not less than \$10,000. Very frequently our fishermen have to cease operations on account of the large numbers of dog-fish coming in and taking the bait, biting the fish off the hooks and making holes in the net with their sharp teeth.

**Government
Reduction
Works**

To encourage the destruction of these fish the Government built some reduction works a few years ago. Three of these are operated by the Department of the Naval Service. The object of this was to make the dog-fish into fertilizer or guano, and they have done so, but the difficulties in connection with this are, first, that the supply is widely scattered and it is rather costly to collect; second, the supplies are erratic and uncertain, sometimes there is great abundance of dog-fish and sometimes they are scarce; then, third, there is a lack of technically trained men to conduct the reduction works. You cannot make the best of waste material unless you have men trained to turn it to account, but the reduction works have certainly got rid of quite a large number of dog-fish. Fishermen have brought them into these works at Canso, at Ship-

pigan and at Clark Harbour, and in a report which a Committee of the Advisory Fishery Board is at the present moment preparing and which will be sent to members of this Commission, you will see the facts in regard to the amount of dog-fish destroyed and the result of the operations of the reduction works in ten years. I do not know that I need refer in detail to the method in which these reduction works are carried on. The returns from the sale of fertilizer and of oil are only about half the cost of operation, so that the enterprise is not operated at a profit. The raw material is brought by the fishermen directly to the works or collected by agents who get a certain percentage for collecting the fish, or by the Department's own collecting boats, and the fish are dumped on to the wharf at each factory. The fish are first cut open and the livers removed. These are kept separate and oil is produced from them. Permit me to read a brief description of the further processes through which the fish are passed before being made into fertilizer.

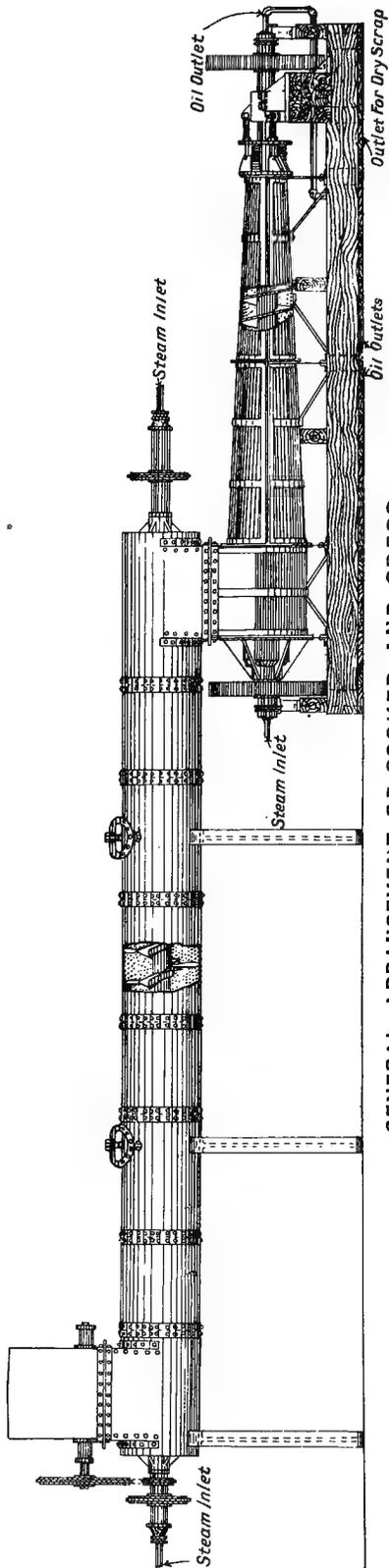
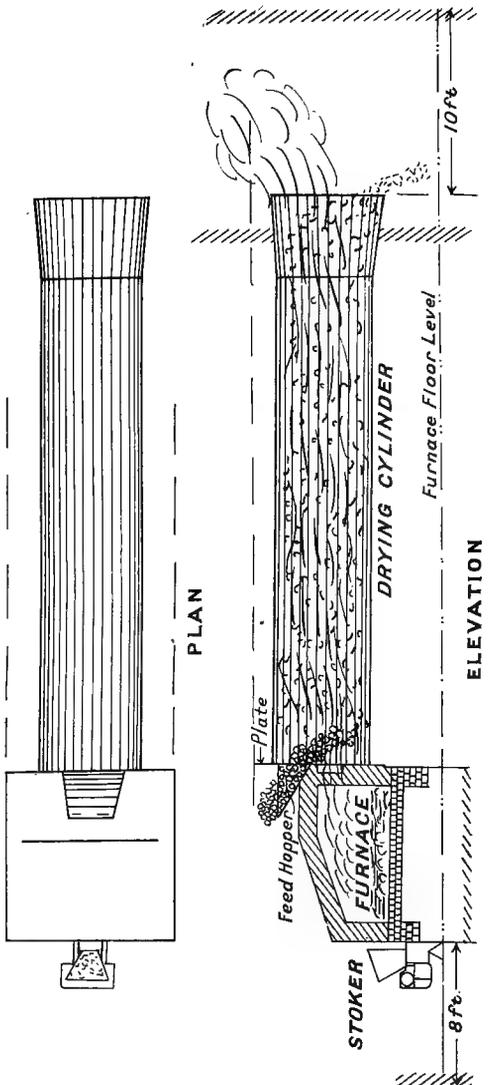
DESCRIPTION OF DOG-FISH REDUCTION PLANT

The dog-fish reduction plant installed by the Canadian Government at the three fertilizer works in the Maritime provinces passes the fish through three processes :

- (1) Cooking or digesting
- (2) Pressing
- (3) Drying

The cooker consists of a horizontal stationary steel cylinder with a feed hopper at the anterior end, and a discharge at the other end. A hollow steel shaft passes through the axis of the cylinder, which is supported by bearings attached to the head of the cylinder, carrying a special conveyor, rotating and moving the material continuously through the cooker. Radial arms project from the shaft in a spiral arrangement so that the material is tossed about, and carried slowly through to the other end. The central hollow shaft within the cylinder is perforated between the turns of the spiral and steam is blown out into the material at these points, so that the cooking is thoroughly done. The hollow shaft is rotated slowly by means of spur-gears, sprocket-wheels or other mechanical gear. The cooked material, having reached the further end of the cylinder, passes into a continuous screw-press by which any liquid remaining after the cooking process is removed. A central hollow shaft in the press carries a tapering screw mounted upon it and this, rotating inside a close-fitting slatted steel casing with an adjust-

PLAN AND ELEVATION OF COOKER



GENERAL ARRANGEMENT OF COOKER AND PRESS



able cone, located at the discharge end of the casing, passes the material out of the press. The hollow screw shaft is provided with special conical perforations permitting steam to mingle with the material while it is being pressed. The steam not only heats the material but keeps it soft and thus permits more easy separation of the liquids from the solid material.

Heavy worm-gearing rotates the main shaft and the thrusts from the screw and the worm are taken up by carefully designed bearings and thrust-collars. A conveyor carries the pressed and cooked material to the drier, which is a hollow steel cylinder mechanically revolving. A series of parallel steel tubes arranged in the form of a ring, and with a central open, horizontal space, rotates inside the cylinder around with it. These tubes are supplied at one end with steam for drying, and in order to throw the material about and expose it to the hot tubes, a number of radial shelves project along the entire inner surface of the cylinder. These shelves not only scatter the wet material over the tubes, but carry it as it dries towards the discharge end, where it leaves the machine through a special exit in the steel shell. The water in the shape of vapour, arising from the wet material during its progress, is drawn off by a large vapour-flue placed in the feed end of the machine. It will be seen from this brief description that the whole process is automatic and it can be accommodated in a rough wooden shed. An engine and boiler are, of course, necessary and as a rule a conveying apparatus is added, thus reducing the amount of manual labour to a minimum. The fuel used may be either gas, coal or oil, and the final product is what is called granulated fish-scrap, from which most of the liquid and oil have been extracted. The oil is treated separately and, if the material is fresh, is of excellent quality and much in demand. It will be seen that, apart from the fish-scrap and oil, no other products result from this process. The production of glue is a somewhat technical matter, and requires special expert skill to extract. As a rule, about eight tons of raw material are required to produce one ton of scrap and 8 to 12 gallons of oil may be produced from a ton of raw dog-fish.

PRODUCTS OBTAINED FROM DOG-FISH

Fertilizer and Oil The reduction plant was manufactured by the American Process Company and has been found very successful. Each plant can handle thirty tons of raw material. The fishermen are paid \$4.00 a ton for dog-fish. That is a rather high price but they will not bring the fish in for less. They are paid \$2.00 a ton for other fish offal. An analysis of the scrap pro-

duced by the reduction works shows it to be an excellent fertilizer for agricultural purposes. It is a coarse, powdery material of dark brown colour and can readily be sold for \$30.00 to \$35.00 a ton. The oil is sold at from ten cents to thirty cents per gallon although it might readily realize forty cents per gallon. The oil varies in quantity and quality very much. These are points into which I shall not enter in detail here. The best oil is a very clear, pure liquid, not unpleasing to sight and smell and, I believe, chemically, it is equal to to the best cod-liver oil.

**Fish
Glue**

Some attempt has been made to produce fish glue from fish waste of this kind, but hitherto it has been found that the production of glue involves too much technical knowledge and too many highly paid officers. That it can be manufactured at a profit has been demonstrated by the success of the Russia glue works at Gloucester. These glue works were started by two men, very humble men, some years ago; they bought fish skins and fish heads and have manufactured glue and fertilizer and such a success has their venture been, that the company which they organized has become a very prosperous company, with a large yield. When I was in the works the other day, they were of about ten times the extent they were a few years ago and they cannot adequately supply the demand for their product. This demand is created by the excellence of their glue. There is quite an opening in regard to fish-glue products. We waste an enormous amount of material, which would produce fish glue, on the Banks and in the Gulf of St. Lawrence fisheries, and the amount per annum would startle anybody. The fish waste is now simply dumped into the sea.

**Eggs Useful
for Tanning**

Vast numbers of eggs are available when dog-fish are being treated at the reduction works. The dog-fish produces living young, but the eggs are contained inside the body and are about the size of small hen eggs. You see tens of thousands of them thrown around the wharves of the reduction works. It has been found that leather tanned with dog-fish eggs becomes almost like chamois. They are a most excellent material for use in the tanning process, so that here we have again another valuable and unutilized resource.

**Dog-fish
Undesirable
as Food**

I know that dog-fish have been dealt with experimentally as a food product. A few years ago a fish company in Halifax canned a quantity of dog-fish and sold them under the name of ocean whitefish. The flavour is quite good and they have been pronounced something like halibut in flavour with

a slight reminiscence of the lobster. But an investigation recently carried on by a distinguished bio-chemist in Canada has shown that they are so rich in uric products that they cannot be recommended as a food. Their flesh soon becomes offensive on account of the large amount of urea in the tissues.

Unfair Charges against Reduction Works DR. ROBERTSON: May I ask Prof. Prince a question? If the amount of money paid for the dog-fish, two cents a pound, was left out of account, would the business be carried on clear of expense?

PROF. PRINCE: I think it would, I think it would then clear expenses.

DR. ROBERTSON: Would it not be fair to treat that as a bounty for the destruction of the fish rather than as the price of the product?

PROF. PRINCE: It is rather unfair to charge the reduction works with some of the charges made against them. So when I say that the returns are only half the cost, that is what is shown by the official figures in the Auditor General's report, but our Committee will point out that some of the charges against the reduction works are unfair, that they should be looked upon as a bounty for the destruction of a menace. I hope the Committee's report may be of some interest because the operation of these works, about which there has been a great deal of prejudice, is fully explained. It has, in fact, been emphatically stated that they would be closed down as not being a paying enterprise.

MISCELLANEOUS AQUATIC PRODUCTS

Fish Powder for Feeding Pigs and Cattle A great many fish which are at present not utilized could be made, as in Japan, into fish powder and either used for human food for making soup, etc., or for cattle feed. Most of you know how excellent has been the result of feeding fish powder to pigs and cattle. It has not affected the flesh and has proved to be exceedingly good fattening material. I have some reports here of experiments at Buenos Ayres, and also I think in India or some other country, where fish powder has been prepared from the inferior fish, which was ground up into a powder and used as feed in this way. The production of desiccated material like that, which will keep well and can be marketed easily, is a line of utilization which is well worth following up.

The Abalone or Ear-shell I shall close by reference to one or two other matters. I think that there is quite an opening in the utilization of shell-fish. There are many shell-fish which are not used on the British Columbia coast. For instance, there is the abalone or ear-shell. The dried flesh of this creature is in great demand amongst the Chinese and is said to sell at about \$300 per ton. An industry has been started but it has not been organized properly and the shells have not been utilized. London alone imports about one hundred tons per annum of those shells from Japan, paying, I understand, \$50 per ton, and we could send them from British Columbia just as well.

Other Unutilized Shell-fish There are nearly twenty different kinds of shell-fish which are not utilized at the present time and which could be readily turned to account. Japan, for instance, has used razor-shell clams for export to China in a boiled and dried condition. Two or three shell-fish like the oyster, clam and pecten or scallop are used, but shell-fish like the mussel and periwinkle have not been used to any great extent, although periwinkles are in great demand in large cities and one firm in Digby has been sending car shipments of them to Chicago and realizing a very good price.

Buttons and Pearls from Fresh-water Shell-fish In the fresh waters we have quite a number of shells. Many of our rivers produce large fresh-water clams which are of great value for button manufacture. In the Grand river 150 tons have been obtained in a year by the fishermen. Canada could also produce a large amount of pearls. A great number of our streams abound in pearl-mussels. American visitors in Cape Breton and Labrador have found extremely valuable pearls by systematic fishing for fresh-water pearl-mussels. I know of one very excellent pearl, of a lovely pink colour, which was obtained in Cape Breton. The fisherman received \$10 but, later, \$250 was paid for it in New York. There is one stream in British Columbia which is called Pearl-mussel river (Lakelse) on account of the large number of these shell-fish which it contains. It abounds with mussels of a pearly character and I have no doubt these could be turned to economic account.

Crayfish or Fresh-water Lobster I have also found, and I have mentioned it in official reports, that our crayfish in the fresh-water streams should be more utilized. The Ottawa, Rideau and most of the interior streams abound in the fresh-water lobster, for which a market could be found in some of the large cities in the United States. The *écrevisse* in France is an extreme delicacy and in London and New York it is regarded as a scarce but valuable addition to the menu.

They are found in so many of our interior rivers that I am satisfied a market could be created. At certain times of the year the crayfish produce two little calcareous bodies in the first part of the stomach; they are called 'crab's eyes' or gastroliths. These hard bodies, like lime buttons, about half an inch in diameter, are supposed to be produced before the creature sheds its shell and the gastroliths are assumed to be the limey matter which is to help form the new shell, so that every year when the shell is shed the gastroliths are produced in the stomach of the crayfish. They have long been used in China and Japan as medicine and realize a very high price. I have had inquiries from different Japanese officials as to whether these 'crab's eyes' could be obtained in Canada and, if they could be, they would realize a very high price in the Japanese market.

**Whales,
Walruses, etc.** The question of the utilization of whales, porpoises, sea-lions, etc., is an important one. We have too long allowed our American friends to go into our northern waters and utilize these valuable products. Considerable fortunes have been made from Canadian whales and walruses by enterprising intruders. I remember many years ago some American boats coming into Hudson bay and carrying off many tons of valuable walrus ivory and I noticed the other day that a boat came into Seattle from Nome, Alaska, after two very successful cruises in our northern waters. She reported that on her first cruise she secured 837 walruses, and on her second, 516. These produce a valuable ivory and oil and their hides are of considerable value, too. I am quite satisfied that these fisheries are carried on in our own Canadian waters and that they probably centre at Herschel island and make trips from there just as on the east they make excursions from some place like Marble island in Hudson bay. I often think we might have listened to the advice of Sir John Schultz who, thirty years ago, said our Arctic waters would yet prove to be the last habitat of those most valuable Arctic animals, the right whale and the walrus, and that some effort should be made to prevent their being entirely destroyed.

**Potash and
Iodine
from Kelp** I had intended saying a word or two about the kelp industry but that is a special subject and I had better leave it over. The Dept. of Agriculture have been carrying on some experiments with kelp, from which potash and other valuable products are extracted, and I will only give you one or two facts which I think are well worth notice before I sit down. It is in regard to the value of the kelp industry as a source of potassium chloride. Professor Cameron of Manitoba university has carried on a

research under the Biological Board and his estimate is that from the shores of British Columbia, which are well clothed with the two kinds of kelp, the bull-head kelp or *Nereocystis*, and the giant or great kelp, the *Macrocystis*, a harvest could be gathered of probably 235,000 tons of a value of \$11,000,000 per year at \$50 per ton. The yield of iodine from this would be about 950 tons, and would be valued at \$3,500,000 at \$38.75 a ton. He estimates that our kelp industry on the British Columbia coast ought to bring in, if properly utilized, \$15,000,000 per annum. These estimates are based upon the price of potassium chloride and iodine before the war. Potassium chloride, which was quoted at \$38 per ton in July, 1914, is practically unobtainable, though nominally quoted at \$400 to \$500 per ton. Iodine has also advanced from \$4.00 in 1914 to \$4.75 at the present time. In addition, the refuse could be utilized as a valuable fertilizer.

Ornamental Zoöphytes There is also a vast number of sea-mosses or zoöphytes. Japan has harvested these. They are sold as air plants, because it is popularly said that they grow without having water, that they flourish on the air. As a matter of fact they are dried skeletons of a kind of coral, or rather hydroids. They are found both on the Atlantic and Pacific coasts. Microscopic colonies of animals live on the branching stems, which they build out of horny and limey matter. Japan has shipped hundreds of tons of these air plants or dried hydroid zoöphytes for ornamental purposes and I know that some years ago the United States imported probably \$50,000 worth from Germany which had been prepared and dyed and sent over for ornamental purposes. Originally, they are of a white or brownish colour. It seems to me that along our shores the younger people could carry on some of these industries. Perhaps the men might not feel inclined to go around collecting material like that, but in many countries the families of the fishermen are helping and, if attention were directed to possible industries of that nature, quite a few enterprises could be carried on in the collection of sea-mosses for the markets which demand them.

There are other unutilized products which I might refer to, but I think I have said enough to indicate that our seas, although wonderfully productive, might be made still more productive if we realized how many resources have not yet been developed.

HON. A. E. ARSENAULT: With reference to the dog-fish, if it is very prolific—is the reduction plant going to serve any purpose. For comparison, take lobsters. Notwithstanding that they have been caught

in such large quantities and caught in season and out of season, there are still great quantities of them and they seem to be as common as ever. Will this reduction plant lessen the number of dog-fish? If it is not decreasing the number of dog-fish in our waters it cannot be serving a useful purpose. Are there any statistics of show that these plants have reduced the number of these fish?

PROF. PRINCE: The dog-fish is not really a very productive fish. It produces from six to eight or ten young at a time and the best authorities are of opinion that it does not reproduce more than three times a year, which would give us, say, thirty young per annum for each female. That is a very small production of young among fish. But each of these is so well provided and can look after itself so well that there is practically no loss and a female lobster producing from 10,000,000 to 30,000,000 young every year may not produce thirty adults. The destruction of young lobsters is so great, so many fish feed on them, and the percentage of loss is so enormous, that the result of the production of the female lobster is probably not very much in excess of the production of a single female dog-fish. Therefore, in considering whether the reduction works are doing any good, one must take into account that they destroy so many females every year, and that thus they are destroying so many parents for the future. In the report of the Advisory Board's Committee we estimate the number of dog-fish that the works have probably exterminated. Personally, I do not think the reduction works will solve the whole dog-fish question. A few years ago the Dept. of Marine and Fisheries published a report on the dog-fish pest, and I gave eight or ten suggestions as to how the dog-fish plague might be met. I would like to see all those methods tried together that we might have some assault made upon this terrible enemy.

The works, so far as they go, must have done some good, and, under a better system, they can do far more. I should say that in my report on the dog-fish I did not suggest reduction works. I suggested a number of other methods. I proposed that we should have a dozen patrol boats along the Atlantic coast with ten to thirty men on each and that these boats should be employed night and day in capturing all the dog-fish they could. The men could be employed for a short time. The dog-fish come on in great hordes for a short time and then disappear, and one of my suggestions was that the patrol boats might be employed like a fleet making war upon these enemies. I made other suggestions and should like to see them all tried.

MR. FEILDING: How far has the production of fish meal been attempted in Canada? I am rather interested in that particular

branch of the fish trade, because some ten or fifteen years ago I was engaged with Herr Jaffé, head of the German Hanoverian fisheries, in investigating methods of utilizing the fish waste at Wilhelmshaven and other places in Germany. They have developed an enormous industry in the creation of fish meal. I was the first man to take it up in England. It was a fish food for fish-culture establishments. About fifteen years ago I recommended Dr. Hugh Smith and Mr. Ravenal and two or three of the United States fish culturists to experiment with it, and I believe they did. The dog-biscuit manufacturers, including Spratt's and other well-known firms took it up. Then it was taken up by the pig-food manufacturers to replace tankage. We know the cost of tankage in this country is very high, and the average farmer is rather frightened of it. Fish meal can be put on the market a good deal cheaper and, I think, is of the same, if not higher, protein value and probably of better oil value. The possibility of its tainting the flesh has been urged, but I am rather inclined to think that it does not do so, if properly mixed with other materials and treated only as a concentrate. The great problem we found in Germany in connection with the treatment of fish offals was that there was a stage in the drying when we found our protein value disappearing. Therefore there is, no doubt, a good deal of practical knowledge to be acquired in that direction. I would like to know how far experiments have been conducted here, so that I may gain an idea to what extent they may be used by farmers in stock-raising.

PROF. PRINCE: In reply to Mr. Feilding I may say that there has been really no systematic attempt to produce fish meal in Canada. Two experimental efforts were made ten or twelve years ago. I instructed certain hatchery officers to procure the flesh of a number of suckers, an inferior kind of fish found in some of our rivers and to produce a dried material, powdered, for the purpose of feeding fry. Some of this meal was used at the Restigouche hatchery, on the famous salmon river of that name, and I believe it was a brilliant success. The officer there, an able man, well calculated to carry out the experiment successfully, reported that the fish seemed to flourish on it and he thought it better than liver to feed to the young fry when they were being reared to the fingerling stage. Recently an experiment was made at the reduction works to produce fish meal from cod and other fish, but the lack of technical knowledge will probably prevent success in that particular case. I examined some of the fish meal produced and could not regard it as satisfactory. With these two exceptions the fish-meal industry has not been developed at all in Canada.

MR. FEILDING: There is a plant at Wick in the north of Scotland where they make a most agreeable foodstuff for human use called 'Marvis.' At one time it had a large market for making fish soups and soufflés and anything you could make with fish meal. I used it and it was most agreeable and useful stuff to have; it would keep almost indefinitely, you could transport it anywhere, it was palatable and its protein value was high. The heads, tails, and what you might call the offal, including the vertebral columns, were removed.

MR. COWIE: One reason for the industry not being developed in Canada lies in the fact that, until recently, the fish business has been practically a salt-fish one. The fish have been headed and gutted and split out at sea, whereas at Wick the 'Marvis' was made chiefly from the fresh cod head, etc. But, on this side of the Atlantic, until comparatively recent years, all of that material has been disposed of at sea.

MR. WHITE: Are the dog-fish treated in the reduction works caught systematically or are they caught incidentally to the other fishing?

PROF. PRINCE: In both ways, but the major portion of the dog-fish have been caught systematically by fishermen going out for them. The main reason for this is that, when they are around, other fishing ceases. Still, a number have been brought in that were caught by fishermen when fishing for other fish. The price paid, \$4.00 a ton, proves sufficient remuneration to induce them to go fishing systematically for them.

MR. WHITE: Could you not pay a lower rate and have the fishermen throw them overboard without their taking them to the reduction works?

PROF. PRINCE: That is one of the suggestions in my report, not to trouble about the reduction works. The main object is to get rid of the dog-fish. But the idea prevails that the fish should be turned to some useful account. A Minister of the Crown told me that the fish ought not to be wasted but should be made into food. He was so strong on that point that it was one of the principal reasons why I had Prof. Macallum of Toronto make a laboratory analysis of the dog-fish flesh to ascertain its nature. Unfortunately, his report is not yet published and possibly I gave information about the presence of urea prematurely, but that is one of the things he found in his researches. The extermination of the fish is the main object, to be attained by any means whatever, and possibly the plan of catching the fish and dumping them overboard after killing them is well worth trying.

MR. WHITE: It would seem to be more economical than running the reduction works at a loss.

MR. FEILDING: It would pollute the waters.

PROF. PRINCE: A good many hundred tons of offal are thrown in now and a few more would not hurt.

MR. COWIE: Was it the idea when the works were started to demonstrate that they could be made to pay?

PROF. PRINCE: The people who supplied the machinery laid great stress on that.

DR. JONES: I suppose there might be some difficulty when paying a bounty to the fishermen, in keeping an account of the number they had killed.

PROF. PRINCE: That is one trouble. I suggested that the tail might be kept as you cannot imitate it. We gave a bounty on the killing of seals and the nose of the seal was to be considered a proof of killing but we found that noses were ingeniously manufactured.

DR. JONES: The same thing used to be true of wolves.

Government Inspection and Branding of Fish

BY

J. J. COWIE

Of the Department of the Naval Service, Ottawa

MR. CHAIRMAN and Gentlemen: As the Committee desires to emphasize the economic side of that portion of the programme devoted to fisheries subjects, and having been invited to address you on the question of curing, grading, branding and preparing fish for market, I propose to tell you something respecting the Act* which came into operation in the course of this year and which provides for the inspection and branding of fish such as are cured in pickle and packed and marketed in tight barrels.

**Pickled-fish
Industry not
Improving**

While the fresh-fish and smoked-fish business of Canada has grown greatly in recent years, the pickled-fish industry, particularly the herring and mackerel branches of it, has gone from bad to worse. This condition is not due to the salt-fish business being shouldered out of existence on the coast by the growing fresh-fish business. On the contrary, there are many parts of our coast that are so far removed from easy and quick transportation facilities, that the people there must necessarily continue to preserve their fish by salting, drying, or some such means. Neither is this condition due to any lack of demand for fish such as mackerel and herring in a salted condition, for, notwithstanding that the importation from Canada has not held its own in the United States, our principal market, that from Europe has rapidly increased.

**Good Quality
and Abundance
of Canadian
Fish**

Again, the lessening importation from Canada is not due to any decrease in the abundance of these fish, especially of herring, in our waters; neither is it due to inferiority in the quality of the raw material. Only the other day one of the largest importers of salt mackerel in the United States told me that the quality of our fall mackerel, especially those taken around the Magdalen islands, Prince Edward Island and

**The Fish Inspection Act*, 4-5 George V, chap. 45. See Appendix IV.

Cape Breton, is, without doubt, superior to that of Norwegian mackerel, and, so far as herring are concerned, from my own experience I can assure you that there are certain seasons of the year when the quality of our herring is equally as good as the quality of those on the other side of the Atlantic; and, yet, the price paid for European herring in the United States is, generally speaking, more than double that paid for Canadian herring, while Norwegian mackerel always command a much higher price than Canadian mackerel in the same market.

Canadian Fish Badly Packed What, then, is the cause of this discouraging condition of our trade in these products? The answer is to be found in the fact that both Dutch and British herring and Norwegian mackerel are cured and graded with the utmost care and packed in well-made, standardized packages, capable of withstanding tough usage during transportation across the ocean, and retaining the preservative pickle until the product is placed in the hands of the buyer; while Canadian pickled fish have, hitherto, been carelessly cured and packed in slim, leaky packages, such as produce rusty, bitter fish that are unfit for food.

THE FISH INSPECTION ACT, 1914

Recognizing this fact and realizing the necessity for taking steps to have this state of affairs changed, Hon. J. D. Hazen, Minister of the Department of which I have the honour to be an official, ordered the preparation of the Act to which I have referred, and secured its passage through Parliament.

Application of Act This Act, then, applies to salted mackerel, herring, alewives or gaspereaux, and salmon, and to the packages in which such fish are marketed. The Act aims at bringing into general use a strong, well-made barrel of a standard size; also it aims at raising the general standard of curing and grading the fish, so that the cured product may be traded in with confidence, to the benefit and profit of producer, dealer and consumer.

Method of Carrying out Inspection Inspection is not compulsory under the Act; fishermen and packers must decide for themselves whether they shall make use of the Government brand or not. To those who apply for it, the inspection is entirely free of charge.

To carry out the provisions of the Act, a staff of competent inspectors has been appointed. This staff, to begin with, had necessarily to be a small one, as the extent to which the brand might be made use of during the first year could not be predicted. Each inspector has been



Staff of Scottish Herring Girls Packing Herring

given a district over which he is required to travel and act in the capacity of an advisor or instructor, in addition to acting as inspector of the fish when cured.

Inspection must be carried out at the place where the fish have been packed and while the original packer is still in possession of them. It is held that improvement in curing can only be brought about by bringing the inspecting officer and the packer into direct contact in this way.

When inspection has been applied for, it is carried out in a very thorough manner, and if, as a result of his inspection, the inspecting officer is satisfied that the fish are properly graded and are packed in barrels that conform to the standard called for by the regulations, he brands on the side of each barrel, with a hot iron, a mark in the form of a crown. This crown will show the grade and quality of the fish, the year of packing and a letter representing the name of the inspecting officer.

**Branding a
Mark of
Quality**

But, it may be asked, how do we expect to improve the seemingly hopeless condition of the pickled-fish business without compulsory inspection? The answer is that, by rigidly enforcing the regulations when fish are submitted for inspection, the brand will become such a guarantee of quality to the trade that the packer who makes use of it will find his branded fish in demand, while the fish of his neighbour, who hesitates to put them under inspection, will be neglected; and so, in due course, all packers and dealers will become anxious to have the Government brand on their fish.

Besides inspecting and branding the fish, the Department is advertising the brand throughout the United States as well as in our own country; in other words, is letting it be known amongst dealers and consumers exactly what this brand stands for, as a mark of quality, and what is being done in order to produce a high-grade article.

**Regulations
Give Detailed
Instructions**

Regulations which take the form of detailed instructions for the guidance of inspecting officers, coopers and packers, as to the construction and capacity of barrels and the quality, curing and packing of the fish, have been printed, and copies distributed all over the coast. The Regulations define the thickness and quality of the staves and heading to be used in barrel-making, the length of the staves, the diameter of the ends and bilge of the barrel, and the manner in which the barrel is to be hooped; they also define the quality and size of the various grades of fish and the manner in which they should be cured and packed, if

intended for the brand. In short, officers, coopers and packers are told clearly and precisely what to do and how to do it.

Meetings of Fishermen and Packers Held In addition to distributing copies of the regulations, public meetings were held last winter and spring at practically all fishing centres on the Atlantic coast from Gaspé to the bay of Fundy, at which I made clear to fishermen and packers the aims and objects of the Act and the manner in which they would have to handle their fish in order to secure the Government brand; also, of course, the inspecting officers, in their travels over their respective districts, are carrying on an educational work.

Notwithstanding all this, while fishermen and packers freely admit that beneficial results will ultimately follow the institution of this system of inspection and branding, it is not anticipated that at the beginning many will be induced to pay the higher price of the regulation barrel that is required to secure the brand, unless they have some assurance that they will be repaid for the extra cost.

Coöperation of Dealers Desirable The work of persuading fishermen to pack their fish in accordance with this Act can be most effectively accomplished by the dealers and buyers of the cured product; and, as inspection and branding will directly benefit such dealers and buyers, an appeal has been made to them to coöperate with the Department in its efforts to improve the business, by recognizing the better quality of branded fish, and by intimating to shippers and consigners that they are prepared to pay more for branded than for unbranded goods.

We do not expect to perform a miracle in a year's time by means of the Act; much work of a missionary or educational nature remains to be done. Improvement will come but slowly at first but, with the expansion of knowledge as to the value and utility of the brand, I am perfectly confident that the pickled-fish business under this system will be greatly extended in the near future, and that better prices than have ruled in the past, will be obtained.

The Act and its provisions have been highly commended, not only by the trade in Canada, but by many of the large importers in the United States who handle Canadian pickled fish.

A number of barrels bearing the Government brand will be on the market this year, and there can be no doubt that the high standard of these branded fish will so satisfy the buyers, that a greater and more general demand for inspection will take place next year.

MR. WHITE: To what extent has *The Fish Inspection Act* been taken advantage of so far?

MR. COWIE: Beyond what I have said, that a number of barrels have been put on the market I could not tell you. Of course the season is not yet finished and the Minister would want to have all that information in his hands first before I could give it out.* Several hundred barrels are on the market this year. The Act has only been in operation since the month of May.

DR. MURRAY: Mr. S. Y. Wilson, a large fish dealer of Halifax, spoke about the dilatoriness of the fish packers of Nova Scotia in taking advantage of this Inspection Act and having their goods properly inspected and branded. Of course, he said, it was not a compulsory thing, and apparently they were very shy about doing it. Yet they seemed to feel that they were not putting up the fish in a proper manner. In line with what both Prof. Prince and Mr. Cowie have said with regard to difference in prices obtained for Scotch herring and that obtained by our Nova Scotia dealers, he mentioned an incident that occurred in Nova Scotia last summer. A dealer in Guysborough county had employed a Scotchman who was well acquainted with the Scotch fish industry. The dealer proposed to pack his herring in the old-fashioned Nova Scotia style, but was persuaded by his employee to adopt the Scotch method. He got proper barrels after the good Scotch fashion and put up the fish in the regular Scotch way, with the result that he has sold some six hundred barrels to a Chicago firm for \$11 a barrel f.o.b. Nova Scotia. At the same time, herring put up in the old way were selling from \$4 to \$4.50 a barrel. I understand that Mr. Wilson himself proposes to put up some two thousand barrels next summer in the modern way.

MR. COWIE: In that connection I might say to Dr. Murray that this firm at Goldboro, in Guysborough county, who took up this matter of curing last summer, really thought of it in the preceding autumn when I was going around the coast. They then appealed to me to find someone capable of taking hold of this part of their business. I secured this man for them and told them what they should do.

DR. MURRAY: The result seems to have been very satisfactory.

*On March 15, 1916, Hon. J. D. Hazen stated in the House of Commons that, during the year 1915, the number of barrels of pickled fish inspected by the Government officers was 1,328, and the number branded 1,211. The distribution of these was as follows: St. John, N.B., district, 899 inspected and branded; Miramichi and Caraquet district, 319 inspected, 302 branded; Halifax district, 10 inspected and branded; Prince Edward Island district, 100 inspected, none branded.—See *Hansard, March 15, 1916, p. 1836.*

DR. JONES: A little demonstration work?

MR. COWIE: Yes.

DR. ROBERTSON: I rise to ask a question and to make a suggestion. Among the undeveloped resources of our coast, certainly, is the ability of the fishermen themselves. The organization of the handling of fish has heretofore been by commercial men and almost entirely for profit. That is not sufficient. I rise to ask whether you and your Committee next summer could not have about three sessions at good fishing spots, so as to bring us in contact with the fishermen. If you could even teach twenty fishermen of ability the proper method of handling their fish, those twenty men could, in the course of a few years, achieve great things. Our work is admirable in a meeting of this kind, but I think a summer session of this Committee at three selected places, with two or three really good addresses, to the fishermen, telling them first-hand the things they could never learn from reading, would help to develop that undeveloped resource. That is the main work of this Commission, the long-distance view, to get hold of these fellows and to instruct them practically.

Oyster Culture in Prince Edward Island

BY

HON. A. E. ARSENAULT

Member of Executive Council, Prince Edward Island

THAT oysters have existed in the bays and rivers of Prince Edward Island from pre-historic times is amply proved by the large and deep deposits of oyster shells found, especially in Malpeque* and St. Peter bays, and which, in places, are over thirty-five feet deep. This mussel-mud, as it is called, is a very valuable fertilizer and, up to two years ago, the immense shell-mud deposits of St. Peter bay were practically untouched, as the only means of obtaining the mud was by horse-power dredges which can only operate on ice in winter time, and, as this bay does not freeze over, the dredges cannot operate on it. Last year, however, the Provincial Government constructed a self-loading and -unloading steam clam dredge, which successfully operated during the past summer, lifting from nine to ten carloads of shell-mud per day.

HISTORY OF OYSTER INDUSTRY IN P.E.I.

Oysters Used for Fertilizer and to Obtain Lime It is a tradition among the French Acadian people, who were the first settlers of Malpeque, a village on the shore of Malpeque bay, that eighty to one hundred years ago oysters were so plentiful in this bay that, as there was no market for them, large quantities of live oysters were fished and spread over the land as fertilizer. The shells were also burnt for the lime they produced. This practice depleted the beds to such an extent that, in 1825, a Provincial statute was enacted prohibiting for seven years, not only the burning of oysters for lime, but their export as well. At the end of the seven years the burning of oysters was made illegal and, in 1840, the exportation of oysters was prohibited for another seven years.

Close Seasons and Leasing Instituted The first act providing for a close season for oysters was passed in 1864 and forbade the fishing, selling or having in possession from June 1st to September 1st in each year. In 1865, an act was passed to enable leasing in certain

*Locally known as Richmond bay.

bays and rivers of the Province. This act does not seem to have produced much result, but, in 1872, a grant of oyster bottom in the narrows in Prince county was issued to William H. Pope. After passing through the hands of several owners these areas came into the possession of John Richards, and, for the last seven or eight years, they have been owned by Sharp Brothers, who have made a notable success of oyster cultivation. About twenty years ago, another grant of five or six acres on Bentinck cove in Malpeque bay was issued by the Provincial Government to George Inman. This lease was afterwards ratified by the Federal Government and is now owned by the Standard Cup Oyster Co., Ltd.

Arrangement between Dominion and the Provinces In each of these cases the ground leased contained natural oyster beds. In 1906, an attempt at leasing on a large scale was made by the Provincial Government but, owing to the differences between the provinces and the Dominion respecting jurisdiction, this attempt was abandoned. In 1912, an agreement was arrived at between the Dominion and the provinces by which the latter acquired the sole right to lease and to retain the rentals. Under this arrangement an extensive survey of the bays and rivers of the Island was made by the Provincial Engineer. The first and principal survey was that of Malpeque bay, which contains approximately 30,000 acres. The survey indicates the nature of the bottom, whether sand, mud or oyster bed. As a concession to the fishermen, all the ground where oyster beds, whether extinct or alive, were found, was declared to be reserved from lease. Of the total area, about one-half is reserved as containing live oyster beds. The balance, some 14,700 acres, was thrown open for leasing and, up to the present time, over 5,000 acres have been leased.

Method of Recording Leases Each lease granted has been duly registered at the registry office in Charlottetown and duplicates of the leases of areas in Prince county are deposited in the registry office at Summerside. Four plans of the surveyed areas have been prepared and separate index books and abstract books of the plots or quarter-plots set forth in each of these plans have been compiled. In the index books, each plot leased is numbered with a number corresponding to that marked in the respective plans.

In the abstract books each lease, with all essential particulars regarding same, is duly registered. This mode of registration in separate books gives the searcher a quick insight into the titles and conditions of each, and prevents any intermixture of plots or uncertain or indefinite idea concerning any area or lease. The numbers on the plan show

each particular plot and no other; the corresponding numbers in the books refer to that particular plot and to no other.

Oyster Cultivation by Private Companies During the summer of 1913, a beginning was made in the cultivation of their grounds by eight different companies. About 2,500 barrels of oysters were imported from the United States. These oysters varied in size from year-olds, a half-inch in diameter, to four-year-olds four inches in diameter. By the end of the year it was found that the smaller sizes had made an excellent growth, while the larger ones had not thriven nearly so well. As much of the ground leased consisted of sand or mud-bottom, the conditions for growth were doubtless not as good as they would have been on natural beds. With a view to getting a set of spat, shells were put out by different companies in July and August, and, that they might obtain these shells, three depleted beds in the reserved grounds were staked out for that purpose.

Some companies had a fairly good catch of spat last year, but it is too early, as yet, to determine this year's catch. The seed oysters planted last year and the year before have shown good growth, but it has been demonstrated that it is useless to import mature American oysters, as three-fourths of them die, and those that survive do not seem to lose the coppery taste, which is peculiar to these oysters. Sales of mature American oysters, which had been in our waters for two seasons, were made to Montreal dealers but did not meet with a very good reception. During the present season no seed oysters appear to have been imported and practically no planting has been done. Cultch has been put down on a small scale by only a few companies and, as I said before, it is yet too early to determine results.

DRAWBACKS TO OYSTER CULTIVATION

Some of the causes that have militated against the industry are the following:

1. Scarcity of capital;
2. Lack of confidence by the investing public in a new enterprise;
3. The doubtful quality of a great part of the bottom available;
4. The difficulty of preventing poaching;
5. The losses caused by the destructive star-fish;
6. The difficulty of obtaining managers with sufficient knowledge and experience.

Scarcity of Capital No doubt the war has had a great deal to do with discouraging investors who were previously willing to take shares in oyster companies. At a time when so many industries are seriously affected, very few people care to venture capital in an enterprise which, so far as Prince Edward Island is concerned, has yet to be proved remunerative.

Opposition of Fishermen The opposition of the fishermen and their friends to the industry has been another factor with which the planters have had to contend. Although I firmly believe that, eventually, the planting of leased areas will be beneficial to the fishermen, as it will have the effect of re-stocking the public beds, still it is hard to impress the general public with this idea.

Frequency of Poaching Again, as any person may with impunity carry a drag in his motor boat, no action can be instituted unless such person is actually caught in the act of dragging. In spite of watchmen, leased areas have been frequently despoiled and detection has been difficult and, in most cases, impossible, as the inhabitants near the shores do not care to give evidence against their neighbours. The Government patrol boats are so few and have so much other work that they can do very little in the way of protection and it is to be feared that, unless sufficient protection can be afforded, a number of the companies will clean up their areas and go out of business.

Destruction Caused by Star-fish The star-fish is largely responsible for the depletion of Malpeque bay and it is one of the worst enemies that the private companies have to combat. They do all they can to keep their planted beds swept but, as the leased areas form a very small portion of the bay and, as little is done towards keeping the public areas free from star-fish, the little that the companies can do towards the destruction of this pest is to no purpose.

Whilst dealing with the star-fish problem I would like to quote from the first report submitted by Prof. A. D. Robertson, who, for the last two summers, has been engaged upon biological work in Malpeque bay. Dealing with the presence of the oyster's enemies Prof. Robertson says:

"Star-fish (*Asterias vulgaris*; Verrill) are abundant now in Malpeque bay. A few years ago they were a curiosity. They constitute one of the worst enemies of the oyster in this bay. They are found in all parts of it, but are particularly abundant on the oyster grounds around Curtain islands and in the Big bay. The Government steamer the *Ostrea*, under Capt. Kemp, did good work during the sum-

mer star-fishing on the beds to the west of Curtain island and in the Big bay. He was assisted during the month of June by Government patrol boats *D* and *E*. Some of the oyster companies also did service in this line. Both Government and oyster companies should pursue this line of work much more vigorously."

"The most destructive enemy the oyster has, however, is man. Oyster poaching goes on almost unheeded. The oyster poacher and the man who buys from him should be severely dealt with. Efficient protective legislation effectively and impartially enforced appears to be an essential if the oyster industry is to advance in Malpeque bay."

That some remedy must be found, and found quickly, if the oyster industry of Prince Edward Island is to be revived, is undisputed. The Provincial Government is willing to act but, as the public areas are under Federal control, must have the coöperation of the Federal Dept. of Fisheries. A number of good power boats fitted with proper appliances for star-fish sweeping would go a long way towards curing the trouble, as these boats would be available, not only for this purpose, but would be a protection against poachers as well.

GENERAL CONSIDERATIONS

Superiority of Malpeque Oysters

The Malpeque Bay oyster is indisputably the best in the world and the market for this bivalve is practically unlimited. The bulk of oysters sold to-day as Malpeques are not really such. I have here with me a few Malpeque as well as American oysters and river oysters and shall be glad to exhibit them for the inspection of the Committee.

Proposed Recall of Leases

It has been suggested that, if nothing can be done towards the encouragement of oyster leasing, the Provincial Government should cancel all leases granted and operate Malpeque bay with a view to preserving the oyster beds lying therein in the interest of the fishermen and, incidentally, of the Province. The bay might be divided into districts or divisions, of which only certain ones could be fished each season. This would enable the young oysters in the other areas to grow and, thus, do much to preserve the industry. The spat and small oysters would be given a rest period in which to grow on certain sections and thus after three or four years become commercially available. This is a matter which will require much thought and attention and I would invite the discussion of the Committee on the subject.

**Progress
may be
Expected** Notwithstanding the disadvantages and difficulties set out herein, oyster cultivation in Prince Edward Island has made progress and if, from a financial standpoint, the companies have not, up to the present, made oyster cultivation a success, it is chiefly owing to the obstacles I have mentioned. When these are removed I am satisfied that great strides will be made in oyster propagation in Prince Edward Island.

MR. DANIELS: What are the evidences of an extinct oyster bed?

MR. ARSENAULT: The evidence is that you find the shells but no live oysters. Experience has shown that we committed an error. We leased large areas of ground that were practically valueless because the bottom was unsuitable for oyster culture, as it consisted of mud and shifting sand. Certain companies got some good ground. The Standard Cup Oyster Company, which has 1,400 acres under lease, got some very good bottom. Another company, the Malpeque, which leased 1,000 acres, has also some good ground, but the bulk of it is of the mud-bottom kind. Notwithstanding these difficulties, I have no doubt that these companies would have been more successful were it not for (1) poaching, and (2) the prevalence of star-fish. Malpeque bay contains 30,000 acres; it is about five miles by eight and you can well understand that it is a difficult matter for private owners, especially where there are only a few of them, to protect their beds. It has frequently happened that, after putting down their oysters, the major part of them have been stolen. As to the star-fish, the year before last the *Ostrea* and another patrol boat did some sweeping and did very good work while so employed. Unfortunately, they were only at it for a month or six weeks and, this year, nothing was done except by the companies. You might say that the duty of sweeping for star-fish lies with the companies, but, where you have large areas under Dominion jurisdiction, it is of very little use for the private companies to sweep their beds when the other portions are infested.

These have been the two great difficulties that the companies have had to contend with and they are difficulties that we propose taking up with the Dominion Government. You might say: Why not leave those beds that, at present, are non-productive? That is certainly what should be done because, in the case of an already built-up bed, the only thing to do is to clean it off and plant oysters or to put down cultch and catch spat. Here (exhibiting sample) is a genuine specimen of the well-known Malpeque. This oyster was taken out of

Grand river and replanted on the private areas. You can see that the growth made each year is about half an inch. Ordinarily, that oyster would grow long and slim but, having been planted in a hard bed, it has acquired a better shape.

I have here a Cape Cod oyster very similar to our Malpeque. It was imported and spent about a year on a bed in Bedeque bay.

DR. ROBERTSON: How does the flavour compare with that of the Malpeque?

MR. ARSENAULT: It is not as good but I believe that in another year it would have acquired a better flavour. Perhaps a connoisseur would say that the flavour was not as good, that it still has some of the coppery taste peculiar to the American oyster, but it has improved wonderfully in quality since it was laid down.

MR. DANIELS: How much growth has it made?

MR. ARSENAULT: About an inch in a year. Here (exhibiting specimen) is a sample of a Grand River oyster. It has a good flavour but has had the disadvantage of being grown in mud. The oyster always tries to get its mouth to the water and, being imbedded in mud, it grows long in order to get its mouth up into the water. It has a thin shell that breaks easily, so that the oyster loses the water and dies. For that reason it is not desirable for market.

DR. ROBERTSON: Have you tried transplanting small oysters less than a year old into Malpeque bay?

MR. ARSENAULT: Yes. They did very well. I showed you some from Grand river which, if left in their natural habitat, would grow like this. Here (producing sample) you see a cluster of mud oysters. Eight spats caught on that same shell and, growing in the mud, they slowly grew out to this length, but they are not marketable.

There are three things that Prince Edward Island has to do in order to make a success of oyster culture. It has, first, to provide that companies which have leased large areas must get within their large areas some good ground, some of the ground that is now reserved, where all they will have to do is to clean the bottom and plant their oysters. That is necessary in order to encourage these companies and give them an opportunity to expand. Second, better protection must be afforded. This is a matter in which the Dominion should assist, because the protection of the fisheries comes within their jurisdiction. Third, something must be done for the destruction of the star-fish. If these three things could be accomplished, the

success of the industry would be assured. If not, there will be very little encouragement to go into oyster cultivation.

MR. DANIELS: Of course in the Island your hope has been to get a revenue from oysters. In Nova Scotia we have had exactly the same hope, but I suppose we had better abandon that and turn the oyster over to the Dominion.

MR. ARSENAULT: I would not say that yet. What we would like the Dominion to do is to give assistance in the way of protection and the destruction of the star-fish. If they will do that, we will take care of the industry.

MR. COWIE: Do you think the method adopted by Captain Kemp in 1914 was successful in combating the star-fish pest?

MR. ARSENAULT: Yes, certainly. But they were not properly equipped.

MR. COWIE: It was only a temporary arrangement but, if my memory serves me correctly, they caught something like 160,000 star-fish in the short time they were at it.

MR. ARSENAULT: Yes.

MR. COWIE: You think, if the operations were continued, they would largely control the star-fish?

MR. ARSENAULT: There is no question about it and, if they were properly equipped, they would be twice as effective. One boat has the steam hoisting gear which is necessary in order to throw the sweeper over. It is necessary to lift the sweeper with steam power and there should be a hot-water vat in which to plunge it and get rid of the star-fish. To remove them by hand is very slow. These government boats do not do much in the summer and, if they were employed in this way, they would serve a double purpose, the destruction of the star-fish and the protection of the bays from poachers.

PROF. PRINCE: Were the lectures by Dr. Nelson on oyster culture of any benefit to the men? The Biological Board sent an expert around the Island to address them and I fancy the fishermen were not very enthusiastic about it.

MR. ARSENAULT: Of course Dr. Nelson's lecture was more or less technical. It was simply about the history of the oyster and its formation and food. So far as the planters were concerned, it was not practical. First, somebody should instruct the planters respecting

oyster culture; second, the fishermen should be shown the benefit of oyster culture and how, ultimately, it would benefit them because, if you could make the planting successful, spat from the beds would spread, thus restocking other areas.

MR. WILLIAMSON: Has Prof. Prince considered the possibility of planting pearl oysters in Canadian waters? When I was connected with the pearl fisheries in South America, Prof. Carmody came there for three months from Trinidad. Perhaps you are aware that there is only one pearl fishery on this continent and that is off the Venezuelan coast. I wrote Prof. Carmody and asked him if he thought the pearl bacilli could be brought to Canada and used to infect certain beds here. He said he did not think so because the water would be too cold. But, even if the water were too cold on the east coast, it might not be so on the Pacific. It would be a very valuable resource if it could be introduced. In fact, when I was connected with the pearl fisheries, we got a lease of water off the island of Grenada. We took oysters from the Venezuelan coast and put them in a bed off the Grenada coast so that the British Empire could have a pearl industry. This lease was the last document that Joseph Chamberlain signed, before giving up the Colonial secretaryship.

PROF. PRINCE: The oyster fisherman occasionally finds pearls in the oysters but they are valueless. The nacreous layer, which is essential for the production of the pearl, is absent from the edible oyster, consequently, I am afraid there is no hope of a pearl industry amongst these oysters. Perhaps we might have a pearl industry in our fresh waters. Valuable pearls are not infrequent in our fresh-water clams.

With respect to the introduction of American oysters, I once ordered a barrel or two from the Island and they were sent to me as Island oysters, but they were all American oysters and had the flavour of the American oyster. The Prince Edward Island oyster is, without exception, the most delicious in the world. Next to it I think the New Zealand oyster, especially the rock oyster, is the best. But these Prince Edward Island oysters have taken first place in the world for flavour and there is no danger of disease on the Island beds, such as is a serious cause of trouble in American and European beds. I have been on American beds and, after seeing what is brought up, you wonder that anyone would eat any of these oysters. Fortunately our own beds are free from that danger.

With respect to the star-fish trouble I do not know that I can accept Mr. Arsenault's statement that the patrol boats have nothing to

do. When I want anything done in my own way, I am always told that they have too much to do, but I am sure the Dominion Government will do what they can to remove this pest. The increase in the star-fish is a thing which has progressed and assumed serious dimensions in recent years. The method of destroying them is very simple; all that is necessary is to drag a mass of tow or rope across the bottom and the star-fish stick to it. The killing of them is important. Fishermen have too often taken a star-fish and have torn him in four or five pieces to destroy him. As a matter of fact, every fragment became a separate star-fish, so the fishermen in their anger were practically propagating the very pest they wanted to eradicate.

I should like to emphasize what Mr. Arsenault said about the so-called barren bottoms which were once oyster beds. I think it is desirable that they should be leased to parties who carry on oyster culture. I suppose the Prince Edward Island authorities know something about what is going on in Connecticut. They could not do better than follow the Connecticut method of leasing and the method of carrying on operations in the United States.

MR. ARSENAULT: The planters have abandoned altogether the idea of bringing over mature American oysters. After this the only oysters that will be imported will be the small sea oysters, one year old, because they find it is useless to bring the others. Most of them die and those that live do not lose their coppery taste.

Conservation of Canada's Inland Fisheries

BY

J. B. FEILDING

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AS an observer of this country's natural resources it has often struck me, when I have heard conservation preached in connection with resources, that those using the expression do not fully appreciate the full and true meaning of the term, as applied to the economic animal world.

Definition of Conservation If we refer to Murray's dictionary we find the term "conservation" defined as "preservation from destruction," "preservation of existing conditions." Neither of these definitions fully expresses the term "conservation" as we mean it to be applied in connection with our fisheries of to-day.

The best definition of the term is "the application of common sense, after careful study, to common problems for the common good, in order to perpetuate the usefulness of a natural economic product." That is the definite interpretation of conservation as I propose to deal with it to-day.

Importance of Natural Balance The first thing that arises in one's mind when setting out to follow up a policy of conservation, as just defined, is that all-important factor, natural balance. In the vegetable kingdom the cultivation of an economic product does not disturb the balance of nature to any great extent. In the animal kingdom, as a rule, this disturbance is the all-important factor when taking into consideration the true conservation of any undomesticated member of it.

Now we know there are several well-defined natural laws, which must be studied by those whose duty it is to advise on the conservation of animal life. Prof. Wallace once stated that no unbalanced deficiency in the animal kingdom can ever reach any conspicuous magnitude without making itself felt at the very first step, through rendering existence difficult and extinction almost a certainty. It follows from this that no derangement of the natural balance of fish life, in a certain

defined area of water, can take place without seriously endangering one or more indigenous species within that same area.

Another natural law, which we must bear in mind, is that the greater or less fecundity of an animal bears little or no relationship to abundance or scarcity in nature, but that abundance or scarcity is governed rather by periodical deficiency in quality or quantity of food, and powers of offence and defence. As an example let me point out that our lake trout (*Cristivomer namaycush*) deposits from 300 to 500 ova per pound of her weight while, on the other hand, the whitefish (*Coregonus clupeiformis*) deposits about 1,300 ova per pound of her weight. We cannot claim that the defenceless whitefish is increasing in proportion to her ova production in our waters.

FACTORS AFFECTING NATURAL BALANCE

The chief factors affecting this natural balance in our inland waters are as follows:

(1) We have the enforcement of regulations arising from legislation affecting netting and angling and which have often brought about artificial conditions. The intentions of the framers of these regulations are obviously good, but the anticipated results are by no means often achieved.

(2) We have pollution, both mechanical and chemical.

(3) Artificial obstructions frequently hinder or prevent the free passage of fish and thus affect the numbers on the spawning beds.

(4) Artificial incubation is sometimes extremely beneficial, sometimes the very contrary, depending largely on the amount of initial study undertaken of the area to be treated, previous to planting.

(5) The correlation of the various aquatic creatures to one another may be disturbed by the extraction or introduction of one or more species of fish in a defined area of water without compensation by natural or artificial means.

(6) There is an intimate relationship between fish and their animal food supply, which, again, is dependent on subaquatic plant life and this, in its turn, is affected by the geological formation of the soil.

With your permission, I should like to deal shortly with each of these six factors in rotation, with the object of pointing out its effect on conservation.

In the first case, let us take the effect of legislation. The intention, broadly speaking, is to frame legislation prohibiting any one from disturbing fish during the period Nature ordains they should reproduce their species.

Effects of
Legislation

It is not fully appreciated that, taking the same species of fish as an example, the natural periods of gravidity vary under different local influences, such as temperature, food supply and environment. Thus it is surely improper to enact legislation enforcing an artificial so-called close season without due consideration of these factors. The remedy is not far to find. Would it not be possible to divide our country, so far as fishery administration is concerned, into watersheds where conditions are nearly akin? This would surely be more advantageous to the fish than the present method of having a universal close time over a whole province.

Let me give as examples only two instances of these varying periods in the province of Ontario. On the west shore of the Saugeen or Bruce peninsula the lake trout (*Cristivomer*) comes on the "redds" a fortnight earlier than it does on the southeast shores of Georgian bay. Again, in lake Nipigon, the speckled trout becomes gravid nearly a month later than it does in the river flowing out of it.

Now let us look into the question of legislation affecting the mesh of nets and its relation to conservation. In framing regulations governing the size of the mesh in a net, the framers have or should have two points before them. First, they must allow the mesh to liberate all immature fish. I go further than this, and say they should allow every fish the opportunity to reproduce its species at least once. Secondly, they should insist, if possible, on the use of a mesh that will certainly trap aged fish that have become a menace to the fishery.

To illustrate my meaning I would say that it is stated that, in certain waters of this province, it is impossible to catch by means of a net, the large lake trout that have become a menace to other fish in the district. Why is this so? Is it not because the fishermen have become wedded to a four-inch mesh? Would it not be possible to regulate this otherwise in order to catch these cannibal fish during the most suitable period for getting them? Fish culturists would like to have those large fish caught, for as brood stock they are not so valuable as the more vigorous, medium-sized fish.

**Pollution,
Mechanical
and Chemical** The next factor affecting conservation is pollutions of two types, that is, mechanical and chemical. Dr. Townsend of the New York aquarium has said that all our fish commissioners of experience are agreed that the decrease in the supply of our food fishes is traceable more to pollution than to any other cause and that, further, stream pollution is going on at a rate proportionate to the increase in population and the development of manufactures. The condition would not be so serious in

effect, had not the flow of streams lessened through deforestation, followed by higher temperatures, loss of free oxygen, and consequently the decrease or total banishment of salmonoids. There is, it seems to me, no moral nor legal justification for pollution of water, even though we are anxious to stimulate the introduction of new manufactures, which are invariably followed by their discharging of foreign effluents. So long as this continues it is useless expending money on artificial incubation in such affected waters.

Under the head of mechanical pollutions—those that interfere with the natural life and habits of fish—we have the waste from saw-mills and tanneries, the cinders from tugs, steamers, etc. We all know their effect on fish, their ova, their spawning beds and their food, so dilution on the subject is unnecessary.

By chemical pollution I mean those effluents that change the natural composition of the water in which fish live. This form of pollution is by far the most serious, because it is not so easily detected, and the process of destruction is often slower. Chemical pollutions are of two classes, those actually toxic to vertebrate and invertebrate life, and those that contain septic bacteria aerobic in character.

Amongst the industrial effluents comprising the former class so often met with in this country are the effluents from pulp mills, gas works, galvanizing plants and similar industries. Most of these effluents are acid in character. Probably they do not affect the water so as to change blue litmus paper on immediate introduction. But what I want to emphasize is that the slightest trace of acid in water will invariably destroy fish sooner or later. It is a well-established fact that fish can only live in water slightly alkaline.

The pollution referred to in the second class is seldom anything else but domestic or municipal sewage. To fish, their ova, their food and especially to the pearl-shell mussels from which our buttons are made, the damage wrought by this effluent is far more serious than is realized. Medical officers of health will often pass an effluent as harmless after it has passed through perhaps an anaerobic tank or gravel filter, forgetting the effect of the aerobic bacteria as reducing agents of the free oxygen content, so necessary to subaquatic animal life. It is said that should water fall below one third of its natural average saturation of free oxygen fish life cannot exist. This latter varies with water temperature of course. Further, as a result of the discharge of domestic sewage, I have often seen serious outbreaks of furunculosis amongst adult fish.

There is only one way of checking the damage done to our fisheries by pollution, and that is by giving our fisheries officials power to act

independently of the departments of public health, in whose hands I believe all matters pertaining to factory effluents are placed. These latter consider only human life and ignore fish and other aquatic creatures.

Obstructions in Rivers So much for pollution. Now let me for a few moments call your attention to another obstacle to conservation, that of obstruction to the free passage of fish when going to, or coming from, their spawning and feeding grounds. Nothing appears to me to be easier in a new country, where riparian and vested interests are only just commencing to be acquired, than to frame legislation to prevent this new trouble. We have already excellent laws demanding fish passes where dams are erected, but these laws do not appear to be always put into force or, when they are, the constructor of the dam is left to erect the fish-pass in any way he thinks fit. It is often due to the fact that the erection of the dam is not reported to the Fisheries Department. What is the result? Some of these fish-passes might be useful, if dry, for assisting hens to go to roost, others might be useful for aërating water in substitution for soda water. In any case the requirements of the fish appear to be seldom considered. In fact, the basic principle of fish-pass construction is entirely overlooked. Surely the time has arrived when the Fisheries authorities should deal with these matters themselves, and compel any constructor of a mill-dam to erect a pass according to approved designs, and also to maintain it so long as the dam is in existence. In my opinion no dam or weir should be permitted without a license being issued by the Fisheries Department, and such license should contain the necessary contract with reference to the building and maintaining of the fish-pass. The effects of such obstructions on a river are many, but the chief results are isolation of the spawning-grounds and crowded "redds," the latter a very serious menace to natural incubation.

Artificial Incubation I need not deal further with this subject but will proceed to the effect of artificial incubation on conservation. I do not wish to touch too prominently on the benefits of the artificial stimulation of conservation, for that is outside my subject in this address. What I wish to touch upon principally, is the often injurious effect of artificial incubation on our fisheries when not administered with considerable forethought and knowledge. The basic principle of artificial fish culture should be to correct the natural balance disturbed by artificial agencies. In fish culture we are apt to look on the side which superficially seems to be the right one, but we quite overlook the result on natural balance, to which I

have previously referred. If we are to utilize the waters to their fullest limit, we must know more than we generally do of the available food supply of the fish, the breeding habits, the distribution or range of species, the enemies, the diseases; in short we must understand the cycle of the fish's life from the ovum to death and its correlation to all other subaquatic life occupying the same area of water. The professional fish culturist is much handicapped by want of data obtained by research, so that he cannot be expected, even if highly trained, to do good work. Surely the farming of livestock on land is a difficult enough study, if success is to be obtained. How much more, then, is expected of a man who has to farm livestock in an element different to that in which he himself has to live? Research must be carried on to assist fish-culture just as it does to assist agriculture. In view of the vast potential value of our waters, this point cannot be urged too strongly.

Another point we have to realize is that, under natural conditions, a very small proportion of the ova of certain salmonoids, for instance, is ever impregnated, so we must bear in mind that, when one species is being artificially incubated, the others should also be maintained in the same proportion—not primarily in numbers but in proportion to their food supply, their abilities in offence and defence and their adaptability to the surrounding waters. Take as an example one fish only, the whitefish, and see how far artificial incubation affects the conservation of this fish.

On an average for every pound weight of the female fish there are 13,000 ova in her ova sacs. Therefore, a 2½ to 3 lb. fish should produce approximately 35,000 ova. Incubation takes place over a period of from 125 to 150 days according to the temperature of the water used. However, under natural conditions the whitefish, unlike, I believe, all other salmonoidæ, do not always pair off. Hence there is little chance of universal impregnation of the ova. But let us assume that one per cent of the total ova is fertilized; that would be 350 ova per pair. Of these 350 ova many, we expect, would be lost to predatory fish, silt and other causes. From Downing's observations, an average of 11 fish may be expected as the result of natural incubation. Now artificial influences, that is, netting, accounts for the extraction from the waters of all this. Consequently, if the whitefish is to be kept as part of our fauna and further provide occupation for fishermen and food for the people, some stimulation or assistance to nature must be given in the form of fish culture. This is what we are wholly depending on to-day in lake Erie, for instance. In this case, artificial incubation aims to redress the balance that man has disturbed.



Trout from Tusket, N.S.



Cleaning Sea-mosses or Zoöphytes for Market

Correlation of Aquatic Animals I come now to the question of the correlation of the various animals to one another, *e.g.*, as food and feeder, enemy and friend, host and parasite. We must have ever before us the law governing the survival of the fittest, and if that species which man takes from the water is not of the "fittest" in a biological sense, woe to those species that remain, for in all probability the species abstracted assisted in maintaining the balance and allowed all others to gain their necessary living.

Let me give a very simple example of the disturbance of the balance in this manner. There are large quantities of burbot, or what the fishermen call variously ling, lawyers or eel-pouts, caught when lifting whitefish. Why are not these voracious fish in every case destroyed? Or even purposely netted for? Are they not in many waters gaining the upper hand? Do we not see shoals of these fish constantly hovering on whitefish spawning grounds, clearing every living thing around them? This fish is left because fishermen are too lazy to bring it to shore, and until they are compelled they will not do so.

The balance may also be affected by the introduction as well as by the abstraction of a certain species. We have an example of this in Ontario, in the introduction of the carp. This fish, where it has become established, has appropriated certain waters and has driven out certain other fish, such as the pike-perch or yellow pickerel and the bass. This disturbance is not due to any cannibal habits of the carp, but simply to its peculiar mode of feeding.

Relationship of Fish to Plant Life and Soils Lastly, I come to the problems arising out of the relationship between fish, their animal food, subaquatic plant life and soil geology. We all know that there are only two sources of food, whether it be for subaquatic life or otherwise, namely, soil and the air, but no animal can derive direct benefit from either. The plant must intervene in order to convert the primitive sources into the necessary protein, carbohydrates, fats and mineral salts necessary to animal life. This inter-relation of the animal, vegetable and mineral kingdoms is a study of absorbing interest, as anyone who knows anything of animal husbandry will readily agree.

As one of the interesting examples I may mention the almost certain association of speckled trout with a stream originating in and flowing through the Carboniferous limestone and similar formations, for in such a stream, you are certain to find large quantities of univalve molluscs of the snail family (*Physa* and *Lymnaea*). The soil conditions of these formations suit certain plant life, which in turn is best adapted

to certain animal food, both molluscan and crustacean, on which the speckled trout thrives.

REGULATIONS SHOULD BE BASED ON BIOLOGICAL RESEARCH

The foregoing are the various causes that may disturb the balance of nature in lakes and streams. The only remedies that can be applied to these particular disturbances are legislation and artificial incubation. Both must be guided by facts obtained by biological research. We must not jump to conclusions. No farmer who expects satisfactory results ignores the work of the biologist and chemist. Scientific facts have to be faced nowadays. The farmer knows, for example, that he can extract free nitrogen from the air and introduce it into the soil by the impregnation of leguminous plants with bacilli. The fish culturist knows he can assist the introduction of free oxygen into water by means of certain subaquatic vegetation. The farmer also knows what is likely to make good brood stock, and so should the fish culturist. Indiscriminate mating of unsuitable parents can only operate detrimentally. With an intelligent policy of artificial incubation, fishery conservation in its truest sense should not be difficult if taken in hand seriously before it is too late. Fishery administration does not or should not only consist of carefully drawn up regulations without biological study as a fundamental basis of them. Is it not axiomatic that it is its duty to cause our waters, large and varied as they are, to produce the maximum of human food possible, keeping always before it the fact that the demand on our fisheries will increase year by year. Especially so, as our inland fish are the only really fresh fish we in Ontario and the Central provinces can ever expect to get.

IMPORTANCE OF INLAND FISHERIES

We must not consider that because our inland fisheries are not at present an important factor in our commercial life that they will not be some day, and that in the near future. You have only to look at the map to see the enormous area in Ontario alone lying dormant under water, much indeed in districts where agriculture would not be profitable. Look at the districts of Algoma, Thunder Bay, and Kenora. I do not think that the land in these districts above water would raise on an average more than from five to seven pounds of beef or mutton to the acre per annum. There is much water in that same area that in my opinion might produce anything from 100 to 250 lbs. of fish per acre per annum. That feature is important.

Let me say in conclusion and without hesitation that much valuable work has been and is being done by the various federal and provincial fishery staffs and great credit is due to our provincial inland fishery departments for recognizing the great work before them. They have many difficulties in front of them, but are making the best of their available material. Now, however, we have reached a stage when we must pause and consider the best way to direct our energies along more scientific and along progressive lines.

RECOMMENDATIONS

Will you let me further in conclusion, with all respect, as an earnest student of economic ichthyology, offer the following suggestions as arising out of my address.

First: It appears essential that a fisheries department should carry on its administration in full coöperation and sympathy with the fishing industry. At the same time we must carry out a resolute policy based on scientific and practical knowledge, duly acquired.

Second: It appears to be necessary to establish some central institute where all parties interested in our fisheries can meet and gain information. Exhibits should be ever before all inquirers to educate them along progressive lines and to push our Canadian fishing interests. Educational exhibits should consist of exhibits of food fishes, dried and desiccated fish, fish oil, fish glue, fish manure, fish made into pig, poultry, and dog foods, pearl-button mussels, nets, boats and general fishing devices. The institute should be a centre where knowledge can be collected from all parts of the world, in order to at least raise fishing interests to the level of agricultural interests. Like Dr. Robertson, I am a strong believer in illustrated bulletins.

Third: Would it not be advisable to establish subordinate fishery administrative districts within each province to collect and regulate the many local peculiarities above referred to?

Fourth: Would it not be valuable to establish fishery associations in each district, such to consist of persons elected by the netting and angling interests, together with the Government officers of that district, to discuss and recommend to the central authority or provincial department methods of improvement and stimulation of the fisheries in their own district? Such associations might also include coöperative agencies for commercial purposes, that is, for the purchase and sale of goods connected with the industry in the district.

Fifth: That we have established a biological station for the particular study of our inland waters appears to me to be essential. Con-

nected therewith should be an experimental plant for research along economic chemical lines for the investigation of the utilization of fishery wastes. I believe much of this offal contains from eight to fifteen per cent of oil and up to 60 per cent of protein, both valuable commodities in the economy of this country.

Sixth: Would it not be of considerable value to the administration of fisheries in this country if there were a non-political organization, such as a Canadian Fisheries Society formed on the lines of the American Fisheries Society, the Japanese Fisheries Society, or the Salmon and Trout Association of England?

Seventh: The formation of a central school of instruction, which, I believe, was recommended by the International Fisheries Commission, would be extremely valuable, in order that the Government executive staff might be able to gain instruction in such subjects as fisheries law, applied zoölogy, botany, chemistry, fisheries technology with laboratory work and practice, elementary embryology and bacteriology, the use of the microscope and other allied subjects.

Eighth: Would it not assist conservation if there were an independent act of Parliament framed, such as a Fisheries Pollution Act, under which fisheries departments could protect their interests apart from the machinery of the public health acts?

Ninth: Would it not be well to enact legislation making all persons obstructing the free passage of water obtain a license from the provincial fisheries department?

With these remarks I will terminate my address, but in doing so, must apologize for saying much that has been said before. My excuse for repetition is the old one, that if you hit a nail often, however lightly, it will eventually be driven home. Though I have made ichthyology a life study, I am still a student, for the more I learn about fishes, the more there is still in front of me to learn.

HON. O. T. DANIELS: I am moved to say that I have been immensely charmed by these excellent papers to which I have listened in relation to this subject. The practical side is the question of how the information should be carried to the fishermen. I suppose that is a work to be carried out by the Department of Fisheries and these excellent men who have addressed us, or some of them. I presume they are devoting themselves to that subject, how to carry the information to the fishermen in the different provinces of Canada.

PROF. PRINCE: I should feel very remiss if I did not express my deep gratitude to Mr. Feilding for the very excellent paper which he has read to us. It contains a large amount of food for thought and some of the suggestions are of a very practical nature indeed. The question of artificial fish culture—and he speaks with authority, because his life has been devoted so greatly to that—is one of immense importance.

He realizes that there are conditions in Canada which are somewhat peculiar and which have acted rather as deterrents to a progressive policy, especially on our Great lakes. We have always, in all efforts to do any work on the Great lakes in the way of improving the fisheries and conserving the game, been confronted by the important fact that half of the waters are in the United States, and any work of an effective character must be done in unison with the states which carry on the fishery industries just across the imaginary line. That has always been a difficulty, but we have had hopes of overcoming it. I worked with Prof. Starr Jordan on the International Commission on that line for some years, but we have been disappointed and I hope that Mr. Feilding may be more fortunate and get some of the states to coöperate with him with good effect.

If I grasped his argument with regard to close season aright, it was that close seasons should vary very much to meet local conditions; that such a thing as a uniform close season for whitefish or trout or pickerel might be unwise. To my mind the object of a close season is not to preserve every breeding fish, but to preserve or protect sufficient breeding fish to keep up the supply and, if that can be done by a season which covers a sort of average of breeding fish, it accomplishes its object. Take the grey trout, of which some breed a month later than others. If the close season in force covers sufficient breeding trout, then a number of them may be caught and destroyed without harm to the fisheries. In the case of the great lake trout, to which Mr. Feilding has referred, it has a close season which certainly does not fit the precise period of breeding, it only covers it partially. I have always claimed that the close season was sufficient for the lake trout and it has held its own sufficiently to enable very profitable business to be carried on, while in the case of other fish, like the whitefish, there has been a decline. Mr. Feilding struck the right note when he pointed out how it was that the whitefish were falling off, although they have a close season which seems to cover the whole period of their breeding. The question of breeding and close season seems to me to depend upon the kind of fish you wish to protect. A shorter close season would be more effective for some kinds of fish than for other kinds.

In regard to the organization of a Fisheries Society and a Fisheries Institute, such suggestions have occurred to us many times, but they have not appeared to take any very practical shape. I hope Mr. Feilding will start the ball rolling again and that a Fisheries Society and also a Fisheries Institute will be established in Canada, perhaps in connection with the Conservation Commission. I wish to thank personally Mr. Feilding for his exceedingly valuable contribution.

MR. FEILDING: May I explain one or two things. In my remarks in respect to the close season I was not criticizing the actual periods laid down by the law, but calling attention to the fact that close seasons have an influence on conservation and therefore, when close seasons are provided, that point would naturally be one of the prominent points to consider. I may say that I have done very little work on the Great lakes. What we in Ontario are considering at the moment is the utilization of the vast areas of what we wrongly term inland waters, namely the lesser lakes of our great north-western sections, such as Algoma and Thunder Bay; nearer, we have lake Simcoe, which is producing practically nothing at the moment. It ought to be a highly productive lake. I feel confident it can produce something once a biological survey has been made. It is useless to pour one particular kind of fish into a lake when we find the water is not suitable. We have before us an example at Manitou lake, Manitoulin island. It was leased to a syndicate to cultivate whitefish many years ago. It has been a failure from the start up to the present time. I visited it a few weeks ago and looked into it carefully during the short time at my disposal. They do not get any of the big bow-backed whitefish, *Coregonus alba*, introduced from lake Erie, there; only a small type of *C. clupeiformis* is caught. Manitou lake is not suited to the production of large commercial whitefish. So, let us consider, before we concentrate our energies on improving these waters, what fish are most suitable to them. That is really the point I wish to bring out. We want to conserve these lesser waters of which we have sole control and which are not being interfered with or participated in by the United States.

Prohibition of the Sale of Game

BY

FREDERICK K. VREELAND

Of the Campfire Club of North America, New York, N.Y.

MR. CHAIRMAN and Gentlemen: I thank you on my own behalf and on behalf of the Campfire Club of North America for the privilege of appearing before you this afternoon. This courtesy is particularly appreciated because it indicates to us that you realize and appreciate the objects that we are working for. We feel that the wild life of the North American continent knows no geographical boundary and our interests are to protect the common heritage of all the people, wherever it is found, and the only way to do that to the fullest extent is by international coöperation. So it is peculiarly gratifying to us to see the spirit of coöperation that is enunciated by your Commission.

**Game Now
too Scarce
for Food**

There are several points from which we can view this question of game protection. There is the sentimental viewpoint. Here is a heritage that is given to us from nature. We are the custodians of it and it is our duty to guard it. Then there is the view of the sportsman who claims the right to a legitimate amount of sport in killing the animals. And finally, there is the value of the game as an economic asset. But, from whatever standpoint we look at the question, we are forced to the conclusion that the time has passed when wild game was a legitimate part of our food supply, excepting in a very few very remote sections. We may not like to accept that principle, but it is not a question of theory, it is a question of cold, hard, inexorable fact, and I will just point to a few of those facts to make clear my viewpoint.

DIMINUTION IN BIG GAME

When our ancestors came to this continent, we fell heirs to a heritage of natural resources probably unequalled elsewhere, the whole continent teeming with wild life, now over ninety per cent gone. The bison, which once roamed in countless thousands, is now extinct ex-

cept for a little remnant still in a wild state near Great Slave lake and a few herds in national reserves. The next in order for extinction is the prong-horned antelope. In the United States there are practically no antelope left outside protected areas and there is no state in the Union where killing is permitted. They are making their last stand in the plains of southern Canada, and Saskatchewan and Alberta have recently passed laws prohibiting their killing. This is a matter for congratulation, but it is to be feared it is too late; the antelope is peculiarly intolerant of approaching civilization and, I fear, is doomed to follow the bison.

Present Scarcity of Big-horn Then there is the mountain sheep, which once extended in its various species throughout the whole length of the Rockies, from the Arctic ocean to Mexico. The most noteworthy species, the big-horn, does not exist to-day in the United States except in protected areas, with the single exception of Wyoming, where, unfortunately, killing is still permitted. It is pleasing to note that in Canada you have taken precautions for preserving the big-horn. You have two splendid parks which will ensure the perpetuation of the species, but it must be remembered that the big-horn sheep is the most highly-prized trophy of the sportsman in the North American continent, and the whole world of sportsmen has its eye on the little tract in the Brazeau country and in the mountains north of Yellowhead pass to which they must go to get trophies. In spite of that, some people of Alberta during recent years considered themselves terribly aggrieved because they were prevented by the enlargement of the Park from going up into the mountains and getting sheep for meat when they wanted them. Taking a sheep as worth \$10 to \$15 to a settler for meat, compare that with the figures given you (\$1,000*) as to the value of that animal, even from the straight business viewpoint, when sought after by visiting sportsmen. The argument is irresistible. These people are not rascals, they simply do not realize the situation; they need education.

Mountain Goat Easy to Kill As to the goat, it is in a much better state because it is not so highly prized, but, nevertheless, it is in serious danger, particularly because it is so easy to get, once one has climbed up to where it lives. It is not as shy and crafty as the sheep and, when the mountains are opened up, it will not survive very long. There is only one portion of the United States where hunting of the goat is permitted, namely, in Idaho and Washington, and, even there, it ought to be stopped.

*See page 150.



Two Stoney Indians with Eleven Heads of Big-horn Sheep

**Decrease
Among
Moose** The moose once ranged over the whole of our north-eastern woods. Now, Minnesota is the only state in the United States where there are enough moose to be killed, and there are not very many there. In the state of Maine, which has had perhaps the most thorough and best enforced game laws with regard to moose of any of our states, a close season was put in effect last year, for the simple reason that there are too many hunters. Along the southern frontier of Canada where the country is brought under development, and where the moose once roamed in thousands, you will now seldom find enough moose to make it worth while to hunt them. It is worth while in New Brunswick, because there they have been thoroughly protected. They are scarce even in many outlying districts as, for instance, the Peace River valley, until recently regarded as remote but now thrown open to settlement. In 1912, the Beaver Indians were half starved, because they could not get enough meat to keep them alive, and one band of Indians travelled 150 miles up on the Liard river to hunt moose. Yet *Rod and Gun in Canada* printed a communication entitled, "Game in the Peace River Country Unlimited," which drew a glowing picture of moose, deer and antelope roaming the woods in countless numbers. Where did the writer ever see an antelope roaming the woods? It shows that people do not realize the peril confronting our animals.

**Scattered
Remnants
of Elk** Elk, which once ranged the eastern portion of the continent, are making their last stand in the Yellowstone park and are surviving there simply because they are fed hay in the winter time. They used to range in considerable numbers in Canada, but they are now practically gone, only a few scattered remnants being left.

**Caribou in
Precarious
State** You have already heard something about the caribou. It is gone in the United States*; there are a few of them left in New Brunswick, more in Newfoundland, and, in the great barren-lands country, there are still large numbers of them, but even there they are threatened with extinction. Last season I was in the mountains of British Columbia, one of the particular objects of my trip being to get some specimens of the mountain caribou for the United States National Museum. We travelled six weeks before we

*A few individuals were recently reported in Maine, having probably strayed over from New Brunswick; but such sporadic appearances, if authentic, only serve to emphasize the disappearance of the animal from regions where it once abounded.

came to a place where there were enough caribou to justify killing. I said to my companion, an old mountain man, who had been in the Fraser River country for eighteen years: Is there not some nearer place to get them so as to avoid carrying them this long distance? He answered that, until the railway came through, the Tonikwa mountains, just north of the Fraser river, were the best caribou range in the whole country but were no good now, that he would not advise me to depend on getting one there. Probably at this very moment there are men hunting caribou in the Tonikwa mountains and selling them to the railway men. I could give you names, but I do not think I ought to do so. My informant is a resident there, and he states that, if it were known that he had told, it would go hard with him among his neighbours. So you see our big game are in a very precarious state.

DANGERS THREATENING WILD FOWL

Turn to the wild fowl. Passenger pigeons once covered the sky and made it black with their countless numbers. In 1857, the Senate of the state of Ohio instructed a committee to investigate the propriety of protecting the wild pigeons. The committee reported that there was no need of protection, that they were in such countless numbers that they could not possibly be exterminated. The last passenger pigeon died last year in the Cincinnati zoölogical park at the age of twenty-two years. The Eskimo curlew, another example, is absolutely extinct. A bulletin of the United States Department of Agriculture says with regard to this question that the golden plover, the willet and the black-necked stilt are in order for extinction very soon. I wonder how many of you gentlemen have ever seen one of these birds outside a museum; yet they used to breed in Canada in very large numbers. The Labrador duck is another extinct species, and I might mention numerous others that are in very grave danger. The prairie chicken is very much in need of protection or it, too, will be exterminated. Recently, I was talking to a man from Saskatchewan who said that the prairie chicken is being killed by gopher poison. That is the viewpoint of the ardent sportsmen; it is not gopher poison that is killing the prairie chicken. The simple fact is that it lives in the open, it is a large bird, a conspicuous mark for the gunner, and it cannot stand the slaughter.

Remote Dis- I do not think it necessary to go further to demon-
tricts Being strate my proposition that the time is passed when
Made Accessible wild game was a legitimate part of our food supply,
 except in a very few very remote districts—and it must be borne in

mind that these remote districts are fast ceasing to be remote. Perhaps you will say that this relates to the United States, that Canada is in a better state than that. Well, happily your conditions are very much better than in the United States, but the difference is only one of degree. You have great areas that have not yet been brought under development and exploitation. But they are being developed. In those newly developed regions you are going through the same experience that we had in the United States and the result will inevitably be the same, unless you take steps to preserve your wild life. Travel by the Canadian Pacific railway from the Atlantic to the Pacific. See how much is left of the former forest belt that is really fit to be inhabited by wild animals. How many moose and caribou and other specimens of wild game will you find in that area? The question brings its own reply. Now you have the National Transcontinental and Canadian Northern lines just opened up. Last year the regions they run through were remote; they are no longer remote to-day. The Pullman car has brought them to your door. You have a railway now to the Peace river. Next year there will be another railway through to McMurray, connecting with the steamboats plying on the lower Athabaska, Slave and Mackenzie rivers, and the whole Mackenzie basin will at once cease to be remote. You are constructing a line to Hudson bay and then that vast territory will be thrown open. So the situation is critical and it requires immediate action.

**Pot-hunting
the Greatest
Danger**

There are several causes of the depletion of our wild life, the natural encroachment of civilization, disease and accident, the killing by sportsmen and the use of game for food. We cannot prevent dangers due to the encroachment of civilization nor can we do much to prevent the ravages of disease and weather, but we can limit the destruction caused by sportsmen, and that problem is being well handled. The most potent cause of them all, however, is the use of game for food. It is almost a truism that the very best way to exterminate any species of wild life is to put a price upon its head. As long as there are dealers in game you will find men who will kill it in spite of anything you may do to the contrary. Before the Act prohibiting the sale of game was passed in New York state, one dealer in New York city admitted that he sold 1,000,000 wild birds for food each year.

**Migratory
Birds Act**

What is the remedy? When the cause is well known the remedy follows almost as a matter of course. The two agencies that have done more than anything else for protecting the wild life of the United States are the Migratory

Bird Act giving us uniform seasons for killing, and the laws prohibiting the sale of game*. We now have laws prohibiting the sale of all or part of the protected game in forty-seven out of forty-eight states, and, in thirty-five states, the laws cover practically all the protected species. These laws are having a most admirable effect. The game, which was formerly diminishing at an alarming rate, is beginning to increase. We get reports from our field agents all over the country, telling us that ducks are breeding on the ponds in the Middle West in a way they have not done for many years. On the feeding grounds on the Atlantic coast, especially Currituck sound, Narragansett bay and Great South bay, the ducks are appearing in very much greater numbers. An interesting result of these laws is that the birds are trying to winter in places where they never thought of wintering before, Cayuga lake and lake Champlain in New York, and some of them had a hard time of it because of the cold weather and ice conditions. It shows how quickly birds respond when they are protected. This cutting-off of the market for game has eliminated fully one-half of the killing.

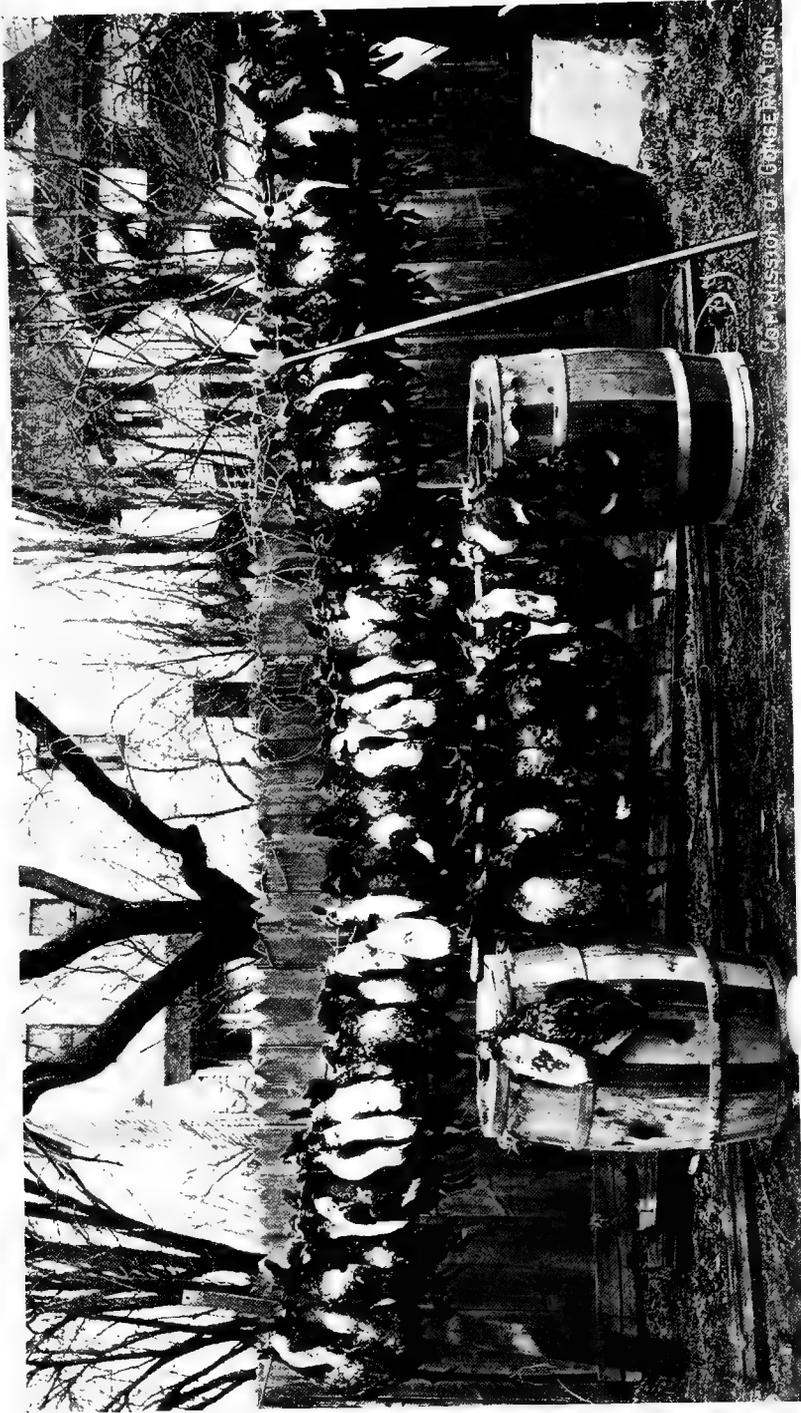
CUTTING OFF THE MARKET FOR GAME

The pot-hunter, as you know, is not covered by the ordinary restrictions of the sportsman; you cannot govern him by bag limits or by the ordinary restrictive measures. If the bag limit prevents him from marketing all he kills, he calls in "his sisters and his cousins and his aunts" and each one of them markets the limit. It is only by cutting off his market that this slaughter can be stopped. I do not know what the figures are with regard to Canada, but your hotels must be using great quantities of game. When I was in Edmonton this autumn, there were wild ducks on the table d'hôte bill of fare. When such a novelty appears, everybody orders it, and that means that every day they appear on the menu several hundreds of wild birds are sacrificed. The dining cars are using great quantities of game. Unless we stop all these causes of destruction, game will inevitably be carried rapidly towards extinction.

HUNTING FOR FOOD CREATES SCARCITY

Just as an example of the difference between sections where game is killed under restrictions and sections where it is killed for food, compare New Brunswick with the Peace River country. New Brunswick

*The constitutionality of the Migratory Bird Act has been questioned and is now before the U.S. Supreme Court for determination but, whatever the outcome, the no-sale-of-game laws will continue their effective work.



Ducks Illegally Nettet in Lake Ontario

has been the Mecca of the sportsman for years, and the shooting has been so well regulated that the moose have held their own and there is still a plentiful supply there. Out in the Peace River country, where I suppose you could count on your fingers the number of sportsmen who have ever hunted, the Indians are half starved for lack of meat. Respecting the demand of the cities, I think it needs no argument that that ought to be stopped. But consider also the remote sections where they are using big game to feed railway construction crews and to feed the settlers who are going into the country. The game cannot stand that.

RAISING GAME IN CAPTIVITY

Of course, when you propose laws prohibiting the sale of game you have some opposition, especially from the dealers. Let me tell you an interesting fact. When the law prohibiting the sale of game was proposed in New York state, the pot-hunters fought it like tigers. The hotel men did not fight it. The President of the New York Hotel Dealers' Association came out boldly and said that he would not oppose the measure provided some means were worked out whereby they could use game raised in captivity. In working out the problem, we provided that, for a very small license fee, those who wished to raise game in captivity could have the Government's sanction, and that the birds so raised would be tagged officially by a game guardian and sold only under those tags. In that way a new industry of some importance is being built up and those who feel that they must have a taste of wild game to satisfy an appetite that is already jaded by over-indulgence, can get it. As to form, the law which we consider the model in the United States is that in force in the state of New York, known as the Hornaday-Bayne law, which was devised by Director Hornaday, of the New York Zoölogical park, who was at that time Chairman of our Conservation Committee, and was put through the legislature by Senator Bayne.

Let me repeat, in closing, that, in considering this question, you must take account not only of the problem of the cities but also of the remote districts like the Peace River country. If the game is not protected it will very soon be exterminated by being hunted for food. I would like to call your attention to Dr. Hornaday's book entitled "Our Vanishing Wild Life," which contains a great deal of very useful information. I would like to add that, if, at any time, the Campfire Club can be of any service in coöperating with you, you have only to call on us and we shall consider it an honour.

The Big Game of the Canadian Rockies

A Practical Method for its Preservation

BY

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BETWEEN the eastern or Hudson Bay slope of the Rockies and the western or Pacific slope, there is not only a marked difference in flora, particularly tree flora, but also some differences in fauna both as to species, comparative abundance, range and local distribution. Further, there is the difference in governmental control, the Pacific slope being entirely under the Provincial Government of British Columbia and the Alberta slope partly under the Dominion and partly under the Alberta government. This paper deals directly with the conditions existing on the East slope—the portion with which the writer is more familiar—and only incidentally with the West slope.

BIG GAME OF THE ROCKIES

Few, if any, sections of the same area in North America have as many species of large game animals as has the East slope. In the portion lying between the International boundary, 49° N. latitude, and the Athabaska river, 53° N., there are found no less than 7 species of large herbivorous game animals, 5 species of large carnivorous animals and at least a dozen important fur-bearing animals. With the single exception of the prairie wolf or coyote, all the large herbivorous and carnivorous animals of this region are properly considered big game. It is true that some of the latter class are looked upon as dangerous, predatory animals, and, under certain circumstances, this view is correct, but the extermination of even such animals as these needs to be directed with some degree of care. The mere fact that an animal, such as the grizzly bear, will kill stock in one portion of a province is no reason for bringing about its extermination in all portions, including those where no stock exists for it to prey upon.

The large herbivorous game animals of the Rockies are :

1. Big-horn Sheep (*Ovis canadensis*)
2. Mountain Goat (*Oreamnos montanus*)
3. Mule Deer (*Odocoileus hemionus*)
4. White-tail Deer (*Odocoileus americanus macrourus*)
5. Moose (*Alces americanus*)
6. Elk (*Cervus canadensis*)
7. Caribou (*Rangifer montanus*)

The large carnivorous animals are :

1. Grizzly Bear (*Ursus horribilis*)
2. Black Bear (*Ursus americanus*)
3. Timber Wolf (*Canis nubilis*)
4. Mountain Lion or Cougar (*Felis concolor*)
5. Prairie Wolf or Coyote (*Canis latrans*)

The fur-bearing animals include the beaver, lynx, marten, mink, skunk, wolverine, and various others of less importance.

DESCRIPTION OF THE IMPORTANT GAME

Big-horn Sheep

The first animal in importance, from the sportsman's viewpoint, is the Rocky Mountain big-horn. No finer trophy exists in America than the head of the big-horn sheep, and no other animal, with the possible exception of the elk, has been hunted more assiduously or with more disastrous results. Although there are six species of mountain sheep in America, the big-horn originally had the widest range, being found from Mexico to the Peace river and westward almost to the Pacific. Because of its unusual development of horn, it has been the most sought after by hunters. As a consequence, it has almost disappeared from the United States and can now be nowhere legally hunted in any state in the Union. It has also decreased very greatly in numbers in the only two provinces of Canada where it occurs, namely Alberta and British Columbia. The writer's study of the game situation in the Alberta Rockies included the taking of a census of the mountain sheep which, however imperfect it is recognized to be, is nevertheless based upon the very best available knowledge and is at least interesting as an indication of present conditions. The estimates were made by seven of the best guides and hunters in the mountains and checked by the writer and the two game guardians who have the widest knowledge of conditions. The following are the number of big-horn sheep believed to be in the region under discussion :

Locality	Not more than	Not less than
International boundary to Crowsnest pass	1000	500
Crowsnest pass to Rocky Mountains park	800	400
Rocky Mountains park	700	500
Rocky Mountains park to head of Athabaska river.....	450	200
Athabaska drainage	250	75
Brazeau drainage	200	100
Total	3400	1775

Since the big-horn is found throughout a greater range in British Columbia than in Alberta, it seems probable that there are many more in the former province. Still it must be recognized that good sheep country in British Columbia is limited in extent, while a large portion of the Alberta Rockies affords suitable range. The latest available estimate of mountain sheep in the States, where it is considered nearly extinct, is 6,300 head.

The range preferred by the big-horn on the East slope is quite distinctive in character. Throughout the Rockies there are wide belts of shale or shaly limestone interbedded with the pure limestone formations. On the surface these softer shaly layers are often miles in width, being, of course, parallel to the trend of the ranges and, from their composition, weather out more rapidly, forming broad trough-like valleys, long, rounded ridges and extended slopes above timber-line. These slopes are covered with a low, thick growth of small alpine shrubs and herbaceous plants and form the favourite grazing ground of the mountain sheep. Often the innumerable short valleys that cut back into the ranges will terminate in a perpendicular rock wall, at the base of which a long talus slope will show many patches of shrubs and herbaceous plants. Such sites are favourite haunts of the big-horn, which, if undisturbed, will sometimes remain for days quietly browsing over a few acres of mountain meadow. On the first sign of danger, the band will retreat to the cliffs, up which they climb with the greatest ease, to disappear among the peaks and basins of the higher summits. The mountain sheep is not, however, a rock-loving animal. It can, when necessary, climb the most tremendous cliffs with ease and certainty, but prefers to graze among the high alpine slopes above timber-line below the towering rock pinnacles that form the numerous ranges of the Rocky mountains. The pictures frequently seen of big-horn poised on the rim of a stupendous wall of rock, gazing off across a wide-spreading valley, are quite true to life, but, as a general rule in the Rockies, the rear side of such a wall is a long, grassy slope, up which it is often by no means difficult to take a train of pack horses.



Head of Big-horn Sheep



Head of Moose



To the big-game hunter, the pursuit of the mountain sheep is probably the most fascinating of all sports. Not only do the regions in which it is found make a powerful appeal to the imagination, but the great care needed to avoid being seen in this open country, the scrambles among snow-covered pinnacles to get within range, the long, difficult shots sometimes necessary, all combine to make the hunting of the big-horn the foremost sport in the western mountains. It will, indeed, be a calamity if this striking and characteristic animal is allowed to disappear from the Canadian Rockies.

Next in importance, though least in numbers among the Rocky Mountain big game, is the American elk or wapiti. Here we have an animal, one of the largest of North American fauna, which once ranged nearly the entire continent in millions, now reduced so greatly that it has become possible to take a reasonably accurate census of its numbers. From Mexico to the Peace river and from the Pacific to the Atlantic, between the St. Lawrence and the coast of South Carolina, was once the home of the wapiti. To-day, a few scattered bands along the Rockies between Colorado and the Brazeau river and some isolated herds in the forests of northern Manitoba and Saskatchewan, comprise the entire wild elk left in North America. Probably the total does not exceed 60,000 head, less than 5,000 of which are found in Canada. In the Rockies the following is believed to be a very close estimate:

Locality	Not more than	Not less than
Oldman River drainage	300	150
Highwood River drainage	50	20
Brazeau River drainage	15	5
Total	365	175

Of these, the insignificant remnant in the valley of the Brazeau is the last of the original elk herds of Alberta. Those now found in the south are British Columbia elk that have migrated to the East slope since the inauguration of a closed season on elk in Alberta some five or six years ago. Originally an animal of the open plains and park-like forests, the elk has now become almost exclusively a forest-dwelling animal, but still avoids the swamps, muskegs and dense tangles of the northern forests and keeps more to the open pine ridges, the dry meadows and poplar groves in Manitoba and Saskatchewan and to the mountain glades and open, lodgepole pine forests on the East slope.

Elk are grazing animals. They live principally on grass, weeds and low brush, such as small poplar, birch and willows. This depend-

ence upon grass and weed range and the inability to subsist on browse alone introduces some important elements into the problem of the permanent protection of elk which are not prominent in relation to the other big game of the Rockies.

The elk is the largest round-horned deer in the world and, except in the Yellowstone park and possibly in Alberta and British Columbia, where closed seasons have been established just in time, it is rapidly following in the wake of the buffalo and antelope. Only very drastic measures taken at once will save the elk from total extermination in Canada.

Mule Deer

The mule deer is the largest game animal commonly called deer. It is found throughout the Canadian Rockies and also across northern Alberta and Saskatchewan into northern Manitoba. The range of the mule deer had not been noticeably restricted, but its numbers have undoubtedly been very greatly reduced. Unlike the white-tail deer, the mule deer has an almost insatiable curiosity, and this trait has contributed considerably to its decline. When alarmed, a white-tail deer will generally make away from the source of danger and put all the country possible between itself and its enemy. The mule deer, on the other hand, will quite frequently circle around so as to get another look and by taking advantage of this characteristic it is often possible to shoot a deer which otherwise might have escaped. Moreover, the mule deer as found in the Rockies is essentially an open-ground animal. The dry, open grassy valleys which border most of the rivers and creeks, the grass-covered south slopes, and the park-like country with a scattering growth of pine and poplar are the favourite haunts of this deer. It is this preference for a dry, park country that has enabled the mule deer to spread across the northern prairies into Manitoba, while in the States it is not found east of the Rockies. A striking characteristic of the mule deer is its ability to climb. In this respect it is not far behind the big-horn, and in many places in the mountains these deer are found in the high alpine meadows grazing along the borders of the forests in somewhat the same situations as those in which the big-horn occurs.

White-tail Deer

Closely allied to the mule deer, but differing markedly in the branching of the horns and in many of its habits, is the white-tail or Virginian deer. This is the most widely distributed game animal in North America. It is not by any means common, as yet, in the Canadian Rockies, but is increasing and, judging from experience in other regions, it should be able to hold its

own under reasonable game laws, without any special measures of protection.

Moose The largest of all deer, the moose, is similarly in little danger of extinction at present. The moose is not a characteristic mountain animal. It is an animal of the great northern forest, is never found out on dry, open plains, but is essentially a forest animal, and is particularly at home in dense coniferous forests which are interspersed with muskegs, sloughs and grass-bordered lakes and ponds. As an element in the fauna of the Canadian Rockies, it is of very little importance. Moose are found over a large part of British Columbia, becoming more abundant in the north, and occur on the East slope in fair abundance north of the Clearwater river. In the south, only a very few are known to range across the boundary from the Glacier National park. The moose is a browsing animal, and, where abundant, is very destructive to forests. It has few natural enemies and can generally find an abundance of food, so that, although it is not a very difficult animal to hunt, it is not likely to disappear rapidly, even in those sections where it is almost the only big game available. Further, the experience of Maine and New Brunswick demonstrate the ease with which moose, with reasonable protection, may be maintained in large numbers in suitable regions.

Mountain Goat The most abundant of all the big game of the Canadian Rockies is probably the mountain goat. This is an animal of such striking peculiarity of appearance and habits, and so unique among the big game of the world that anything threatening the existence of the species should be viewed with the utmost concern. Fortunately, the immediate future of the Rocky Mountain goat in Canada presents no reason for alarm, but the great diminution that has taken place in this species over the whole of its former range in the States proves that it is not safe against destruction because of any characteristic of its own. The mountain goat has, however, several characteristics that favour a long and successful resistance to extermination in the Canadian Rockies. In the first place, the mountains of British Columbia are its natural home and the region of its greatest abundance. It occurs throughout the entire province and northward through Alaska, almost to the Arctic ocean. It is everywhere present along the East slope in numbers that it would be difficult to estimate, but certainly well up in the thousands. Although quite frequently confused in the popular mind with the mountain sheep, the goat has nothing in common with the sheep as regards appearance and very little as regards habits or range. It is found

usually far above timber-line on the edge of perpetual ice and snow and only occasionally descends to the timber along the valleys in crossing from one range to another or in search of salt. The favourite range of the goat appears to be the rocky talus slopes and the bare exposed ridges of shale where there is a sparse growth of grass and weeds among the boulders and loose rock. In such localities it is seldom far from the crags and inaccessible peaks to which it retreats when alarmed. The mountain goat is a stupid animal. Whatever may be its characteristics in regions where it has become scarce, it is certainly not a difficult animal to kill in the East Slope region, providing the hunter is a fairly expert mountaineer. Goats are quite easily seen before the snow falls because of their white coat and do not appear to be specially keen-sighted. Moreover, even though they see the hunter, they will generally wait till he approaches quite close before seeking safety in flight. The goat seems to be quite confident of his ability to climb where he is secure from pursuit and does not appear to realize man's ability to strike at a distance. The comparative remoteness of its range, the worthlessness of its hide, the small esteem in which it is held either as a trophy or as a source of meat, and the abundance, hitherto, of other more desirable and more easily obtained big game have all contributed to save the goat from the rapid decline in numbers that has befallen most of the other big game of the Rockies. Should any of these factors cease to be a source of protection, there can be little doubt that the goat will very rapidly disappear. For the immediate future its position is quite secure, but it is very easy to predict what will happen if certain existing dangers to the sheep and mule deer of the Rockies are not curbed before these animals become scarce.

Caribou The mountain caribou is distinctly a British Columbia animal, and its food habits are such that it does not find the East slope very generally suited to its requirements. Caribou are found either in dense, moist forests, where they frequent the small marshy beaver meadows, or on open moss-covered hillsides above timber-line, or in the far north. The extreme southern end of their range is in northern Idaho, where the high mountain beaver meadows near the edge of timber seem to be their favourite haunt. They are essentially northern animals, are able to subsist under very severe weather conditions, and are much more abundant in the Alberta Rockies north of the Athabaska than south of it. The occurrence of caribou on the East slope south of 53° is limited to the west side of the Athabaska river from the Miette south to Fortress



Head of Caribou



Head of Elk

lake. Ten years ago they were much more numerous and were found well down the Athabaska below the present site of Jasper park, but they have been very much reduced, and at present it is doubtful if any remain throughout the year on the Alberta side, as it seems generally agreed among guides of that region that the whole band winters in British Columbia.

Grizzly Bear Among the carnivorous animals of the Rockies the grizzly bear is easily the most important though not the most numerous. This animal occurs throughout the East Slope region, but is everywhere very scarce. Its principal home is in British Columbia, in the Selkirk mountains and between the Selkirks and the Rockies. On the Alberta side it is probably most abundant in the neighbourhood of mount Robson, but I have seen grizzlies or evidence of their presence south of the Crowsnest, in the Highwood and Kananaskis valleys, at Pipestone pass, the headwaters of the North Saskatchewan, the South Brazeau and Pembina valleys and in several places along the upper Athabaska.

The most advanced legislation with regard to the grizzly is the closed season and the special bear license required by the law of British Columbia. This effort to protect the grizzly is a recognition of the fact that the grizzly bear is not always a pest that should be exterminated, but, except in a stock country, is a perfectly harmless animal under ordinary circumstances and one that may be made a source of very considerable revenue.

Black Bear The black bear is very much more common in the Alberta Rockies than the grizzly. It is found practically everywhere throughout the mountains and, although nowhere particularly abundant, yet seems to be able to hold its own under present conditions. The efforts for the protection of the black bear should be directed toward preventing any ill-advised bounty legislation and perhaps toward the establishment of a closed season when the fur is not prime.

Cougar Of all the big game of the mountains, the cougar or mountain lion has probably the least savoury reputation. Fortunately, it is a comparatively rare animal on the East slope, though common enough in parts of British Columbia. Cougar are rarely seen on the east side of the mountains, but a few have been killed in the Rocky Mountains park and adjacent to it on the south side. It is hard to consider this animal anything but a dangerous pest. It is undoubtedly a source of much damage to stock

and of probably still greater injury to game, especially deer. In the excessive snows of the west slope, the cougar finds little difficulty in killing a deer and, as it has a dislike for frozen meat and very seldom eats more than a very small portion of a deer while it is still warm, its usual practice is to kill a fresh deer for every meal. Probably a deer every two days through the winter is the kill of each full-grown cougar.

Wolves Both species of wolves, the timber wolf and the coyote, are found in the Rockies. The former is very rare south of the Athabaska and not abundant north of it. The latter is very common everywhere. Neither seem to warrant protection, while the timber wolf is undoubtedly a dangerous, predatory animal and should be exterminated.

Summary of the Present Situation A very brief summary of the present status of the Rocky Mountain big game would be as follows:
The mountain sheep has declined from former abundance to a condition that promises early extinction outside the game preserves. Probably not over 3,500 sheep remain on the East slope.

The elk, after being reduced to less than two score head, have begun to increase and to re-establish themselves by migration from British Columbia. This is due to the closed season, which must be retained for a number of years and perhaps indefinitely unless other provision is made.

The mule deer is much more abundant than the sheep, but is also decreasing rapidly. It will need special protection at no distant date.

The white-tail deer is increasing slowly. It can probably continue to do so if the present situation is not adversely disturbed.

The moose is slowly decreasing and, under present conditions, will, in time, disappear from the East slope. It is not an important element in the mountain fauna.

The mountain goat exists in great numbers. It is probably increasing at the present time. Danger to the mountain goat is in the future, but its rapid extermination, once it is hunted for meat, is a foregone conclusion.

The grizzly bear is rare, but probably no more so than at any previous time. It is not extensively hunted, but would increase if given some measure of protection.

The black bear is fairly abundant and holding its own or only very slowly decreasing.

The cougar is rare and the timber wolf almost non-existent, while the prairie wolf is very abundant. All three are noxious animals, dangerous both to domestic stock and game and should be destroyed.

Fur-bearing animals are, on the whole, very scarce, except perhaps the lynx. Mink and marten occur in a few places in fair numbers; beaver, once almost extinct, are becoming numerous under protection. Other animals occur only sparingly.

PRINCIPLES UNDERLYING GAME PROTECTION

It may rightly be asked: "What is a proper public attitude toward the wild game of the country?" Some confusion exists in the public mind, and a great deal of talking to no purpose is indulged in, which might perhaps be avoided by the formulation of a few guiding principles. The following are suggested:

1. The first duty of the country is to its people, not to its wild game. If the presence of large wild game interferes with or prevents the establishment of successful homes, it must be destroyed. Perhaps one might go so far as to say that this game should be utilized, so far as is within reason, in assisting in the maintenance of the pioneer homes on the edge of settlement. At any rate we hope the time will never come in Canada when deer parks and game preserves are considered of more value than the people of the country, and we see no reason why the same attitude should not be held in regard to those regions where the game is already established but the homes are not.

2. In a strictly agricultural section, or a region of intensive cultivation, large wild game animals are distinctly out of place, particularly such animals as buffalo, elk or antelope. This applies to much of our prairie farm belt.

3. In an agricultural region where there are numerous woodlots, areas of broken or rocky timbered lands, and hill slopes suitable only for pastures or forests, large game such as the native deer may easily be maintained in the midst of a dense population without detriment to anyone. This applies to most of our eastern farm sections and to the whole of the northern prairie country along the edge of the great northern forests.

4. In a grazing region, large grazing game animals, such as elk and buffalo, cannot be successfully maintained on the same land as domestic stock, especially sheep, without coming into competition with it for the available range. This applies to our western grazing lands both on the Great plains and in the British Columbia interior plateau country.

5. After all possible agricultural or grazing lands are removed from consideration, there still remains in Canada, more than half, perhaps

three-fourths, of the entire country which can never be cultivated or ranged successfully. All of this land, even the desolate Arctic wastes of the barren grounds, is suitable for the production of wild game and fur-bearing animals.

6. Wild game can be made to yield a very considerable revenue, if maintained in sufficient numbers and variety to attract sportsmen who are able and willing to pay for the privilege of hunting. This is fully demonstrated in Maine and New Brunswick.

7. Deer and other large game may be established and maintained in any region where there is suitable range, regardless of the density of the population, providing there are proper laws backed up by proper public sentiment. This is proved by the experience of Connecticut and other densely populated New England states.

8. In certain regions, notable especially for their scenic attractions, to which tourists may be attracted, the game has an æsthetic value that far surpasses its value as an object of the chase, and in such regions the propriety of extra restrictions is generally unquestionable.

Applying these principles to the Canadian Rockies, we find there a region almost devoid of agricultural possibilities, with valuable, though limited, grazing lands, stocked with one of the most varied big game faunas of North America, and possessing a wealth of mountain scenery, of rivers and waterfalls, lakes and glaciers, snow fields and unclimbed peaks unrivalled in America, if not in the world. Whether as an attraction to the big game hunter who finds here more species of big game than in any similar area on the continent, or as an attraction to the tourist and mountain climber, who must inevitably find this the most wonderful mountain playground in America, the game of the Canadian Rockies has a value as a national resource that can scarcely be exaggerated, and to let any of its numerous species be exterminated would be an act of extreme folly.

ENEMIES OF THE WESTERN GAME

Agents of Destruction It, therefore, becomes of some importance to study with care the factors that threaten the big game of this mountain region. Big game is destroyed by three principal agents. These are: (a) Natural causes, such as disease, predatory animals, accidents, combats or unfavourable climatic conditions.

(b) Disturbance of the breeding grounds and interference with natural range, especially the fencing up of the winter range of grazing animals.

(c) Hunting.

All wild animals are liable to destruction by natural causes and there is little reason to think that the advent of settlement has any material influence on these factors. Even though predatory animals are greatly reduced, there are certain diseases and some insect pests introduced by settlement that may tend to offset the smaller mortality resulting from the elimination of the natural enemies of the herbivorous animals.

Disturbance of game on breeding grounds and breaking up of winter range may have a very destructive effect, but is more or less an unavoidable accompaniment of settlement and commercial exploitation, and must be provided for in any project for the conservation of game.

Hunting, alone of these destructive agents, is, on the one hand, directly responsible for the decrease in game and, on the other, wholly within the power of the nation to control without conflicting with any fundamental rights. This brings us naturally to a consideration of the kind of hunting and the class of hunters found in the western game country, especially the Rocky mountains. Briefly, there are three principal classes.

1. Transient big-game hunters from outside the mountains.
2. Residents of local communities, mostly coal-mining villages.
3. Stoney Indians.

Big-game Hunters The first are a minor element in the problem. The decline in the more characteristic big game of this region has resulted in a corresponding decrease in hunting parties from far distant places. No doubt there has been an increase in the number of hunters from nearby localities, but except in the immediate vicinity of the transcontinental railways, it is very seldom that a party is encountered even during the hunting season. Moreover, nearly all such hunters have a reasonable regard for the game laws which, if enforced as successfully against all classes, would make a remarkable change in conditions.

Resident Miners The resident miners are a much more difficult class. They are mostly Europeans with no very great respect for the law, except as they see it embodied in force in the person of a Northwest Mounted policeman. But the police, although *ex officio* game wardens, are few in number and have other duties that largely prevent them from taking an important part in game protection. On the entire East slope, outside the Parks, there are only five policemen, and none of these ever gets away from the villages in

which they are stationed, except on special detail work. On the other hand, there is a mining population of fully 10,000 people and, with a population of this size and nature, with the irregularity of employment and the labour troubles that have marked this industry, it is to be expected that there will be little regard for the game laws where such settlements exist. As a consequence, most of the mining settlements are now surrounded by a wide belt of country in which all forms of big game have become extinct. Fortunately, there is little tendency to range more than about 25 miles from the camps, so that the total damage is, as yet, not very considerable.

**Stoney
Indians**

Finally, and most important of all, we have the Stoney Indians. This is a hunting tribe of mountain Indians who have a reservation in the foothills west of Calgary, but range the Rockies from the Crowsnest pass to the Brazeau river. This tribe numbers between 400 and 600 individuals. Their reservation contains no land of much agricultural value, but is a very good stock range. It is by no means utilized to capacity, for a large part of the tribe is constantly scattered throughout the mountains on hunting expeditions, and at least one-seventh reside continuously off the reservation, mostly on the Kootenay plains along the North Saskatchewan river, some 150 miles by trail from their agency.

Until 1st June, 1914, there were no real restrictions whatever upon the killing of big game by these Indians throughout the year and, as yet, the legal restrictions that were then imposed have had no actual application. The Stoneys are not amenable to the Alberta game laws unless made so by specific proclamation of the Federal Department of Indian Affairs. On assuming the administration of the Rocky Mountains Forest reserve, the Forestry Branch found that the only game laws that applied to the Stoneys permitted the killing of all the game required for food throughout the year and six head of any big game in addition. Immediate representations were made, which resulted in the proclamation of 1st June, 1914, by which the Stoneys were made amenable to the present Alberta Game Act.

The real situation is that we have here a tribe of from 400 to 600 individuals living practically in an aboriginal state. Game has always been their main source of food supply, and they are particularly skillful in securing it. No restrictions have ever been placed upon them in the matter of hunting at will, but they are shrewd enough to know that any flaunting of their continual inroads upon the game would result in serious objections from the local white population. As a consequence, while continuing to kill without restraint, they endeavour

to do so secretly and, except in the more remote portions of the mountains and during the hunting season, they destroy all evidence of the presence of game around their camps.

Wild meat, however, with a little flour, sugar and tea, continues to form the entire ration of the Stoney. To supply from 400 to 600 people with a daily ration composed largely of meat requires the killing of a large number of animals. The writer was fortunately able to get a very fair check upon the meat consumption of the Stoney a few years ago, and found a large group had an average daily consumption for a period of three months of $2\frac{1}{2}$ pounds per person. If this figure is extended to the entire tribe, it is a simple matter to determine that about 3,500 head of game per annum would be required. Probably the annual slaughter is not less than 2,000 head, of which about one third is sheep and the rest deer and moose. In the 1913 hunting season the writer visited 8 Stoney hunting camps, and in these alone found that nearly 100 head of sheep had been killed in addition to numerous deer. During the same period our forest officers visited 6 or 8 additional camps and found about an equal number of sheep with many deer, 5 elk, some moose and bear and, in one camp, we afterwards ascertained that 25 sheep, all ewes and lambs, had been surrounded in a blind valley and completely exterminated.

Destructiveness of Stoney Indians

It is not alone the large numbers of game killed annually by the Stoney that constitutes the menace to the big game of the Rockies, but equally important is their method of hunting. To the Stoney, there are two kinds of cattle, that with a brand on it, which belongs to the white man, and that without a brand, the wild game of the mountains, which belongs to the Stoney. The Stoney usually chooses the easiest method of rounding up his wild cattle. This means the killing of game regardless of age or sex, the extermination of whole bands of sheep or elk whenever possible, the killing of moose when yarded up in the winter, the use of dogs and the making of drives in which the whole camp, men, women and children participate, the slaughter of game at all seasons of the year and its constant harrying and disturbance regardless of season.

What are the results of these conditions? There is a strong probability that the five elk killed by the Wesley band of Stoney in 1913 were the last remnant of the original countless elk herds of the Alberta Rockies. Already the big-horn sheep is so reduced in numbers that the date of its extermination also is within a measurable distance. Moose have been reduced to one third of their former

range and are slowly being eliminated; deer are fairly numerous in places, but it is strikingly noticeable that these places are those that have been relatively inaccessible because of blocking of trails by windfalls and forest fires. Goats alone are on the increase, but it is a well-known fact that the Stoneys scarcely ever hunt the goat, so that this fact merely serves to prove our contention that the alarming decrease of game in the Canadian Rockies is due principally to the unrestrained hunting at all seasons of the year by these Indians.

There are, however, other evidences that support this view. In four sections of the mountains, the activities of the Stoneys have been curbed. These are the portion south of the Crowsnest pass, the present Rocky Mountains park and the Red Deer valley north of it, the Athabaska valley, and the north side of the Brazeau river. In the south country the Stoneys have been driven out by the Provincial game warden, Mr. Riviere, and in spite of a very large mining population, and an increase in both local and foreign hunters, there has been a very notable increase in all kinds of game. This is especially true of sheep, while nearly all the elk in the Rockies are in this section.

Rocky Mountains park and the Red Deer valley have been created a game preserve and are patrolled by the Parks Branch of the Dominion Government. There is a very good stocking of game in this area, principally sheep, goats and mule deer, but no elk or moose. Of course, all hunting is prohibited, so that this increase is not due solely to the restrictions placed on the Stoneys, as it is in the south.

The Athabaska valley was largely denuded of game by the resident Indians and the locators and builders of the Grand Trunk Pacific. Since the Indians have been removed from the region, although hunting has been permitted, an increase of game has been noted, the most striking of which is the return of the caribou, which had been exterminated before the advent of the railroad.

The strip of country lying along the north side of the Brazeau has been comparatively immune from excessive hunting because it was a more or less neutral belt between the Beavers and Iroquois from the north and the Stoneys from the south. This resulted in a remarkable increase in deer and moose, and in the survival of the elk, but this condition is now threatened by the inroads of the Stoneys who have exhausted more accessible regions and, from the base established on the Kootenay plains, are hunting in the Brazeau valley. Unquestionably, therefore, there can be no hope entertained for the Rocky Mountain big game until these Indians are compelled to observe the game laws.



Group of Stoney Indians with Heads of Big-horn Sheep



Stoney Indian Encampment

METHODS OF GAME PRESERVATION

Game Laws and Game Preserves For the preservation of game, two principal methods are employed. These are:

(a) The establishment of game laws which restrict the season of hunting, the number, age and sex that may be killed; the requiring of licenses, often graded so as to discourage non-resident hunters; the prohibition of the use of unfair hunting methods such as dogging, hunting on snow or using automatic guns; the restriction or prohibition of the sale of game, etc.

(b) The establishment of game preserves or game refuges where all hunting is prohibited at all times of the year.

All the provinces have game laws and, with some minor modifications, they would all be fairly satisfactory and doubtless accomplish excellent results if adequate machinery for their enforcement were provided.

Nearly all the provinces have game preserves. The four western provinces have all adopted a game preserve policy, with, however, some important differences in method.

In Manitoba, specially designated portions of the Dominion Forest reserves have been constituted game preserves. This is an excellent method and one employed also in various States. Its complete success depends upon the care and knowledge with which the boundaries are established, the thoroughness with which they are marked on the ground, and the degree of protection afforded by the regulations for these preserves and the officers employed to enforce them.

In Saskatchewan, the Game Act automatically makes all forest reserves game preserves. This is a very faulty method. Forest reserves are not selected nor are their boundaries established with game preservation as their object. The principles upon which forest reserves are created have little in common with the principles that should govern the establishment of a game preserve, and the method employed in Saskatchewan is wholly negative in character, amounts simply to a shifting of responsibility and, only by the merest accident, could it result in the creation of really adequate game preserves. Moreover, in spite of failure to administer those already established, it promises to result in the establishment of a great deal larger area of game preserves than there is any justification for.

In Alberta, a similar negative policy of shirking responsibility for direct action has been adopted. The Alberta Act makes all Dominion parks created by the Dominion Government, game preserves. This is not quite so objectionable as the Saskatchewan system, but it has some

special objectionable features of its own due to the fact that parks, like forest reserves, have many important functions other than that of game preservation, and making game preservation dependent upon the creation of parks is a serious handicap to the proper utilization of the natural resources of the province, as well as to the preservation of the game.

The Manitoba system is unquestionably the best. Perhaps there are, in Saskatchewan and Alberta, reasons for the policy adopted that do not appear upon the surface. Whatever the reasons, however, it is unquestionable that these provinces should alter their present Game Acts so as to make the creation of game preserves a matter of straightforward positive action by the parties upon whom the responsibility for game preservation rests, instead of shifting it on to the Federal Government, which has no constitutional authority with regard to provincial game. Moreover, complicating the problem by involving it with other conservation policies, to which it has little or no direct relation, should be avoided. Game preserves should be created not with the idea of obtaining some political or other irrelevant advantage, but solely for the benefit of the game itself and the numerous interests dependent upon it.

In British Columbia, as in Manitoba, the province assumes the responsibility for the creation of its own game preserves. Several have been established where there seemed to be some special need, but, while British Columbia has some very commendable features in its game laws, neither in the establishment nor in the maintenance of game preserves is it, as yet, in a leading position.

Game Preserves, Forest Reserves and Parks Since game preservation in all the western provinces is more or less involved with the Dominion Forest reserves and Dominion parks, it becomes desirable to

understand the nature and functions of these three forms of special reservations. It must be obvious that each has distinctive functions and, although these functions are not all of them necessarily antagonistic, nevertheless some of them are, and there is absolutely no warrant for assuming that the establishment of one form of reservation qualifies it to serve in the capacity of either of the others. This whole subject would be the better for some clear thinking and a few definitions, and for action based upon reason rather than upon impulse.

A *game preserve* is a block of land set apart because of special suitability for the protection and propagation of wild game, for the purpose of furnishing a place of refuge where game shall be allowed to breed and increase unmolested, and is administered under regulations designed specifically to promote this purpose.

A *forest reserve* is a block of land either timbered or non-timbered set apart for the purpose of producing timber upon a commercial basis, and having a greater value for timber production than for any other purpose.

A *park* is a block of land which, because of some special features, such as scenic attractions, natural wonders or ancient monuments, has been set aside for the purpose of affording a place of public resort, a pleasure ground for the people.

Special Game Preserves a Necessity These are distinct functions, easily definable, recognizable by everyone and, although expert advice may be required in determining what lands are actually suitable for these various purposes and are not more suitable for some other use, nevertheless, if these definitions are kept in mind, no difficulty need be experienced in deciding which one of the three forms of reservation any given section is most suitable for. It then becomes only a matter of deciding upon the extent of the reservations for which the Government is willing to become responsible. Were this simple, direct policy adopted, we should not have the present complications between various governments and government departments, whereby we have the spectacle of parks created in order to make game preserves, game preserves made out of forest reserves, which were created without a thought of suitability for game refuges, parks turned into forest reserves only to be turned back into parks; and, meanwhile, the Stoney and the pot-hunter and the unemployed miner continue to take their toll from the game without let or hindrance. The solution is perfectly simple. Create game preserves for the sole purpose of game preservation, unhampered by considerations of forest or park values. Then, either organize a special game protection staff for the administration of these preserves or, if it is found that they are largely within forest reserves or parks, let the Branch having previous jurisdiction over the land assume responsibility for the game protection and organize its own special staff for that purpose.

It may rightly be asked, "Why, if we have suitable game laws, are special game preserves required at all?" The answer is that game laws, to be effective, must be enforced, and the simple fact is that they very seldom are. In this they do not differ materially from other prohibitory legislation, which does not carry with its violation a feeling of moral guiltiness. Most men who have any feeling on the subject are quite willing to support the game laws in the abstract, but it is remarkable how little effect abstract considerations have on them when a big buck steps out in front of them during the closed season. More

serious, however, than game law violations is the question as to whether we really have suitable game laws. The suitability depends largely upon the point of view. As a matter of fact, game laws are mostly designed not to ensure a permanent, unchanging supply of game, but to ensure to each citizen his fair quota of what game there is in the country. Consequently, although as the population increases, game laws are made more stringent, experience proves that, until all the game has been hunted out of existence, few communities ever come to look upon game from any other standpoint than that of the hunter. Then, they adopt permanent closed seasons, in other words, make the whole province into a game preserve and, if the possibilities of game restoration have not all disappeared, the country may again become restocked regardless of the density of the population.

As regards interest in game protection, citizens may be divided into three classes:

1. A small but highly influential minority composed of hunters, dealers in sporting goods, guides and others having a direct personal interest in game, who have practically exclusive control of the making and amending of game laws.

2. A very small and not very effective minority that is interested in game not as an object of the chase, but seeks for various reasons to shape the game laws so as to retain the game undiminished.

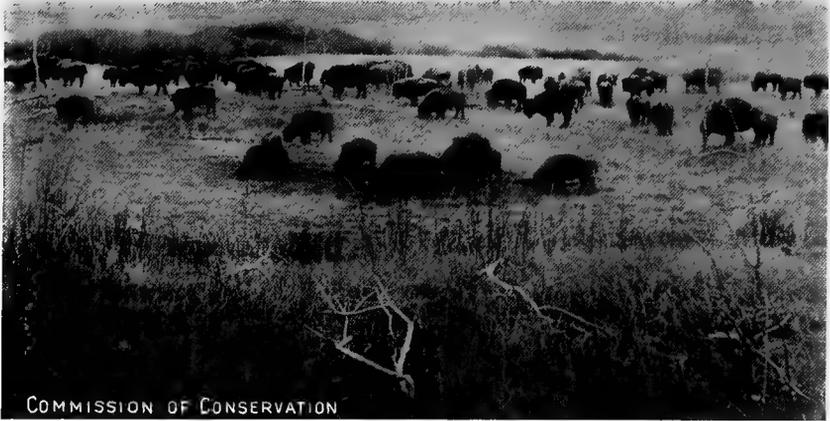
3. A very large majority which never hunts, has no interest in hunting or anything pertaining to it, and is normally indifferent to game legislation, but inclined to favour restrictions or can at least be depended upon not to oppose restrictive legislation.

As a matter of practical politics it is out of the question to make the radical changes in game laws that would be required to retain the game in the face of an advancing settlement and rapidly growing population. By the creation of game preserves in all parts of the country, it will, however, be possible to accomplish two important things:

1. Maintain a supply of game for a much longer period than is probable without game preserves.

2. Maintain a nucleus in a wild state from which the country may be restocked when the large class that is now indifferent to the fate of the game comes to have a positive sentiment in favour of game preservation. That such a change of sentiment is inevitable we have the abundant evidence of other peoples to prove.

Briefly, it can be said that the game preserve is essential to prevent the extermination of many species of our large game animals in various



Buffaloes in Buffalo Park, near Wainwright, Alta.



Elk in Buffalo Park, Alta.

sections of the country. While it is not demanded by any large body of citizens, it is, on the other hand, not opposed. It, therefore, lies wholly with our governments to decide whether they will be guided by experience and take the steps necessary to ensure game for the future, or whether they will neglect to do so and allow our game in the Rocky mountains to meet the fate of the buffalo and antelope of the prairies, of the elk of Ontario and Alberta, and of the sheep, grizzly bear, goats and caribou of the Northwestern states.

Qualifications Required by a Game Preserve In order to fulfil the purposes of a game preserve, it is necessary that the area selected have certain special qualifications. These may be briefly stated as follows:

1. Suitable range for all the large animals which the preserve is designed to serve, including both winter and summer range.

This requirement is too obvious to warrant any discussion.

2. A minimum of commercial assets such as coal, oil or other minerals, which require the establishment of permanent settlement for their development.

The fewer people there are in a game preserve, the less likelihood there is of violations of the regulations, the less disturbance there will be to the game and the more rapid will be its natural increase.

3. A minimum of land valuable for grazing domestic stock, which has been preëmpted by stock raisers or is primarily valuable for stock range.

With enormous areas which have no value as grazing lands, it should seldom be necessary to interfere with legitimate stock-raising in order to establish a game preserve. No areas whose value as grazing lands has been proved by beneficial use should be included in game preserves.

4. No railway lines or probabilities of future railway construction.

Railways are in the same category as permanent settlements. They introduce undesirable complications in administration.

5. Natural boundaries conforming to well-marked topographic features of the country which are readily determined and, more particularly, which act as natural barriers to ingress and egress, and thus facilitate guarding against trespass.

We constantly see game preserves created which have but few of these primary qualifications. This is due either to the attaching of the game preserve to some other form of reservation, such as a forest reserve or park, or to failure to make a thorough examination of the area with these requirements in view. Most frequently do we see the fifth requirement, that of natural boundaries, disregarded. In fact, until 1911, there was not a game preserve in the West having such

boundaries, and, as yet, there are only a very few. In the prairie sections it is difficult to conform to this requirement, but not so in the mountains. Preserves may be created on the East slope with practically their entire boundary on topographic lines, and it is only necessary to decide what lines form the most desirable boundary. Two topographic features may be selected, rivers and mountain ranges. The value of these natural boundaries lies (1) in being plainly delineated, and (2) in forming barriers to entrance into the preserve. For the first purpose, there is but little choice between them. For the second, mountain ranges are vastly superior. There are only three non-fordable rivers in the Alberta Rockies. These are the North Saskatchewan, the Athabaska and the Smoky. By "non-fordable" is meant that they can only be forded at well defined points. All of them can, of course, be crossed at the regular fords at any but flood stages. All the other rivers may be crossed practically anywhere except during floods, and then may be forded at numerous points. As a real barrier to ingress, there is not over 75 miles of river in the Rockies that has any value for a game preserve boundary. Stream line boundaries are an intolerable nuisance if actually maintained, especially in such a region as the Rockies, where all the main routes of travel follow the rivers and where it is frequently necessary to swing back and forth across the rivers a dozen or more times a day. They are not only a nuisance to the casual traveler, but also to the big game hunter whose wounded deer or elk or moose escapes across the river into the game preserve, to the game guardian who is condemned to watch 50 miles of creek bed that a man can wade across, and to those responsible for fire protection on adjacent lands, who must keep a fire ranger stationed over half a valley when he might just as well be guarding the whole of it.

The mountain ranges are in quite a different category. None of these may be crossed except at certain well-defined passes. The main crest, for instance, has only 15 practicable passes between the International boundary and the Yellowhead in a distance along the range of 450 miles, or an average of one every thirty miles. Some of the secondary ranges are quite as inaccessible. For instance, the range east of Maligne lake, part of which formerly was the boundary of Jasper park, is inaccessible for 45 miles of its length.

Rocky Mountain Game Preserves Having in view the principles previously stated, the Forestry Branch of the Dept. of the Interior made a careful examination of the entire East slope south of the Athabaska river, as well as a detailed study of the Rocky

Mountain big game and its requirements, and, as a result of this study, has delineated four proposed game preserves, which conform to these requirements as nearly as it is possible to do so. Three of these preserves are contiguous to the three mountain parks. The total area of proposed preserves is 2,260,000 acres, or about one-sixth of the Rocky Mountain Forest reserve. These preserves are all selected because they form the natural range and breeding grounds of one or more of the big game of the East slope. None of them contain all the species found on the slope, but most contain a majority. In all cases, both winter and summer range inside the preserve has been assured; there is a minimum of known or probable mineral deposits, very little grazing land suitable for domestic stock and, although there is considerable timber, it is not considered that the harvesting of timber under forest regulations is detrimental to the interests of a game preserve. None of these preserves is crossed by any line of railway or is likely to be, and, in all cases, natural boundaries have been selected which constitute almost insuperable barriers to ingress and egress. The object of the boundary delineation was to select lines having as few gateways as possible, and also to retain all around the preserves a buffer strip of forest reserve or park. This has been accomplished with almost complete success. In addition, the preserves are well distributed along the East slope, so that they serve all portions, and there are large areas of forest adjacent to the preserves where the overflow from them may be hunted without endangering the preserve itself.

GAME PRESERVE ADMINISTRATION

The practical difficulties which confront a force of game guardians are very frequently overlooked in the establishment of game preserves by governing bodies, who look to others to assume responsibility for this protection, or when preserves are created as the result of non-official representation by parties interested in game preservation but inexperienced in the administration of restrictive regulations over large areas of land. In outlining a game preserve policy for the Rocky mountains, the Forestry Branch has drawn not only on its detailed knowledge of natural conditions in the Rockies and of the big game of the mountains, but also upon its fund of experience in the administration of large areas of forest reserves, and has outlined a complete plan for the efficient guarding of these proposed preserves.

The two principal elements in this plan are (1) the prohibiting of firearms of any kind within the preserves, and (2) the establishing of a special force of game guardians who shall have no other duties and who shall be

**Plan of the
Forestry Branch**

stationed largely at the natural gateways to these preserves rather than attempt to protect them by patrol. The character of the boundaries and the general situation of the preserves as previously described, makes this a wholly feasible project and guarantees an efficiency of protection that can be secured in no other way. This force will give its entire time to game protection and will assist in fire protection only as an incidental part of its main duty. All other forms of administrative activity on the preserves, such as the construction and maintenance of roads, trails, telephones, cabins and other permanent improvements, the regulation of timber cutting, the detection and control of forest fires, the making of surveys and forest studies, the regulation of occupation, etc., will be handled by the regular reserve staff. Except that stock grazing, which is inconsistent with the purpose of the game preserve, will be prohibited, there need be no interference with the full utilization of all the natural resources of these preserves. The cutting of timber, the development of mines and the establishment of summer resorts can be permitted. This liberality is possible without injury to the preserves because of the proposed rule barring guns and the small probability of any detrimental use on a large scale ensured by the character of the areas selected for preserve purposes. In order to ensure close coöperation between the Forestry Branch and the Parks Branch officials, it is absolutely necessary that the two administrative forces be under the same supervisory officers. Thus the federal game guardians on preserves located in forest reserves should be directly under the forest reserve supervisors and those on Dominion parks should be under the park superintendent. This would avoid all chances of conflict of authority, ensure protection for the game, produce the permanent improvements necessary for the most efficient work, and secure for the administrative staff a considerable amount of valuable assistance in the work of fire protection and of guarding against trespass.

The total cost of ensuring thoroughly adequate game protection on the 2¼ million acres of game preserve proposed under this plan would be \$16,000 per annum, or 0.7 cent per acre. Included in this, there would be, of course, a large gain in fire protection on the same area, the value of which it is difficult to estimate. One inspector and six permanent game guardians would be required, supplemented by 12 assistants for periods of from three to nine months. A great deal, of course, would depend on the character and qualifications of the men selected for this work. Before everything else, the appointment of local residents for political reasons should be avoided. The char-

acter of the work would justify the organization of a uniformed force on military lines. The position is wholly different from that of the forest ranger. The duties of the game guardian are primarily police duties and police methods of organization and control would probably ensure the most efficient results.

The writer's interest in this plan arises from the fact that he directed the work of collecting the information upon which it is based and personally examined the proposed preserves and wrote the report of the project. If put into operation, it would not only prevent absolutely the extermination of any of the Rocky Mountain big game, but, if combined with a suppression of the Stoney Indians, would ensure a permanent supply of big game of all species in the Rockies. Not only should it appeal to those who wish the game preserved for its own sake, but it should also appeal to the big-game hunters and to all the interests connected with them.

**Control of
the Stoney
Indians**

The suppression of the Stoney Indian is the more difficult project. The Dept. of Indian Affairs, the Provincial Game Guardian, the Mounted Police, and the Forestry Branch have none of them evinced an eagerness to undertake this duty. Primarily, it belongs to the Provincial Game Guardian, and now that the Stoney has been placed under the Alberta Game Act, the action of the Provincial officials is awaited with some interest. The probabilities of controlling this tribe are, however, remote and much more certain results can be obtained through the establishment of game preserves that are closed to all hunting at all times. The Indian problem will no doubt ultimately solve itself through the operation of natural causes. In the meantime, something effective must be done in the Rockies if the distinctive game of this region is not to be allowed to disappear.

The plan proposed by the Forestry Branch promises the maximum protection at the minimum of expense. It is based upon accurate knowledge and not upon hearsay. It is, in fact, the first comprehensive survey of so large an area that has ever been made on so intensive a scale in America. Last August, H. S. Graves, Chief Forester, U. S. Forest Service, announced that a similar study is being made in the United States National Forests.

The preserves, as outlined, are all game preserves, not a small nucleus of game preserves surrounded by a huge area of land which makes an effective appearance on the map but has very little influence on the census of the game population. Such preserves are extremely harmful to the interest of true game preservation, in that they are

wholly deceptive and lead to an unwarranted feeling of security on the part of those interested in game preservation but not familiar with actual field conditions. The game preserves proposed by the Forestry Branch are not intended as show places. They have been deliberately placed at a distance from the main transcontinental railways in order to promote their effectiveness. There are plenty of parks wherein the tourists who stay close to the railways can see all the game they wish. The parks are all rightly game preserves, in spite of many obvious handicaps. These proposed game preserves are of a different type, and whether or not it is practicable to control the Stoneys outside the preserves, it is certainly practicable to prevent them getting into these preserves with guns.

SUMMARY

The following measures are necessary for the successful preservation of the big game of the four western provinces:

1. A modification of the Saskatchewan game preserve policy along the lines followed in Manitoba, namely, a delineation of game preserves within forest reserves as a result of special study of conditions, instead of a blanket creation of all forest reserves into game preserves.

2. A modification of the Alberta Game Act so as to permit the establishment of game preserves without the necessity of creating them Dominion parks.

3. The establishment in Alberta of the game preserve system recommended by the Dominion Forestry Branch and the extension of the same detailed study of the game situation to the region lying north of 53° N. latitude.

4. The establishment of a similar game preserve system in the more settled portions of British Columbia, and especially the strengthening of the inadequate force of game guardians on those already created.

5. The establishment of an adequate antelope park by the Dominion Government somewhere in southern Alberta or Saskatchewan on the lines of the buffalo park at Wainwright.*

6. The placing of a complete closed season on elk in Manitoba and Saskatchewan, and the reduction of the bag limit in Alberta from two sheep and two goats to one of each.

7. Coöperation of all forces interested in an effort to compel the Stoneys to observe the game laws of the province of Alberta.

*Steps have been taken towards this end. See page 130.

Game Preservation in Dominion Parks

BY

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Dominion Parks Branch, Dept. of the Interior

THE Dominion parks in Canada, which are maintained as wild-life sanctuaries, include an area of 7,927 square miles—upwards of 5,000,000 acres—nearly equal to one-half the total area of Switzerland, almost as large as Belgium and nearly one thousand square miles greater than the area of Wales. Jasper park alone, which includes 4,400 square miles, is larger than Montenegro and almost twice the size of Prince Edward Island. Within this great area no trap may be set, no gun may be fired; within these boundaries all wild animals live as free from danger as they did before the advent of man. The fenced enclosures, Buffalo and Elk Island parks, respectively, situated at Wainwright and at Lamont, Alta., comprise 176 square miles.

Buffalo and Elk Island Parks

Buffalo park was created to contain the Government herd of buffalo, secured in 1907 and 1909, from Michel Don Pablo, of Montana. In six years, this herd—which at the time of purchase was the largest herd on this continent—has increased from 709 to over 2,000 head. Elk Island park, a small reservation, 16 square miles in extent, contains 50 elk, for the protection of which it was originally established, but it now contains, in addition, about 100 buffalo, 40 moose and 80 mule deer. In these two parks protection consists chiefly in vigilant effort to protect the animals from disease and enemies, and to maintain the type at a high standard. The danger from prairie fires is also one which has to be constantly guarded against. Both parks are protected by double strips of ploughed guard, one inside and one outside the park fence, which are ploughed once each season or, if the season is very dry, twice. As the perimeter of Buffalo park is about 76 miles, its fire guards necessitate several hundred miles of ploughing.

Guarding against Disease

Those charged with the care of the animals have to be continually on the alert to avoid the possibility of an outbreak of disease. When the epidemic of foot-and-mouth disease broke out about a

year ago in Chicago, the Chief of the Animal Division immediately reported that the Canadian herds were liable to contract this disease, since the infection can be carried very readily by human beings. As a consequence, both parks were immediately closed to visitors and remained closed until all danger of infection was past. In 1912, when the fatal disease known as hæmorrhagic septicæmia broke out among the buffalo in the United States Yellowstone park, steps were immediately taken to protect the Canadian herd. The officials in charge of the herds were fully instructed respecting necessary preventive measures and the steps to be taken if signs of the disease appeared. As a result, there has been no serious illness of any kind among the buffalo.

Parks as Sanctuaries for Small Game It is an interesting fact that, while these two parks were set aside primarily for the protection of buffalo, moose and elk, they are becoming sanctuaries for all kinds of bird life and for various small animals. The superintendents report that wild life quickly recognized that within these enclosures it was safe, and large numbers resort there to breed. Feathered game is especially plentiful and, on the shores of the lakes that supply fresh water for the buffalo, thousands of wild ducks and even geese are making their homes. Last year the Superintendent of Buffalo park, in his annual report, said: "A great many true sportsmen have already recognized this valuable protection to the feathered game and the overflow this year has afforded them an ample supply for their guns." This bears out the assertion of Dr. Hornaday that all that is necessary is to create the reserve and protect it, that the birds will discover its existence in a very short time and will resort there in numbers to breed.

System of Protection In the great open parks of the Rockies, the system of protection followed is necessarily different, but it is meeting with similar success. The main feature of the policy adopted there is a system of interlacing trails extending from the park headquarters to the outlying boundaries, with game wardens' cabins placed at strategic points and linked up by telephone. Each warden patrols a certain number of trails, covering them every few days, and passing the nights in the comfortable little cabins which also serve to store sets of fire-fighting tools.

The Parks Regulations require that all guns and firearms brought within the boundaries must be sealed by a Government officer and all unsealed firearms are liable to confiscation. In addition, all parties travelling through the park are compelled to register at the office of the superintendent, and to declare their intended routes of travel. This



Big-horn Sheep in Rocky Mountains Park, close to Banff



Group of Big-horn Sheep, near Banff, Alta.

makes it possible to notify the game wardens, who patrol the trails in question, that such parties will be travelling in that direction at a particular time. The wardens are then on the alert and are enabled to follow them up, visit their camps and search for evidence of infractions of the law. It is very difficult for an offender to escape detection by the trained game warden. Recently, a number of hunters left Banff, in Rocky Mountains park, to hunt big game on the British Columbia side of the mountains. The warden in charge of the trail along which they travelled inspected their vacated camps two days after they had left the park and found they had cached two goat heads, evidently intending to pick them up on their return. The warden immediately followed them; later, they were brought to Banff, tried before the resident magistrate, convicted and fined. The maximum penalty for killing game in the parks provides for the confiscation of the entire outfit, pack-horses, ponies, guns and camp equipment and, in a case recently tried in Banff, when this penalty was enforced, the property confiscated amounted to over \$1,000. Convictions such as these have convinced old-time hunters and residents of the park that the Department intends to enforce the Parks Regulations without respect of persons.

**Increase in
Numbers of
Animals**

The results of this protective policy are seen on every hand. Five years ago, the big-horn sheep and the Rocky Mountain goat, which are approaching extermination in the United States, had almost disappeared from the Rocky Mountains park; now, they are to be found within a mile of Banff itself. You can hardly travel along the automobile road from Banff to Castle, without running into a flock of 30 or more. There are several herds of goats up the Spray river, about 10 miles from Banff and, from the Canadian Pacific Railway hotel there, with the aid of field glasses, goats can frequently be seen on the slopes of mount Rundle, about a mile away.

Deer, which a few years ago were seldom seen by the visitor to the parks, are now to be found everywhere. They roam the streets of Banff, nose around the back doors, and sometimes eat from the hands of the residents. The same increase in numbers is noticeable in all other forms of wild life. The black bear is frequently seen on the outskirts of Banff, and the grizzly is occasionally reported; red fox, wolverine, marten, lynx, mink, grouse and partridge are seen in abundance. Dr. Hornaday says it took the wild animals in Yellowstone park about five years to ascertain that it was safe to trust themselves within rifle-shot of man, but, in Rocky Mountains park, they appear to have been more intelligent, for they found out in less than three.

Those in charge of the parks have been able to realize the truth of Dr. Hornaday's assertion that: "There is not a single wild mammal or bird species now living that can not or does not quickly recognize protection, and take advantage of it."

The daily diaries kept by the game wardens furnish probably the best sources of evidence in this regard. From the Rocky Mountains park, one warden reports "Numbers of deer in Banff town tame enough to feed at house door," while others mention seeing quantities of wild fowl, especially partridges, as well as numerous sheep and deer, 90 sheep having been seen in one flock. From Jasper park, it is reported that sheep are becoming so tame as to be in danger of being caught by trains, that partridges are very plentiful and beavers and swans increasing. A warden in Waterton Lakes park states that he saw in one day 33 deer, of which 11 were big black-tail deer, while another speaks of seeing sheep in bands of 15 to 20.

**Waterton
Lakes Park**

Waterton Lakes park, increased in area at the same time as Jasper park in June, 1914, from 13½ square miles to 423 square miles, is in the heart of one of the finest game districts in the Rockies and abounds with grouse, partridges, pheasants, ptarmigan, grey geese, ducks and prairie chickens. Black bears, grizzlies, mountain goats and sheep are numerous.

Before this park was increased in area, a two-mile strip of unprotected territory lay between it and the United States Glacier park on the south. With the United States sanctuary on the one hand and Waterton Lakes park on the other, one can realize what a hunters' paradise this strip was prior to that date. United States authorities, the Campfire Club of America and others, interested in the protection of wild life, had pointed out the dangerous nature of such a condition of affairs for years. As our park has been extended to the boundary, there now exists a great international sanctuary, the first of its kind, of over 1,800 square miles in area, in which the wild life of that portion of the Rockies enjoys absolute protection.

**Duties of
Wardens**

The Parks Branch maintains a staff of permanent game wardens but, whenever circumstances demand it, this is increased by the appointment of temporary wardens. In addition to their other duties, the game wardens are charged with the destruction of noxious or predatory animals and are allowed to carry a gun for this purpose. Formerly, the game in Rocky Mountains park suffered severely from the attacks of coyotes, which existed there in great numbers, but, owing to the energetic measures adopted

by the wardens, this source of danger is being kept down. The keeping of dogs in the townsites is not encouraged. A heavy license is required and no dogs are allowed to run at large. At present the Parks Branch proposes to inaugurate a vigorous policy with regard to cats. Anybody who heard Mr. Saunders' address* will realize the importance of this proposed measure. Dr. Hornaday has stated that cats destroy many millions of very valuable birds each year. In the state of Massachusetts alone it has been calculated that they are responsible for the death of at least 700,000 birds.

The Dominion Forest Reserves and Parks Act, passed in 1911, reduced the parks in area and, between the old and new boundaries of Rocky Mountains park, left a district of about 3,000 square miles. To continue the protection afforded prior to the Act, the Minister ordered that, during the open season in Alberta, the park wardens patrol this area also and protect the game from the bands of Indians and others who make it their custom to go into the mountains at this season of the year.

Preservation of the Prong-horned Antelope The most important new work, which has been undertaken by the Branch during the past two years, is, perhaps, the measures taken to preserve the prong-horned antelope. This beautiful and curious little animal, which is as graceful as the deer and can outstrip the swiftest greyhound, is now in imminent danger of extinction. In former times it was found in great numbers over most of the western half of this continent, its range extending from Manitoba to the foothills and from Mexico to the far north. Mr. Thompson-Seton estimates that, at the time of the first settlements in the west, the habitat of this animal covered nearly 2,000,000 square miles and he places the number of antelope at that time at about 10 to every square mile. That means that, half a century ago, there were some 20,000,000 antelopes on the continent. He estimated that, in 1900, there were probably less than 100,000 living, at least half of which were in Mexico. Since that date, records from the United States show the numbers have decreased to half what they were then, so it is evident that, within a comparatively short time, it will be exterminated. In 1912, Hornaday estimated they might last 20 years, but recent reports make it doubtful if, in so far as Canada is concerned, even this can be looked for. The chief difficulty encountered in trying to afford protection to this little animal lies in its own nature. It is delicate, capricious and easily upset. It is so sensitive to shock that, as Hornaday says, it dies literally "at the drop of a hat."

*See page 155.

During the past few years, several attempts were made to breed antelope in Buffalo park, but met with practically no success. Although given every attention and the food to which they were supposed to be accustomed, all died. The Superintendent reported that he considered this was due to the fact that the antelope never fully recovered from the shock of capture and, after repeated failures, he recommended that the attempts should be discontinued. It was then decided to attempt to preserve this animal by creating carefully selected reserves at a considerable distance from each other, and containing within their respective areas all the necessary plant growth required by antelope, together with good winter and summer pastures, thus affording both shelter and feed the year round. In the selection of these reserves the services of Mr. Thompson-Seton, the eminent naturalist, were secured by the Department. With Mr. Maxwell Graham, Chief of the Animal Division of the Parks Branch, he made a personal inspection of a number of possible areas throughout the West. Finally, three areas were set aside as reserves for antelope, one in Alberta and two in Saskatchewan, and it is hoped that, by devoting special study to the needs of the animals and their possible diseases, success may be assured.

Early last spring, the Northwest Mounted Police notified the Branch that there was a herd of antelope near Foremost, Alberta. Mr. Maxwell Graham was successful in enclosing with a fence about 12 miles in length, a herd discovered near the junction of two deep coulees in Southern Alberta. The land was mostly unsettled and all of it unfitted for agriculture. Broken by numerous ravines, containing all the vegetation needed by the antelope, such as sage brush, cactus, and antelope grass, as well as water of an alkaline nature, no better selection for an all-year-round reserve could be asked for.

When the discovery of the herd was made, the time of year—early spring—forbade any idea of attempting to drive and corral the antelope. The Dept. of the Interior decided to construct around the eight sections where the antelope were situated, an antelope-proof fence. With considerable difficulty, owing to the nature of the ground, the sections have been efficiently fenced and there are now 42 antelope within the enclosure.

Further, by means of wing-trap devices on two sides of the reserve, it is expected that other antelope now in the near vicinity will also be secured. These devices have been approved by Mr. Ernest Thompson-Seton and others in a position to judge of their value.

To perpetuate the species, we have thus a nucleus herd, in an enclosed reserve eminently suited to it, and have, therefore, great

hopes of a success as complete as that obtained in the preservation of the buffalo.

**Creation
of Bird
Sanctuaries**

Action has also been taken by the Branch in the creation of more bird sanctuaries throughout Canada. The United States now boasts some 65 bird sanctuaries, but Canada, which is the breeding place for hundreds of varieties of bird life, possesses only one. This is a reserve set aside in 1887 for the protection of wild fowl in the neighbourhood of Long lake, Sask. The islands and shores of this lake have long been favourite breeding grounds for many varieties of wild fowl and it is interesting to observe that, so long ago as 1887, the Government recognized the importance of protecting bird life.

A large number of areas were recently visited by a parks officer who has reported tentatively as to their suitability for bird sanctuaries and, pending further investigation, 23 areas, 12 in Saskatchewan and 11 in Alberta, have been reserved by the Department. It is expected that the majority of these and others which may be selected, will be declared bird sanctuaries and will be properly protected and patrolled.

**Reservation
on Point
Pelee**

Respecting the proposed bird reservation on point Pelee, this spot—the most southerly point in Ontario—has long been a favourite bird resort. It is in the direct line of migration and thousands of birds of numerous species visit it in their migratory flights. In addition, owing to its southerly situation, many species, unknown elsewhere in Canada, have been found there. This point of land is already the property of the Crown, under the administration of the Ordnance Lands Branch of the Dept. of the Interior. Unfortunately, much of the coast line has been disposed of to summer residents and others, but enough still remains to establish an effective bird sanctuary. The Minister has already approved the principle of the Parks Branch taking over this area and administering it as a Dominion park. To bring it under our protective regulations, all that remains, therefore, is the transfer of administration from the one Branch to the other and an Order in Council proclaiming it a Dominion park.

**Convention
to Protect
Migratory
Birds**

The Parks Branch has been asked to report, as was also this Commission and the Dept. of Agriculture, on the proposed convention between Great Britain and the United States respecting the protection of migratory birds. All the provinces of the Dominion, whose coöperation is essential to the success of such a convention, were asked for their opinion regarding the proposed treaty. Favourable replies as to the principle were

received from all the provinces, exception being taken to a few details by two of them. An Order in Council* was thereupon passed advising the Governor General to inform the United States Government that the Canadian Government is favourably disposed towards the conclusion of the proposed treaty. The ratification of this treaty will undoubtedly mean a very long step towards an adequate bird protective scheme embracing the whole Dominion.

**Wild Bison
or Wood
Buffalo**

There are two other questions which have already received the sympathetic consideration of this Commission. The first of these is the preservation of the wild bison. This animal, commonly known as the wood buffalo, represents the last of the wild herds of this continent. It inhabits the district lying between the Peace and the Slave rivers and westward in the direction of the Caribou mountains. Its numbers are variously estimated at from 300 to 500 head, but all authorities agree that it is apparently diminishing in numbers. This animal probably represents the finest species of bison now existent. It is larger, darker and hardier than the plains buffalo, which is the species forming the Government herd at Wainwright. Outside of the interest which it excites, the Parks Branch, which does not at present exercise any administration over the herd, is anxious to secure its protection also because it appears to offer an unequalled source from which the Government herd may be replenished. One of the important questions continually confronting those in charge of the Canadian buffalo is the maintenance of the herd at a high standard.

Although the danger is far from imminent, there is a tendency wherever wild animals are restricted in range and where inbreeding necessarily occurs, for the type to deteriorate. In the case of the buffalo at Wainwright, the result of this may become manifest in, say, 15 years when, at the present rate of increase, the herd may number 20,000 individuals. If, however, there is from time to time an infusion of new and vigorous blood into the herd, there is little danger of deterioration. Unfortunately, there are, however, very few sources available from which pure, vigorous, unrelated stock can be secured and there is apparently no source so desirable as the wood bison of the north.

At present the wood bison ranges in scattered bands over an immense and remote territory, preyed upon by wolves, white trappers and possibly Indians, and no proper protection is afforded it, such as it

*See page 141.

would receive enclosed in a natural range and brought under a preservatory administration. It is believed that adequate protection can only be afforded by centralizing the herds and driving them down into some locality where they can be confined within a restricted area, an area where proper patrols can be established, where game regulations may be enforced, and where energetic steps may be taken to lessen the menace from wolves. The selection of a suitable area for a reserve of this nature is now engaging the attention of the Branch.

**Woodland
Caribou**

I may add that the creation of a sanctuary for the wild bison will provide an opportunity to protect another native species, which is also in danger, namely, the woodland caribou. The range of the wood bison coincides in part with that of the woodland caribou and the creation of a reserve in this district would serve the double purpose of affording much needed protection to both.

**Sanctuaries
for Fur-
Bearers**

In addition, this whole territory abounds with fur-bearing animals. In the opinion of Thompson-Seton it is a better fur country than Algonquin park and such a reserve would become a sanctuary which would add considerably to the conservation of our natural resources by the production of valuable fur-breeding animals, which should have sanctuaries provided similar to those for other beneficent animals and birds.

It is judged impracticable to confine fur-bearing animals in small enclosures for many years, unless the quality of the stock is maintained by infusion of new blood periodically, which, in the case of most fur-bearers, will necessitate open ranges or sanctuaries from which to obtain the new wild stock. The Parks Branch has recommended, therefore, the establishment of large sanctuaries for fur-bearing animals in the Northwest Territories and in Northern Ontario and Quebec. The overflow from such preserves would provide hunters and trappers with an adequate and never-ending supply of pelts and the fur industry of Canada would, again, become one of its chief sources of wealth.

**Bounty on
Wolves**

Vigorous steps have been taken recently by the Parks Branch to protect the game in the Northwest Territories by destroying the principal destroyer of the beneficent wild life—the wolf. The Parks Branch, which administers the Dominion wolf bounty in the Northwest Territories, recommended the extension of the comparatively small area within which a Dominion bounty of \$20 has for some years been paid. This bounty is now paid

on wolves which are killed anywhere within the Northwest Territories, an Order in Council to this effect being passed last August.

Recommendations for Preserving Fauna The protection of musk-oxen is one which has already been brought to your attention by Mr. Stefansson and your Chairman has already made valuable recommendations respecting their conservation. Below are the recommendations contained in a report prepared by Mr. Maxwell Graham for the Society for the Preservation of the Fauna of the Empire; the Chairman of the Society has concurred in them and has expressed the hope that action will shortly be taken:

(1) "A close season for a number of years, during which no one but Indians, explorers and travellers may kill musk-oxen and then for food only. If during this period any musk-ox skins are offered for sale the same should be confiscated and the person so offering the skins should be severely dealt with.

(2) "When an open season is allowed for musk-oxen, hunting these animals with dogs should be absolutely prohibited, for the reason that when dogs are used the musk-oxen will, as with wolves, stand at bay. This habit of theirs is taken advantage of by skin hunters and others, these people shooting the animals down as they might cattle in a pen.

(3) "No skins should be sold or exported unless tagged by a government official, who would periodically inspect all musk-ox skins stored at Hudson's Bay or other trading posts, his duty being to confiscate all skins which were plainly not prime, and hence not taken when in season, and to see that all skins legally obtained were tagged with a numbered metal tag or label, bearing on it the year's date of such tagging.

(4) "The establishment at different selected locations within the proper range of the musk-ox, of absolute sanctuaries, wherein not only musk-oxen but caribou, as well as fur-bearers, might thrive and multiply."

The report also recommended:

"That customs officers at Herschel island examine all vessels and be empowered to confiscate any musk-ox skins illegally obtained from the natives, while such vessels are wintering in their proximity."

And a further extract states:

"In order to still further safeguard the interests of the natives and of the musk-oxen, I would advise that the government supply to the natives up-to-date wolf traps, which might later be paid for either in wolf pelts or money obtained for the same."



Reindeer at Athabaska Landing, in Transit to Fort Smith



Jamieson Lake, Buffalo Park

**Introduction
of Reindeer**

The question of the introduction of reindeer into our far north as a means of opening up the mineral resources of the Yukon territory and other portions of the Canadian hinterland, is also one which has been referred to the Parks Branch for report, and they have recommended that, when future attempts are made to introduce this valuable animal into our northern country, the Labrador herd be not looked to as a possible source of supply. Apparently, these reindeer are too small and too light for use as a means of transportation. It is stated that they are smaller than our barren-land caribou, which are about one third smaller than our grey woodland caribou. Dr. Grenfell has stated that his reindeer, which came from Norway, are too small. He admits that good dog-teams can out-travel his deer and says he hopes to get new stock to improve his herd.

The United States herd in Alaska, however, appears to offer a type admirably suited to our requirements. Originally, this herd was made up of 200 of the finest and largest of the Tunguse variety of Siberian reindeer and about 1,000 large and hardy Russian animals. The type which has been developed is, in consequence, a larger and stronger one and, therefore, one much better adapted for transportation purposes than the Labrador herd. In addition, the Alaska reindeer are now acclimatized and, if transplanted to Canada, would probably meet no new or adverse conditions. Before the experiment is made, however, it will be necessary to ascertain whether reindeer moss is procurable in the districts in which it is proposed to establish herds and, also, whether it will be possible, during the fly season, to transfer the reindeer to mountainous regions where they will be free from insect pests—their deadly enemies.

As the Alaskan authorities have gained, by costly experiments, much experience in the management of their herds, the Parks Branch recommended:

(1) That it should be ascertained whether the United States Government would be willing to dispose of a number of its reindeer in Alaska to the Canadian authorities.

(2) That, if the United States Government were willing, a special officer be sent from Canada to Alaska to thoroughly investigate conditions on the ground.

(3) That no action be taken as to the definite location of the herd or cognate matters until all possible information with respect to the Alaskan experiments has been secured.

Later, if thought desirable, steps might be taken to secure a herd from Siberia, as the Tunguse variety is apparently so superior to all other reindeer, but it would seem that the first step should be along the lines followed in Alaska.

**Value of
Wild Life**

The tourist and recreational values of game are other considerations in which the Parks Branch is particularly interested. As to the first, tourists delight in observing the wild animals running free in the Parks and this attraction is worth almost as much to the country as is the scenery; in fact, the wild life in our national parks has to-day become a part of the scenery, so numerous and tame have the wild creatures become. As to the second, the first necessity in Canada, to-day, is the conservation of human efficiency. More than ever after this war we must look forward to building up and maintaining a virile, hardy and intrepid race, and to do this we must not get too far away from primitive conditions of life. The instinct of the hunter is one of the oldest and deepest of the race; there is, for the ordinary man, no stronger lure to the out-of-doors than this. In Canada, it will be possible, for a time, to satisfy this instinct without great trouble. But the time will inevitably come, as it has already come to a great part of the United States, when there will be no game for the poor man to shoot. In that country, sportsmen, despairing of assistance from the Federal Government in the protection of game, are planning for a system of private preserves where wealthy individuals will be able to enjoy hunting. This is but a return to the methods of the older countries where the game is reserved for the enjoyment of the few. If large areas of the barren rocky tracts in northern Ontario and Quebec and in the Northwest were set apart and placed under the same sort of protection as is afforded in a private preserve, it would be possible, not only to secure a large revenue by the imposition of a small license fee and from the disposal of pelts from fur-bearing animals, but provision would also be made for meeting a natural recreational demand, a demand which should be provided because it tends to make happier and healthier and, therefore, better citizens of our people.

PROF. PRINCE: What is the experience in regard to the preservation of bears? I have always maintained that the black bear of Canada is not destructive. On investigating a case of alleged destruction of sheep by a bear in Gaspé, it was found that the culprit was a man, who had spread the fragments around to hide his crime, so that the bears were looked on as the offenders.

MR. WILLIAMSON: So far as the Dominion parks are concerned we have not had very much trouble with bears. Of course, we do not have many of them but last summer the Alpine Club at Banff was visited by them. They pulled down the water pipes and got into the cellar and ate up a quantity of provisions. The Club complained and we sent up wardens who shot the bears. I believe they do destroy sheep and other stock, but we have very few stock in the parks and are not troubled with black bears or grizzlies. If they become too mischievous, we shoot them.

DR. ROBERTSON: They seem to have some boy-like Hallowe'en proclivities but that is not a shootable offence.

PROF. PRINCE: In the case of the Alpine Club, I think it is to the credit of the bears that they found the things to eat. The bears are not to be blamed, but rather the men. I regard the bear as the clown of the woods, as Hornaday defines him. It is ungracious on our part to unnecessarily destroy him, but, at the same time, we should prevent him destroying property.

I never saw more magnificent skins than the grizzlies, etc., that were brought into Edmonton twenty years ago from the present Jasper park. It is a pleasure to find such efficient protection of game. In past years we have heard a great deal about the successful preservation of game in the United States and I have often felt a little critical about some of the published reports. I visited Yellowstone park fifteen years ago, when it was alleged in the *London Times* that the buffalo were being preserved there and that the example of the Yellowstone Park authorities should be followed elsewhere. At that very time, wholesale slaughter was going on and two fresh heads were offered me at the town of Livingston on the outskirts of the park. We can trust our Canadian officials and the fact that the herd of buffalo has increased shows that the work is being well done. The increase is marvellous and reflects great credit on the Department having charge of this work.

The reference to the prong-horn antelope touches a soft spot in my heart because I have seen them, in the course of years, diminishing very rapidly. It is a rare thing now to see a prong-horn on the prairie at all, whereas a few years ago this beautiful, graceful animal was often seen. I hope that every measure is being taken to preserve it. It is not only a beautiful game animal but is, in many respects, unique.

When I first went to Manitoba there were tracks, just like the old

buffalo trails, beaten by the great herds of elk, and, now, there remains hardly a single head. In Vancouver island, also, a herd used to roam near Cameron lake between Nanaimo and Alberni, and I fear every one of these has been shot in the last eight or ten years. If, in these sanctuaries, the elk is being successfully conserved, that is a creditable achievement.

The Indians, of course, are a difficulty. But for the little protection afforded, the wood buffalo would have been exterminated ere this. It is a magnificent animal, much finer than even the prairie buffalo. I think the Victoria museum has a fine specimen.

Are not the caribou up the Skeena as large as the Tunguse? I have one or two heads from the Skeena which must have been magnificent animals.

MR. WILLIAMSON: The black mountain caribou are not as big as the Siberian caribou. I do not think we have in this country any animal to equal the Siberian Tunguse.

DR. HEWITT: Sir Clifford Sifton remarked that one of the objects of this Commission is to bring together various divergent elements working along similar lines. For instance, it seems to me that this Commission might assist in promoting the coöperation of the Forestry Branch and of the Dominion Parks Branch in game preservation. There would be much more unity of purpose, and therefore of success, if the work were brought more together under one head and if a Branch, which is essentially engaged in forestry preservation, were willing to delegate the duties of game preservation to a Branch which has an efficient staff engaged for that purpose. I was very pleased to hear from Mr. Williamson of the formation of bird sanctuaries and I have, therefore, to correct the mistaken views which I derived from other sources. But there is some ground for my making such a mistake, as the Parks authorities keep their activities so dark. Those of us who are working hard to obtain bird sanctuaries should certainly be the first people to hear that such refuges have been set apart. Under whose authority will these bird sanctuaries be administered and in what way?

MR. WILLIAMSON: The bird sanctuaries which we have established are simply reserves. As the Dept. of the Interior controls Dominion lands in the West, it can reserve any areas it wishes, and we take advantage of this to have certain areas reserved. Many of them may be unsuitable for bird sanctuaries, as in the case of lakes which dry up during summer.

DR. HEWITT: Who inspected them?

MR. WILLIAMSON: Col. Maynard Rogers, the Superintendent of Jasper park, inspected quite a number in the summer of 1914. He recommended their reservation pending an authoritative inspection by some one conversant with bird conditions.

DR. HEWITT: You would not regard them as established sanctuaries?

MR. WILLIAMSON: No, simply reserves. They are reserved from all entry.

DR. HEWITT: There is no warden?

MR. WILLIAMSON: Not yet. In fact there has not been a warden on the one reserved in 1887, at Long lake, Saskatchewan, although the birds there are safe from any molestation.

MR. FEILDING: As an officer of the Ontario Government I must say I have been extremely interested to hear this address of Mr. Williamson's on the game parks of this country.

Reverting to the question of bears that Prof. Prince has brought up, I may say that I have recently finished a tour of fishing inspection in northern Haliburton. I never saw a place more infested with bears, due, I think, very largely to the fact that there are enormous patches of berries, principally raspberries, on which the bears live. Settlers, fire rangers and others who travel in that country, state that the bears have never been known to do any harm to sheep or cattle. There is a large section of that country which might be easily set aside for the protection of bears, because it has no agricultural value and is apparently of very little value. I have never seen elsewhere in Canada—either here or in the far West—such numbers of moose and deer as there are there. They seem to be increasing rapidly and, moreover, it appeared to me to be a district very easy to protect. There are only two ways into it, both of them very difficult, and it does not seem to be in any way attractive for the settler. It is surprising to find such scenery in a province like Ontario, which is generally looked upon as a fairly flat country. We are doing our best to protect the speckled-trout streams there, which we have discovered are fairly good and need protection. I hope, also, that we shall be able to protect the mammals of that district.

DR. ROBERTSON: Would it not be a better argument to obtain both Government monetary and public support for the parks and the preser-

vation of game to cite the reasons resting on hunting with a camera rather than hunting with a gun? The argument about the hunting appears to me as too ancient to be of use in coming years. Ottawa is a great headquarters for men who hunt. There is not one person in a thousand in Ottawa who has any chance to hunt with a gun and, of that number, at least four out of five are not quite safe companions with a gun. I gathered from Mr. Williamson's paper that no such argument was needed for the maintenance of our buffalo parks; no one wants to go hunting with a gun for buffalo any more. No such arguments can be used for the antelope. If we encourage hunting with a camera and discourage hunting with a gun, we shall not be any less courageous or resourceful. Canada ought to be a bird sanctuary from ocean to ocean, so far as guns are concerned. I know no feathered creature that any man is entitled to shoot with a gun in these days.

DR. HEWITT: It will be a sanctuary so far as insectivorous birds are concerned.

DR. ROBERTSON: That is why I think if we put it on this humane and not less enterprising plane to the public and the Government we should perhaps achieve more. I put Mr. Williamson on his mettle; would he rather hunt with a gun or with a camera?

Conservation of Birds and Mammals in Canada

BY

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MR. CHAIRMAN and Gentlemen: I have a number of matters of interest which I would like to bring to the attention of the Commission in connection with conservation of birds and mammals in Canada.

PROTECTION OF BIRDS

Treaty with U. S. re Migratory Birds First of all, I wish to refer to the question of the protection of birds. This Commission has been devoting its attention to the conservation of our game and migratory birds and, some time ago, invited Mr. Haskell here to discuss the question of an International Convention with the United States to cover the protection of the migratory birds. The United States Government passed a Federal Act providing for the protection of migratory birds, both game and insectivorous, and, as many of those birds had their breeding places in Canada, it was very desirable, and indeed necessary, in order to carry out the objects they had in view, to obtain the coöperation of Canada. Consequently, they submitted this matter to the Canadian Government and it has been under the consideration of the Dept. of Agriculture, the Commission of Conservation and the Dept. of the Interior. I am very glad to be able to read to you this afternoon the Order in Council which the Government passed this summer, dealing with this matter. I think, if I read the whole Order in Council, it will explain the matter better than if I simply referred briefly to the essential portion of it. The Order in Council passed on 31st May, 1915, is as follows:

“The Committee of the Privy Council have had before them a report from the Secretary of State for External Affairs, dated 6th May, 1915, representing that he has had under consideration a despatch to Your Royal Highness from His Majesty’s Ambassador at Washington, (No. 36), dated 24th February, 1914, enclosing a draft of a Convention between Great Britain and the United States for the protection of migratory birds in the United States and Canada, put forward by the United States Government.

“The Minister observes that it is proposed to accomplish the purpose of the Convention by the establishment of close seasons common to the two countries. The hunting of game birds would be permitted for a period of three and a half months in each year, with the exception of certain species, for which special close periods of ten and of five years, respectively, are provided. The hunting of other birds, to which the Treaty applies, would be entirely prohibited, except for scientific or breeding purposes.

“The Minister submits that, as the matters dealt with in the proposed Convention are more immediately of provincial concern, he caused the views of the several provincial Governments to be invited thereon.

“Replies have been received from all the provinces, showing that they unanimously approve the principle of the proposed Convention, the majority of them, indeed, having already enacted legislation for the purposes aimed at. British Columbia, however, is unwilling to accept the proposed close season for ducks, geese and other game birds as provided in Article 2, or the provisions of Articles 3 and 4 in so far as they would restrict the killing of cranes, swans, curlews and wood ducks. It is willing that continuous protection should be extended to insectivorous and other migratory non-game birds, and that the shooting of ducks, such as mallards, widgeon, pintails, teal and all other sporting ducks, but not of geese of any kind, should be restricted to the season between September 1st and February 1st. Nova Scotia desires that the open season for plover and other shore birds should be extended so as to include the latter half of August.

“The Minister states that the subject has further been under the consideration of the Departments of the Interior and of Agriculture and also of the Commission of Conservation, and that there is a general concurrence of opinion that the protection of these birds, which is important, especially in the case of insectivorous birds, on economic grounds, and harmonizes with a widely growing sentiment of the desirability of conserving the creations of Nature, should be ensured, and to this end that a Convention for the purpose should be concluded with the United States.

“It is not believed that the objections raised by British Columbia and Nova Scotia should present an insuperable difficulty. A fuller explanation of the considerations which influenced the framing of the provisions to which exception is taken might suffice to remove them, or further discussion might lead to a compromise.

“The Committee concur in the foregoing and, on the recommendation of the Secretary of State for External Affairs, advise that Your Royal Highness may be pleased to request His Majesty's Ambassador at Washington to inform the United States Government that the Canadian Government is favourably disposed towards the conclusion of the proposed Treaty and to communicate for their consideration the views herein set forth.”

I think that this is one of the most satisfactory achievements, to the consummation of which this Commission has given its active sup-

port and assistance, and I cannot conceive anything now that will prove an obstacle to the conclusion of an International Treaty between the United States and Canada to provide for the protection of migratory birds.

United States Regulations It might be well if I referred briefly to the provisions of United States regulations for the protection of migratory birds under their Federal Act. In order to carry out their regulations, they have divided the country into a breeding zone and a wintering zone; and all regulations in regard to open seasons are framed in accordance with these two zones. Their regulations also take into account the migratory routes along the Missouri, the Mississippi and the Ohio rivers, along which the protection of birds travelling to their nesting places has been declared; no shooting of birds along these routes is allowed between January 1 and October 31. The object of the regulations, of course, is to reduce the open seasons, which have been very diverse in different states, to within reasonable limits, to give the sportsmen their opportunities at the best season of the year, but to give the birds the benefit of any doubt, and I think the regulations succeed pretty well. The legislation is designed to prohibit the shooting of migratory birds in spring and between sunset and sunrise, to make the seasons approximately equal in length in different parts of the country and to limit the seasons during which the birds may be shot to a maximum of from two months to three and a half months. The various classes of birds are defined and the regulations are framed according to these classes and according to the season. A close season for five years has been declared on certain migratory game birds, particularly shore birds. All this, of course, refers chiefly to the game birds. In regard to insectivorous birds, the protection of which is ensured absolutely—that is, they are not allowed to be shot at any time—they include the following: bobolinks, catbirds, chickadees, cuckoos, flycatchers, grosbeaks, humming-birds, kinglets, martins, meadow larks, night-hawks or bull-bats, nuthatches, orioles, robins, shrikes, swallows, swifts, tanagers, titmice, thrushes, vireos, warblers, waxwings, whippoorwills, wood-peckers, wrens, and all other perching birds which feed entirely or chiefly on insects. Of course, it is to be expected that, when this Treaty is concluded, Dominion regulations along similar lines will be required. These will be very valuable because they will strengthen the hands of the provinces, all of which have regulations of some kind or other dealing with the protection of birds, but all of which do not appear to enforce those regulations to the fullest possible extent.

Slaughter of Birds for Plumage An idea, indicating the necessity of this further protection, occurred to me only the other day. As you know, the importation into Canada of plumage, other than ostrich feathers and those of domestic fowls, that is, the plumage which ladies are accustomed to use in their hats, particularly the ospreys or aigrettes, has been prohibited since last January. Unless we take stringent action, this embargo on foreign plumage will undoubtedly lead in this country to the killing of valuable native birds. Only the other day, in an electric car, I happened to look down at the hat of a lady in front of me and imagine my disgust to see the skins of two chickadees; one of our most beautiful, most useful and most widely distributed birds, 70 per cent of whose food consists of injurious insects; those beautiful and useful *native* birds had been sacrificed simply to satisfy the thoughtless and wanton craze of fashion. Therefore, it will be necessary for us to take further steps to assist the provinces in carrying out their legislation.

Bird Sanctuaries The Commission has also been dealing with the subject of bird sanctuaries. At the last meeting the question was brought up and very forcibly set forth by Dr. Clarke,* and something has been done since then in the matter, particularly on the St. Lawrence and in the Gulf. We hope that this campaign will proceed further and that the Commission will not stop until they have secured satisfactory and concrete results from their efforts. When we think that in this country we have hardly a single good bird sanctuary or reservation, and when we remember that our neighbours to the south of the line have sixty-five sanctuaries entirely devoted to the protection of birds, I think it is time we should take effective action, if we are going to wear the halo of righteousness that we are so fond of bestowing on ourselves. I will only say this, that if there should be any tendency on the part of any of the authorities to devote less attention at the present time to such subjects as this or any other conservation question, on account of the war, we must do all we can to prevent such neglect. The conservation of birds, especially insectivorous birds, is more pressing than ever before. If we are going in for increased production—and that is one of the slogans of the various Departments of Agriculture—we cannot accomplish that purpose to the best advantage without increased protection of birds, because, as everyone knows, they are one of the most important factors in controlling insect pests and therefore in securing increased production. In the matter of education, very satisfactory

*See *Sixth Annual Report*, Commission of Conservation, p. 108.

work has been carried on through the efforts of the Departments of Agriculture and of Mines, through Mr. Taverner in the Geological Survey, and also by the recently formed Canadian Society for the Protection of Birds.

PROTECTION OF MAMMALS

Animals in Dominion Parks Turning now to the question of the protection of mammals, I will refer briefly to the present state of affairs. We can group our chief wild mammals into three groups, those which are under protection in Dominion or provincial parks, those which are under protection on the forest reserves and those, in the Northwest Territories, which are not so protected. The welfare of the animals in the Dominion parks is very well looked after; I think we ought to feel perfectly well satisfied that, under the present administration, game protection is receiving the attention it deserves. That, at least, has been my impression in visiting some of the more important parks. I was particularly impressed with the buffalo park at Wainwright, Alberta, one of the most interesting of our national parks. There we have a park of 160 square miles entirely devoted to the keeping of this herd of buffalo, which is practically all that is left of this formerly widely-spread and very typical North American mammal, and the conditions there are such as to indicate the fact that things are going well. The herd was purchased in 1907 from Michel Don Pablo, of Missoula, Mont., and then numbered about 750. It has now increased to about 2,000 and it is one of the most inspiring sights one can imagine to ride or drive out on this reserve and see the buffalo, as in the old days, grazing in herds here and there.

No Danger from In-breeding The question has been asked as to whether there might not be some danger of the animals in-breeding, that is, whether the breed might not become degenerate. I do not think that is likely to occur there. For one thing, the animals are under their normal climatic and environmental conditions. Everything is favourable in that respect. If you take animals out of their natural environment, and then interbreed them, you will get bad effects from in-breeding, but under normal conditions like those at Wainwright, we should not have any bad effects. We can safely assume that from experience in other cases. About 1865, a few red deer were introduced into the North island of New Zealand. One buck and two does were introduced; they have multiplied until now, I understand, there are over ten thousand head of deer in that island and they are doing wonderfully well. On Lambay, one of the islands

of the Irish sea, only about a square mile in extent, two or three fallow deer were introduced some years ago; they have increased and formed a herd there and, according to the owner of the island, you could not imagine a finer, stronger herd of animals, yet it has been entirely developed by in-breeding. Therefore, in the light of the knowledge of those cases, I do not think there is much to fear regarding the bison or buffalo decreasing in virility in our Wainwright park.

**Animals in
Forest
Reserves**

The Dominion and provincial parks are known, of course, to most of you and I will not deal with the others. On the forest reserves, the game is protected in some cases by the Dominion Government. The Dept. of the Interior has forest reserves in the Prairie provinces. In Manitoba the Provincial Government has declared game refuges in the Riding Mountain, the Turtle Mountain and the Spruce Woods reserves. In Saskatchewan the Provincial Government has declared game reserves, or refuges as they call them, in the Beaver Hills, the Pines, Moose Mountain and Porcupine No. 2 forest reserves. The animals in these reserves, while they are not quite on the same footing as regards protection as those in the Dominion parks, are, nevertheless, protected as much as is possible under the circumstances. They are not protected as much as they should be, as I found out by actual investigation, but that is largely due to local difficulties and to the men who are put in charge.

**Protection
of Caribou**

Coming finally to the third class—the game in the Northwest Territories—this is regulated by the *North-west Game Act*, which is administered by the Dept. of the Interior, and I understand that this Act is now undergoing some very necessary revision. We need in that north country a much more vigorous policy than we have at present, especially a policy that will actually carry out the law as it is set forth in our Act. I will refer particularly to one case, namely, that of the caribou, which this Commission has had under consideration for some time. Stefansson, who is a very ardent advocate of the rights of the Eskimo, and who consequently became an equally ardent advocate of the necessity of better protection of the caribou in that northern country, has noted and called our attention to the serious conditions in the north in regard to caribou. The people have rather regarded the caribou as occurring in herds of millions and, when you begin to think of millions, you are liable to assume the impossibility of extermination. As a matter of fact, the caribou has been totally exterminated in some localities. When this question of the preservation and protection of the caribou



Big-horn Sheep at Vermilion Lakes, Alta.



Deer in Rocky Mountains Park, Alta.

was under our consideration, I had a letter from Dr. H. W. Henshaw, Chief of the Biological Survey of the United States Dept. of Agriculture, which is charged with the preservation of game in the National Reserves in the United States. I was discussing with him the general question of the preservation of the caribou in Alaska and northern Canada and, replying on the 21st July, 1914, to my request for his opinions on certain matters, he said in part:

“I consider it very important for the preservation of the caribou that the females should be permanently protected. It is a well-known fact that caribou are now extinct in considerable areas in North America where formerly they were common, and that their numbers are still steadily decreasing, while the area they inhabit is also becoming more and more restricted. With the advance of settlements in the north this process of extermination is certain to continue and even be hastened, and it appears to me that it would be most unwise not to protect the females at all times, since an open season for the females would simply add another factor to hasten the extinction of the species. Caribou are among the most easily exterminated of all our large game animals and the greatest care must be exercised to prevent their extinction in the not distant future.”

The Commission has been taking up this question of the protection of caribou and hopes to secure that protection along certain lines, chiefly by the absolute protection of females and by limiting the number of hides coming out of the country. I shall not speak further on the caribou beyond mentioning the necessity of its maintenance for the benefit of the people in that northern country. As you know, it furnishes the chief material for clothing for the Eskimo and the people in the north country and also, in certain seasons of the year, their chief means of subsistence. Therefore, to our northern people, whose presence is necessary in those northerly territories, apart from philanthropic reasons, the caribou is an essential animal and it seems to us that when a Government is willing to spend money on the importation of a foreign species of caribou, the reindeer, it is really worth while protecting our native reindeer, the caribou, which, while not domesticated in the same way as the ordinary species, is more suitable for a number of purposes.

**Proposed
Reserve for
Musk-oxen**

The musk-ox is another animal which is being exterminated in certain parts of the Arctic. This reduction has been described in Stefansson's reports and in reports from the Royal Northwest Mounted Police. It is sought very diligently by pelt hunters and so-called sportsmen who are fond of shooting it, because the musk-ox is an animal that neither fights

nor runs away, so it is not difficult to shoot it and get a good head and a robe. Of all mammals it is probably one of the most stupid in the way of not taking care of itself. No doubt its solitary life and the absence of enemies with firearms in previous years have led to that, but these characteristics lead to very speedy extermination and I have recommended, as one of the best means of preventing the total extermination of this animal, the declaration of at least a portion of Victoria island an absolute reserve for musk-ox and the prohibition of any killing of these animals there. If that were done, it would serve to ensure the food of the Eskimo who remain in that part of the country, and be a source of fur of increasing value, as from time to time it might spread out into other regions where its numbers were decreasing.

Moreover, protection is needed in the Northwest for the white fox which is there becoming gradually reduced in numbers. It is not provided for in the *Northwest Game Act* and it has been suggested by us that a close season be also given to this animal.

Protection for Sentimental Reasons There is one thing that I should like to mention before closing and that is the general need of educating people in regard to the necessity of protecting these animals, as one might say, from a sentimental point of view. Take, particularly, the case of the buffalo at Wainwright. While it is conceivable that under certain conditions there might be some commercial return from them, that is not primarily the object of the Wainwright reserve, which is to preserve the buffalo from extermination. In this material age the majority of people look at things from a material standpoint and questions are likely to be asked as to why this money is being spent, why this large tract of land is being withheld from settlement and allowed to be roamed over by a lot of wild animals. It is against that sentiment that this Commission has sharply to set its face and to carry out its campaign of education in order to make the people realize that we have a duty to perform in preserving these relics of a former fauna in our country. It is our duty to generations yet to come, who would blame us if they found that we had allowed this fauna to become extinct and to disappear forever when it was in our power to preserve it.

Those of us who have had to study the question of the gradual extinction of mammals will appreciate that point of view. The average man on the street does not, but he soon appreciates it if it is explained to him in the proper way, and that is one of the important lines of work that this Commission will have to continue. We cannot speak once and then be silent. We must continue to preach this gospel and

impress upon the people of Canada that, once an animal is exterminated, it cannot be regained and the nation is the poorer in those resources which increase our happiness, improve our health and add to our material prosperity.

MR. VREELAND: Speaking for the Campfire Club of North America, I want to express my extreme gratification at the facts that Dr. Hewitt has presented to us to-day, especially regarding the Migratory Bird Act. In the United States that is a thing for which we have been fighting for a great many years and we believe that that Act, backed by the laws for prohibiting the sale of game, has done more for the preservation of the remnants of our wild life than any other measures. It is highly gratifying to know that Canada is preparing to take part in an international agreement, because really this matter can only be handled in an international way. Before we had this law in the United States, people in New York asked us what was the use of protecting ducks when they were going to be shot in New Jersey, and the people in New Jersey said the same thing with regard to New York. Only last summer, when out in British Columbia pleading for the protection of ducks and geese, they said to me: What is the use of protecting them in Canada when they will be shot in the United States. The answer to that is that we are protecting them in the United States and this international treaty, if it is carried through, will give us a uniform series of laws for all North America.

With regard to prohibiting the importation of plumage, we had the same problem of the menace to native birds when we passed similar laws, and the way we overcame the difficulty was to pass State laws making the sale of plumage illegal. In New York state, which is the principal market for plumage, we have this provision: "No part of the plumage, skin or body of any bird protected by this section or of any birds coming from without the state, whether belonging to the same or a different species from that native to the state of New York, provided such bird belongs to the same family as those protected by this article"—thereby providing against misrepresentation—"shall be sold or be in possession for sale." The penalty is \$25 for each bird. As a result of that, the New York Conservation Commission recently raided a mail-order house in New York and confiscated 1,200 egret plumes, which at \$25 apiece makes a heavy fine. If you protect the centres where the plumage is sold, the battle is practically won.

MR. WHITE: During the past summer, the Commission has made representations respecting the further protection of game of all kinds,

more particularly migratory game, in Canada. The protection of game is entirely under the provincial governments and the ratification of a Migratory Bird convention by Great Britain and the United States must be preceded by such action on the part of the provinces—if they have not already taken it—as will bring their laws into line with the provisions of the proposed convention.

In the three Prairie provinces, all matters affecting game come under the Minister of Agriculture and, furthermore, all game legislation is referred to their Committee on Agriculture. Last August, I interviewed Hon. Mr. Winkler, Minister of Agriculture for Manitoba, and the Chief Game Warden, Mr. Barber. My reception by Mr. Winkler was all that could be desired and he expressed himself as thoroughly in accord with us regarding the necessity and advisability of having the required legislation, and offered to do all he could to forward our aims and objects. In Saskatchewan I saw Hon. Mr. Motherwell, the Minister of Agriculture, and in Alberta, I saw Hon. Mr. Marshall, the Minister, and Mr. Craig, the Deputy Minister. In the three provinces all professed themselves as being willing to do all they could to forward our objects and to assist us and, so far as possible, to bring their laws into line.

In British Columbia I was less fortunate because Mr. Bryan Williams, the Chief Game Warden, does not see eye to eye with us in all respects. Hon. Mr. Bowser, Attorney General, has offered to do what he can and Mr. Williams said he would go as far as was possible, considering the state of public opinion in that province.

That, in brief, was the result of my interviews with these four Provincial governments and, considering the way in which game protection is regarded by most people, it was highly satisfactory. One of the most important things we have now left to do is to comply with the request of the four Provincial governments that, about January 1st, we submit our proposals to them. They will then do what they can to pass the desired legislation.

In my recent trip to the West, I advanced exclusively the material aspect of the case. The Chief Game Warden of British Columbia stated that, had it not been for the sportsmen who went into northern British Columbia, some of the people in the smaller villages there would have had a very hard time indeed. Owing to the financial depression they were left with practically nothing. All the mines were closed down, and he said that his investigations show that the average sportsman coming from the United States and going into British Columbia to get moose, spent on an average \$1,000 per moose and, in the case of one village, Telegraph Creek, he estimated that these

sportsmen had left in that vicinity in the neighbourhood of \$18,000—a very important item in a very small village.

Two or three stories will illustrate the attitude of some people in regard to game protection. A farmer who resided on the shore of Shoal lake, in Manitoba, rowed a visitor to an island in the lake. As soon as the farmer saw the hundreds of pelicans on the island, he was much surprised and announced his intention to return in a few days to kill them and feed them to his swine. Another was the story of a farmer in Alberta who was arrested and heavily fined for killing a moose to furnish food for his dogs. Still another was that, in Alberta last year, 253 moose were killed south of latitude 55°. In addition to that number, there were those that were killed and not recorded and, also, the hundreds that were killed north of that latitude. This is sufficient to show that, unless that magnificent animal receives proper protection, it will soon become virtually extinct in the province of Alberta.

Bird Protection in Canada

BY

W. E. SAUNDERS,

Of the McIlwraith Ornithological Club, London, Ont.

MR. CHAIRMAN, ladies and gentlemen: Birds, in common with all wild life, are reproducing annually in excessive numbers and the amount of that excess is governed by the amount of destruction that takes place in the individual species under consideration. As a general rule it may be stated that the total annual death-rate corresponds almost exactly with the annual rate of increase. When it is considered that the annual rate of increase in common birds, such as the robin, is perhaps two, three, or even five hundred per cent, it follows that the annual death-rate is the same. Were it not so, an enormous increase in the number of these species would take place until eventually they would themselves check their increase by their very abundance. This destruction takes place in very many ways. The birds migrate, covering thousands of miles, exposing themselves to very great dangers, often fatal. The conditions which perhaps we ought to consider this afternoon are the other fatal conditions to the birds, exclusive of migration, because with migration the Commission of Conservation has and can have very little to do, most of the migration taking place out of the territory under its purview.

**Æsthetic
Importance
of Bird
Protection**

While we have in the past given very great consideration and thought to the economic side of bird protection, yet the æsthetic side is equally worthy, perhaps even more worthy, of consideration than the economic side. A comparatively small proportion of the population is interested personally in birds from the economic side, while there is a large and rapidly increasing number of the residents of Canada and of the civilized world who are taking great interest in the study of bird life, and this study is of very great benefit to the individual as well as to the nation at large. It has a refining influence upon the student and yields an amount of enjoyment which I hesitate to estimate, because it is such a personal matter with me. To one who has made a life-long study of birds, it is a very pleasant thing to go into the country and meet at

every turn friends whom one knows; it is like going down Sparks street and meeting all one's most pleasant acquaintances in one afternoon.

**Domestication
of Humming-
birds**

Probably every bird is capable of partial domestication while in the wild state. I was very much interested a couple of years ago at a meeting of the American Ornithologists' Union in a paper by Miss Sherman on *The Taming of the Wild Humming-bird*. I suppose the small size of the humming-bird and its almost insect-like character had given me the feeling that it was incapable of domestication or of knowing its friends but she demonstrated that she had domesticated them to some extent. She actually tamed them so that they came and buzzed around her head for food. She began with bottles of syrup hidden in the base of a gaudy artificial flower; from that she progressed to the bare bottle and the humming-birds came most freely; they quite expected the syrup and promptly demanded it from her if the bottle were found at any time empty.

**Jack Miner's
Experiments
with Wild
Geese**

From the humming-bird perhaps the longest step we can take is to the wild goose, one of the wildest as well as largest of our birds. Jack Miner at Kingsville has the most spectacular demonstration every year on his farm of the possibility of temporary domestication of this bird. One morning last April, 1,000 wild geese came to his farm, all of which lit within 150 yards of his house. Many of them—by actual count 425 geese—were in the small enclosure right in front of his dining-room window. I went into the enclosure with him and found it quite possible to walk to within fifteen or twenty feet of the nearest goose; but, when those geese were out on the lake, two miles distant, it was exceedingly difficult to get a boat within half a mile of them. In one case, they knew absolutely they were on safe ground and in the other case they suspected danger, because man is a dangerous animal. To them, however, the man who goes around Jack Miner's place is safe and, therefore, they are not in the least alarmed. It seems that the birds have methods of communication, not only between members of their own species, but with others, because one day during last year's migration, while the geese were visiting Miner's place, on four different occasions flocks of wild swans flew over, apparently to see if these stories the geese were telling about the safety and pleasant conditions on Miner's farm were true. But while the swans found they were apparently true, because the geese were down in the ponds on the farm, they felt like the farmer who, seeing the giraffe at a menagerie, said: "There ain't no such animal." The swans looked at the geese and

said: "It looks safe but cannot be"—and went away. And now Miner's ambition for next year is to have some swans there in order to assure these wild fellows that it really is all right on his farm. Perhaps I might take it upon myself to urge upon the members of the Committee on Fisheries and Game that probably the most spectacular demonstration of protection that you can see on the continent of North America is at Jack Miner's place in Kingsville any day in April while the geese are there. They come in March and leave in May and the number is limited only by the amount of corn that Miner, who is not a very wealthy man, can afford to feed them. During the migration season last year I believe he fed them about three hundred bushels of corn. That does not cost a great deal of money, but then he is giving it to wild geese and for the benefit of the country at large. I am not sure that in any year I have spent out of my own pocket the value of three hundred bushels of corn for the benefit of the country at large. Of course, Mr. Miner gets personal enjoyment out of it, or he would not do it, and his work with the geese has resulted in an entire change of condition in his township. In the old days the geese were common all over that country. Settlement banished them and twenty years ago there were none. When he began his experiments about twelve or fifteen years ago, he obtained a few domesticated Canada geese and kept them in an enclosure, hoping to lure wild geese to visit him annually, but he had the tame ones there for a number of years before the wild ones came. Eventually they did come, seventeen visiting him the first year. The next year there were thirty, then one hundred and fifty, then five hundred in the fourth year, and after that Miner said he could not count them, that he had about "five acres" of geese the year following. It is all very well for a person to talk about quantities of wild geese, but nothing is so convincing as to see them for yourself and if the members of the Committee could spare the time to visit Kingsville next April, I am sure they would be impressed with the value of even individual effort, though much more could be accomplished if the matter were handled on a little larger scale. On Miner's farm there are two ponds, one, thirty-five yards across, the other, thirty by fifty or sixty, yet they accommodated between 1,000 and 1,500 wild geese last spring.

**Encouragement
of Birds
near Home**

Coming down to smaller things, the protection of the ordinary birds around the home, it is not often that we can get figures that are exact and reliable. In fact, not very many people have tried or have made serious effort to encourage the birds and increase their numbers. But I was told the other day about what seemed to me to be really a very spectacular result.

A family, residing in the summer on a little island, about three-quarters of an acre, in the Rideau lakes, had one or two cats. A visitor there induced his friends to leave the cats at home. Then he began to put up nesting boxes to attract the tree swallows, and they came at the first invitation. Up to 1915, he never got enough boxes up on that island to accommodate the swallows who came. But this year he got up a few more boxes than were needed, and, in seventeen boxes, he had fifteen pairs of swallows on an island that formerly had two cats and five pairs of birds. In addition he had three pairs of orioles, two pairs each of five other species and one pair each of five others, a total in five years of thirty-three nesting pairs on three-quarters of an acre from a beginning of five pairs. I think that was a very creditable result indeed.

**Destructiveness
of Cats**

Of course one great help to him was banishing the cats. The cat, I think, comes fairly under the jurisdiction of the Conservation Commission. I wish it came legally under such jurisdiction and that the Commission would appoint me Cat Ranger. If that were done I can assure you the number of cats would suffer a very serious diminution every year because, as you know, every cat spends most of its time in an effort to kill. It kills not only the mice but every bird it can possibly catch and, as I look at it, each insectivorous bird killed by a cat is worth more than the cat itself. I have proved that there are some uses for cats. Buried under apple trees I have eaten them as apples, buried under rose bushes I have picked them in the form of roses. That is a very satisfactory way of disposing of cats. While we have the semi-wild domestic cat we cannot have a very serious increase in birds and I think it is a fair subject for the Conservation Commission to take up.

**Ducks
Nesting in
Chimney**

There are some very interesting possibilities in the way of bird protection in the Northwest, particularly with regard to the birds whose nesting places are in holes in hollow trees. One such, the American golden-eye, has nested for four years in the chimney of the residence of Mr. R. B. Price, Camrose, Alberta. Mr. Price knows when the birds are hatched because the duck then sits on top of the chimney and waits for the youngsters to climb up and project themselves over the edge, to roll down the roof and bang on the ground, which never seems to hurt them at all. In 1915, however, the humanitarian instincts of the neighbours got the better of them and they carried the little fellows down in a hat. I have been urging Mr. Price to put up another dummy chimney in the hope of getting two pairs of birds, and in the meantime I have heard that his experience has been duplicated in Saskatchewan.

Pelicans Resent Interference Then we come to the matter of bird sanctuaries. Some birds do not like people to make a fuss about them and that refers particularly to large wild birds on whom human friendship is suddenly thrust. I had a remarkable experience along that line in Alberta. On a small island in Miquelon lake, twelve miles north of Camrose, there were two hundred breeding pairs of white pelicans. The pelican, a bird about the size of an eagle, is not accustomed to human interference. I visited the island with a friend and saw these two hundred nests but the birds left the island before we landed and did not return for about an hour or two after we left. My companion was an enthusiastic ornithologist and bird protectionist and his next door neighbour was the local M.L.A. Through his influence that island was declared a bird reserve and the nearest farmer a game warden, his duty being to see that the birds were not molested. He visited the island practically every day and the birds resented it so much that, since that year, there has not been a pelican on the island. That shows that we must be careful in our attitude towards some of the wild birds.

Extermination Imminent in some Cases In North America it has been the habit to await practical extermination before anything is done for the wild things, either animals or birds, with the exception of the game which is so highly thought of by the hunter. In fact there has been so little done for birds that, in the United States, practical extermination has actually taken place in the case of some birds. There are some birds that really require immediate assistance and, if one ventures to make a prophecy, it must not be considered as exact in terms of years. We can never tell when the last of a species is with us and, though a species that seems to be in danger of extinction may remain in fair numbers for years without apparent diminution, it may then come to a time when it practically drops out of existence all at once, as did the Labrador ducks, which became extinct about 1865 from no known cause. It is surmised by ornithologists that they were few in numbers, that they had a restricted summer habitat and that in the fatal year a tribe of Indians visited this summer home and killed, as they always do, everything they could—in fact as they need to do, because in that northern country they must subsist on the wild things—and thus the last of the Labrador ducks were destroyed.

Danger to the Caspian Tern Now we have a bird in Ontario which is just about in that condition, namely, the Caspian tern. It is the largest of the terns. These terns are large birds with sharp-pointed wings, and closely related to the gulls. They dart down

for their fish rather than settle on dead things as the gulls do. I believe there is only one breeding place in Eastern Canada where the Caspian tern exists in any numbers and that is an island near Parry Sound. There are one or two breeding grounds in Michigan and these are all that are known in the Great Lakes district. It formerly nested in the gulf of St. Lawrence and Taverner tells me it is still there in small numbers; but so far as he learned there is no large breeding ground of the bird in that district. So all we need practically to exterminate the Caspian tern in Eastern Canada is to have a band of fishermen, for instance, settle on a Parry Sound island beside the breeding ground, or perhaps on that island itself, and feed on the eggs for one summer. If there is no natural increase that summer, they will return possibly one-third of their former number, perhaps go to some other island and they are well on the way to extinction the moment they begin to move around and leave their ancestral domain. Of course, that tern is of no very great value to man so far as we know. We have other terns and other gulls, but I am sure I do not need to argue with the members of the Commission and the ladies and gentlemen present as to the desirability of preserving every form of wild life we have. We cannot afford, for many considerations, to allow any of them to become extinct.

VALUE OF BIRD SANCTUARIES

Not only small, but large birds should be encouraged and we should endeavour to increase their number by means of reserves and sanctuaries. Remember, for instance, the little bird sanctuary I referred to in the Rideau lakes, where in five years there was an increase from five pairs of birds to thirty-three pairs, from a summer population of ten to sixty-six. That shows the possibilities. All over this country are such islands, particularly in the West. There, ducks are such a prominent feature in the landscape and such an important article of food that the islands in the various lakes should be reserved. I think the Committee could not use its influence to better advantage than in endeavouring to back up the efforts of those of us who have been trying to get such areas set aside as bird sanctuaries, and I am sure that a word from the Committee would be of more influence than a long letter from a private citizen. I have tried these long letters and, so far as I know, they have had no influence. I am one of many who have tried to effect changes in existing conditions and am accustomed to disappointment and defeat, but if, backed by his own conscience, each one sticks to his guns, eventually perhaps he will win out.

Places Suggested as Sanctuaries Perhaps I might suggest a few conspicuous places that might with very great advantage be made bird reserves. In the gulf of St. Lawrence, we have the Percé rock and Bonaventure island. With regard to the latter, I believe some steps are already under way towards making it a preserve. There are also the Bird rocks of Magdalen islands. Percé rock and Bird rocks are the only North American nesting grounds of the gannet or solan goose, a large, white bird the size of a goose. It feeds on fish of no economic importance and, even if it took a percentage of valuable fish, we could not afford to have it destroyed. These islands are the summer homes of many other species and are desirable bird sanctuaries from many points of view.

In other portions of the gulf of St. Lawrence we meet a rather peculiar condition of affairs. We are accustomed in Canada to look upon ourselves as a people who get our living either from the soil or from manufactures, and we are perhaps inclined to overlook the fact that some parts of our Dominion are still wild and depend upon wild life. The inhabitants of the north shore of the St. Lawrence, fishermen, half-breeds and Indians, are largely dependent on birds for meat. Unless something is done in the way of protection among the islands scattered along our shores, there is danger that the absence of birds may render the whole area uninhabitable, so that the fishing population would have to migrate in there in the spring and come out again in the autumn.

Then there is the consideration of the reservation of marshy areas. They lend themselves to reservation purposes readily because we do not value them highly for anything else. Point Pelee, for instance, contains a large marsh capable of forming an overflow point for game such as ducks, and it is also the most northern breeding ground of several North American species that have reached their limit of latitude. There are more of some varieties of birds found on point Pelee than in all the rest of Ontario put together.

LARGE BIRDS ATTRACT HUNTERS

The apparently irresistible impulse of every sportsman to kill everything that is big always saddens me. Torrey puts the case in a nutshell when he says: "Czars and rare birds pay the price." He should have said "large birds," because most people do not know the rare birds, but the man with a gun is always anxious to shoot something large. For years I have been urging the Ontario Government to give the large birds special protection but have had the reformer's usual exper-

ience. The result was full of disappointment and defeat, but not discouragement, and I still hope that, before it is too late, some of the larger birds, such as the fish hawk, will be protected. These birds formerly nested along lake Erie and probably on lake Huron. They still nest in Algonquin park and probably in Muskoka but the shores of lakes Erie, Ontario and Huron are destitute of them. My brother informs me that they are common also along the Columbia river, between its source and Golden. Are we going to sit by and witness their extermination in that district?

Diminution among Eagles The bald eagle formerly nested along every large lake and also probably beside every medium-sized lake a few miles in extent. In the district with which I am personally familiar, lake Erie south of London, there was a nest about every five miles. Now there is a nest about every thirty miles. About five-sixths of the eagles have been killed off. The eagle is not an injurious bird and, during the summer holidays, every person enjoys the sight of one of these large birds soaring above. In August, going from Ottawa to Kingston on the Rideau river I saw one fish hawk, but not an eagle, yet it was formerly a common resident along all lakes the size of Rideau lakes. Some years ago I questioned an Essex County farmer regarding an eagle's nest across the road from his place and asked what his experience had been with these birds. He said his neighbour thought he ought to have them killed off, because they were so hard on chickens, but he said: "They never touch any of mine and I am the nearest." Other people have had the same experience. The eagles pick up dead fish, etc. They are really scavengers and, if they have any economic value, it is as scavengers. But the æsthetic value of the eagle is considerable. Everyone likes to see them and, when a man with a gun kills one, he takes away from the country, from you and from me, our rights in that bird, and almost invariably he throws it on the waste heap.

Danger to the Blue Heron The great blue heron is another species in the same category. It used to nest in communities and, while it does yet to a certain extent, the communities are very small. There is one heronry near London with about twenty odd nests. How it has escaped so long I do not know, because we have so many irresponsible people who do not think, whose impulse is to slaughter and who go out with .22 rifles into a heronry just to see how many herons they can kill. Then, of course, the eggs rot or the young starve to death. It is the privilege of the members of this Committee to inaugurate a system that will prevent that sort of thing occurring in

the future. I do not see why it should not be possible through your influence to have the provincial governments declare such places as heronries bird sanctuaries where guns would not be allowed, where special penalties would be enforced on any person going with a gun. As a rule the few places in which these heronries now exist are places where the neighbours are favourable to the birds because, if that were not so, they would not have lasted nearly so long.

I am sorry that the subject of bird protection has been so wide that I have not been able to enter much into details. May I assure you that if I or the McIlwraith Ornithological Club of London, which in a way I represent in this bird campaign, can be of any service to the Commission at any time, we shall be only too pleased, and I sincerely hope the members of the Fisheries and Game Committee will feel it within the scope of their activities to urge upon local governments the importance of this matter of bird protection. Feeling as I do that, while the economic side of the question is of value, the æsthetic side really is of considerably more value, I wish to emphasize the fact that the combined value of the two aspects is very great indeed.

DR. MURRAY: Mr. Saunders' paper strikes me as having been of quite unusual interest and I hope we shall have the pleasure of hearing him in this Committee many times hereafter. He has brought forward many good points for the Committee to take into consideration and among the ideas that have been put forward this afternoon there is one that seems to me to be eminently practical. The Commission of Conservation should in some cases constitute itself into a Committee of Extermination; in order to secure the preservation of the birds, we shall have to secure the extermination of the domestic cat. Mr. Millar left me with the impression that, in order to secure the preservation of game in the western provinces, we should have to secure the extermination of the Stoney Indians. I do not know exactly what the arguments against that might be and what force might attach to them; he intimated that that was something we might look for in the natural order of things.

I noticed that both Mr. Millar and Mr. Vreeland complimented the province of New Brunswick very highly in certain respects and have given it quite a good advertisement in the matter of moose and other game. I should also like to call attention to the fact that in Nova Scotia there is a good field for the sportsman who wishes to get moose, and that caribou, which have become almost extinct in all other parts of the Dominion, are still to be found in small numbers in portions of Nova Scotia and that they are being carefully preserved.

Silver Fox Raising in Captivity

BY

HON. A. E. ARSENAULT

Member of the Executive Council, Prince Edward Island .

SOME twenty-five years ago, Hon. Charles Dalton began experimenting in raising silver foxes in captivity, but at first met with little success. After some years, however, the knowledge then acquired enabled him and a few others, who had been let into the secret, to acquire considerable wealth from the sale of the pelts of domesticated foxes.

**Phenomenal
Rise in
Prices**

In 1910, one rancher sold three pairs of silver foxes, and, in 1911, the selling of foxes as breeders became general. The price of live foxes rose from year to year until, in the latter part of 1913, sales of young foxes were made at prices ranging from \$13,000 to \$17,000 per pair and for tested breeders from \$20,000 to \$30,000 per pair.

In the meantime, enterprising speculators did quite a business in the importation and sale of foxes from Newfoundland, Labrador, Western Canada and Alaska and, in a number of cases, these foxes or their offspring were afterwards resold as pure-bred Prince Edward Island foxes.

**Registration
Provided for**

It was realized by many of those interested in the propagation and preservation of the pure-bred Island fox that something should be done to prevent or make difficult the sale of imported foxes as Island-bred. Accordingly, at a meeting of fox men, a committee of fifteen was appointed to draft legislation providing for registration of foxes. This committee met in Charlottetown and, after full consideration and discussion and after hearing evidence, drafted a bill* which, with a few amendments, was enacted into law by the Provincial Parliament in the spring of 1915.

This bill met with opposition from a considerable number of ranchers, with the result that classification of foxes was made compulsory only to members joining the Silver Black Fox Breeders' Association.

*A copy of this bill will be found in Appendix I.

At first, very few breeders took advantage of this opportunity, but, when in the summer and autumn of 1915 it became apparent that little business could be done except by persons whose foxes were registered, there was a rush on the part of breeders to register their stock. The form of registration includes the marking and identification of the foxes, and is very complete.*

The result arising from this registration and enrolment cannot but be beneficial as it will prevent the selling of foxes for other than what they really are, and will thus restore confidence to the investing public. It will also to a great extent check, if not prevent, the flotation of wild-cat companies and otherwise place the fox industry on a sound basis.

Although it was felt that the war would have a bad effect on the fox-farming industry by limiting the market for furs and lowering the price of fox pelts, it is a remarkable fact that fox skins offered for sale this year have realized handsome prices, some skins realizing from \$500 to \$2,000 each. This has to a great extent restored confidence in the industry and has tended to bolster up the price of live foxes.

With care and good management the Silver Black Fox Breeders' Association of Prince Edward Island will accomplish a great work and will elevate the raising of foxes in captivity to the rank of a great industry.

MR. DANIELS: Does this deal with pedigreed foxes?

MR. ARSENAULT: The registration requires: the name of the animal, the sex, when whelped and where bred, the markings, malformations, if any; the number of pups in the litter that the animal came from, and detailed information as to present and previous ownership. In order to identify the foxes, they have a system of marking which is simply a tattoo in the ear. They have an instrument which tattoos the name, the year of birth and the number, so that the fox can be identified wherever it is found, even when the pelt is marketed. The result will be that, when pelts come to the market you can trace the origin of the pelt and, if it has brought a good price, it will increase the value of the stock.

DR. ROBERTSON: Is the tattooing a necessary part of the procedure of obtaining registration?

MR. ARSENAULT: Yes. It is essential and makes a record. In that way there will be no chance of practising any deception as to the

*See Appendices II and III.

quality of the fox, because the association will trace and verify the facts set out in the application for registration. While the war has had an effect on the pelt market, at a sale of 137 miscellaneous pelts, some wild and some domestic, an average price of \$330 was obtained within the last few weeks, on the Montreal market. There have been very few pelts marketed in Prince Edward Island in prime condition. The only pelts marketed were those where an animal was killed by its mate, and perhaps badly cut up, or where it died out of season, at a time when the pelt was not in its best condition. This year, however, there will be a number of animals killed and the result will be anxiously awaited.

The price of foxes at present is from \$4,000 to \$5,000 a pair, which is a very reasonable figure, and it is to be hoped that in the future there will not be any such over-speculation as has occurred in the past.

Resolutions

AT the session of the Committee held on the afternoon of Tuesday, November 2nd, 1915, the following resolutions were agreed to:

Moved by Hon. O. T. Daniels, seconded by Dr. Jas. W. Robertson:

RESOLVED, that the Committee commends very earnestly to the Dominion and Provincial authorities who are charged with the conservation and improvement of Canadian fisheries, the question of providing opportunities for vocational education suitable for those employed in the industry; and,

RESOLVED, FURTHER, that the Committee most respectfully recommends the institution, as soon as practicable, of simple Demonstration Stations, the employment of competent travelling instructors and the distribution of well-illustrated bulletins dealing with the practical problems arising from fishery occupations.

Moved by Hon. A. E. Arsenault, seconded by Dr. Howard Murray:

WHEREAS, the Committee heartily approves the efforts now being made for the preservation of North American migrating birds, some of which are seriously threatened with extinction, and learns with satisfaction the attitude of the Provincial Governments in this connection; now, therefore, be it

RESOLVED, that the good offices of the Dominion Government be solicited to negotiate a Treaty between Great Britain and the United States, for the purpose of securing more effective protection for the birds which pass from one country to another.

Moved by Dr. Howard Murray, seconded by Dr. Jas. W. Robertson:

RESOLVED, that the Committee learns with satisfaction of the action of the Department of Fisheries, in increasing the number of whitefish fry planted in the Great Lakes and hopes that the number may be increased to that suggested as sufficient by the best authorities, namely, 20,000 per square mile of whitefish area.

APPENDIX I

An Act to Incorporate the "Silver Black Fox Breeders' Association of Prince Edward Island"

(Assented to April 24th, 1915.)

BE IT ENACTED by the Lieutenant Governor and Legislative Assembly of the Province of Prince Edward Island, as follows:—

1. This Act shall be cited as the "Silver Black Fox Breeders' Association Act."

2. In this Act, unless the context otherwise requires, the expression "Association" means the Silver Black Fox Breeders' Association of Prince Edward Island.

Objects of Association 3. The Association shall have for its object the encouragement, development and regulation among its members of the Silver Black Fox Industry of Prince Edward Island.

(a) By keeping a record of the breeding and origin of all foxes held in captivity by members of the Association; by collecting, preserving and publishing data and documents relating to the same.

(b) By establishing standards of breeding and by carrying out a system of registration for its members.

(c) By adopting means from time to time for the protection of its members engaged in the propagation and breeding of foxes in compliance with this Act or any by-laws or regulations thereunder.

(d) By maintaining an efficient inspection among members of the Association, so as to enable the Association to prevent, detect and punish fraud.

(e) By compiling statistics of the industry and furnishing official and authentic information in regard thereto.

(f) By exercising an oversight of the personnel and of the finances of all fox companies incorporated or to be incorporated in this Province that are or become members of the Association.

(g) And for these purposes to have power to make all needful contracts and agreements.

Powers of Association 4. The said Association may acquire, purchase, hold, possess and enjoy any real or personal estate within this Province or may sell, lease, mortgage or dispose of same for the benefit of the Association, and it may have the power to sue and be sued.

Incorporation Clause 5. John E. B. McCreedy, E. Rigg Brow, Richard E. Spillet, Chester McLure, Waldron B. Prowse, James A. Johnson, William B. Hayes, Joseph W. Callbeck, Albert C. Saunders, Frederick L. Rogers, John D. McIntyre, William H. Prowse, W. Leith Poole, J. Frank Sterns, James D. Stewart, William E. Cameron and all others who may become members of the Association to be by this Act created are hereby constituted a body politic and corporate by the name of "Silver Black Fox Breeders' Association of Prince Edward Island," and by that name shall have all the general powers and privileges incident to a corporation by the Act of the General Assembly of this Island entitled "An Act Relating to Corporate Bodies" and the amendments thereto.

Membership 6. Membership in the Association shall consist of individuals, partnerships, voluntary associations and incorporated companies who are owners of foxes registered or enrolled in the Association provided they have conformed to all the regulations of this Act and its by-laws and amendments.

Board of Directors 7. There shall be a general meeting of the Association held annually in Charlottetown on the first Tuesday after the fifteenth day of February, and at the first annual meeting a Board of Directors shall be chosen, consisting of fifteen members of the Association, duly qualified to act as such, five of whom shall be residents of Queen's County, five of King's County and five of Prince County. At the first annual meeting five directors shall be elected for a term of three years, five for a term of two years and the remaining five for one year. At each subsequent annual meeting five directors shall be elected for a term of three years, and also such additional directors as may be necessary to fill vacancies on the Board for the remainder of the terms of the directors resigning, dying, becoming incapacitated, or ceasing to be residents of this Province.

Officers of the Association 8. The directors shall appoint from their own number a President and three Vice-Presidents, one for Queen's, Prince and King's Counties, respectively, and an Executive Committee of seven members, of whom the President shall be one. The Directors shall also appoint a Secretary and Treasurer who shall *ex officio* be members of the Association, and all other necessary officers. The same person may be Secretary and Treasurer of the Association.

Notice of Meeting 9. At least two weeks' previous notice of such meeting with full particulars as to place, hour and date shall be given by the Secretary of the Association by advertisement in such newspapers published in Prince Edward Island as the Executive may suggest.

Annual Statement 10. The Secretary of the Association shall annually on or before the 8th day of February in each year, furnish and provide a full, true, correct and complete statement of all receipts and disbursements of the Association up to and including the 31st of December next preceding, and submit the same to the members thereof by mailing a copy thereof to each member of the Association.

Officers to Continue till Successors Appointed 11. In the event of an election of directors or officers of the Association not being held at the time and place provided for under the authority herein, then the persons in office at the time when such election should have been legally held, shall continue to be the officers of the Association until their successors are legally appointed. And in the event of the annual meeting not being for any reason held on the day appointed, or the non-election of directors or officers as aforesaid, the directors shall call a special meeting of the Association within sixty days thereafter, of which special meeting at least two weeks' notice shall be given in the manner provided in Section 9 of this Act and at such meeting the election of directors and officers shall take place, and all such business as may be transacted at an annual meeting may be transacted at this meeting.

Resignation of Directors 12. A director of the Association may, by giving thirty days' notice in writing to the President or Secretary of the Association, resign from office, and in the case of a director of the Association dying, becoming incapacitated, resigning office, ceasing to be a resident of this Province or failing to attend two consecutive meetings without cause shown satisfactory to the Board, it shall be the duty of the directors to appoint a person to fill the office until the next annual meeting of the person so resigning, dying, becoming incapacitated, ceasing to be a resident of this Province or failing to attend two consecutive meetings without cause shown satisfactory to the Board.

Quorum 13. The Executive, of whom four shall form a quorum, shall have full power to transact and manage the business of the Association in all matters, and all revenue and other moneys due to the Association shall be collected by them and such as may be necessary expended under their direction subject, nevertheless, to the by-laws and regulations of the Association and subject in all cases to an appeal to the Board of Directors.

Registration and Inspector 14. The directors shall cause all the foxes owned by members of the Association to be registered or enrolled as provided for in the by-laws of the Association and may appoint a competent inspector whose duties shall be such as are provided for in the by-laws.

Provisional Directors 15. The following persons, namely, John E. B. McCready, E. Rigg Brow, Richard E. Spillet, Chester McClure, Waldron B. Prowse, James A. Johnson, William B. Hayes, Joseph W. Callbeck, Albert C. Saunders, Frederick L. Rogers, John D. McIntyre, William H. Prowse, W. Leith Poole, J. Frank Sterns, James D. Stewart, shall constitute the first Board of Directors and shall continue in office until their successors are appointed.

Sales Board 16. The Association is hereby empowered to list foxes and fox pelts for its members and to establish a Sales Board for fox pelts through its head office, subject to the order of the Executive and as provided for in its by-laws and regulations.

Membership of Non-residents 17. Non-residents of the Province who are owners and breeders of Silver Black Foxes may become members of the Association, subject to the approval of the Board of Directors, provided they conform to its rules and regulations, and pay towards its maintenance as provided for in the by-laws.

Fines and Penalties 18. The Executive is hereby empowered to impose fines and penalties on members or officers of the Association for infractions of any of its rules, regulations or by-laws or for any fraudulent act, for such amount or amounts as it may deem proper, and in the case of fines the members or officers so fined shall stand suspended from the date of the imposition of same until payment is made or judgment is reversed by the Board of Directors.

Penalty for Mis-conduct 19. The directors may for misconduct or for the infraction of any of the rules, regulations, or by-laws of the Association, suspend or expel, or after expulsion, re-instate any of the officers or members of the Association.

Power to Obtain Information 20. The Association is hereby empowered to obtain any information that may be considered necessary regarding the breeding and pedigree of foxes, capitalization, cost of equipping and maintaining ranch, of any incorporated company, voluntary association, partnership or individual, being members of the Association, owning and breeding foxes, and all such information when not given voluntarily or to the satisfaction of the Executive of the Association, may be obtained by the Executive summoning such persons as may be desired, to appear before them at a place and date to be named in the summons, to give evidence under oath touching such matters under consideration. Failure to answer such summons or to give evidence may be punished by fines, suspensions or expulsions.

Conditions of Membership 21. From and after the date of the passing of this Act membership will be granted in the Association for good and valid reasons only to any company, voluntary association, partnership or individual, that has not submitted a copy of its prospectus to the Executive of the Association before offering the capital stock for public subscription. The Executive, before giving a certificate of approval to the prospectus must satisfy itself that all representations regarding the finances of the company, ownership

of property, number of foxes on hand or to be purchased, are correct, that the company is not over-capitalized and that the promoters or the Provisional Directors are men of acceptable reputation and character. After the certificate of approval is obtained and incorporation granted, no changes may be made in the prospectus or in the carrying out of its provisions, without the approval of the Executive of the Association, to whom application shall be made, in which are fully set forth the proposed changes, and any parties making such changes and neglecting to conform with those provisions shall, on proof of such, forfeit their right to become members of the Association. All members making future fox stock flotations must also conform with the conditions of this Section.

Non-liability of Association 22. The Association, or any of its officers, shall not be liable for any action in any Court of Law or Equity in this Province at the suit of any person, firm or corporation for any loss or damage they may have sustained by virtue of any bona-fide act done in pursuance of this Act, its by-laws or regulations; and for any action so brought, the defendant or defendants may plead the general issue and give this Act and the special matter in evidence.

Association may Decline to Register 23. The Association shall have the right of declining to register or enrol pedigrees or to register transfers of ownership when in the opinion of the Executive the application for registration or enrolment or transfer is not in accordance with facts and where there is just cause or reason it may cancel the registration or enrolment of any fox already accepted and registered.

Penalty for Deception, etc. 24. Any member of the Association who shall be found guilty of any misrepresentation, deception or fraud in relation to the registry of animals in the Herd or Enrolment Books of the Association shall forfeit all his privileges in the Association and shall be debarred from further registry or transfer of any foxes during the pleasure of the Association.

Directors' Duties and Powers 25. The directors may, from time to time, make, alter, vary, or repeal by-laws to regulate, prescribe and establish.

(a) The appointment, duties, functions, and removal of all officers, agents and servants of the Association, the security to be given by them and their remuneration, the manner of making records and all forms and certificates required for use by the Secretary or other officers of the Association.

(b) The time at which, and place where, the meetings of the Association shall be held, the calling of the meetings of directors, the requirements as to officers and the procedure in all things at all meetings.

(c) The mode or manner of admission of members and the fees chargeable (if any).

(d) A system whereby all foxes owned by members in or outside of the Province may be registered and enrolled, and the fees chargeable for same.

(e) And generally all such by-laws as may be deemed necessary for the more effectually carrying out the objects and purposes of this Act, and the management of the business of the Association; provided always that all by-laws or any alteration or repeal thereof shall only continue in force until the first following annual meeting of the Association, unless the same are approved by a majority vote at such meeting.

Appeal to County Court 26. Notwithstanding anything contained in the "County Courts Amendment Act, 1878," limiting its jurisdiction either as to the subject matter to be litigated or as to the amount of the claim, any one or more shareholders of any incorporated fox company (provided it is

a member of the Association) representing in the aggregate ten per cent of the total paid-up capital of such company, if dissatisfied with the sum charged or submitted by the directors or voted for at a meeting of the shareholders, for the keep of the ranch and the management and running expenses of such company including any compensation voted for the directors, may, within sixty days after meeting of shareholders at which such charges were submitted, apply by written petition to the judge of the County Court of the county wherein such company has its ranch or chief place of business, which petition shall contain the names and addresses of the directors of the company, the date of such meeting, the amount of the paid-up capital of such company and the proportion of such capital owned by the applicants, the amount of the charges for keep and management submitted or voted, and the grounds of objection thereto, and shall be signed by the applicants and verified by the affidavit of one of them.

Jurisdiction of County Court 27. On such petition being presented, the Judge of such Court may make an order requiring the directors of such company, or such of them as may reside within the Province, to appear before him at a time and place to be named in such order and to give full and detailed particulars of the keep of such ranch and the cost thereof and of the management and running expenses of such company, and show cause why such amount of such charges should not be settled or fixed by such Judge.

Manner of Serving Order 28. Such orders may be served on the directors in the same manner as summonses issued out of the County Court are served on defendants and ten clear days shall elapse between the service of such order and the return thereof.

Procedure on Return of Order 29. The Judge on return of such order, shall inquire into, ascertain, examine and investigate the charges and expenses connected with the management of such company and the maintenance of the ranch, and, for such purpose, shall hear and examine under oath, all such witnesses and evidence bearing on the petition as may be produced before him either by the petitioners or the directors; and the directors are required to produce before the Judge on such return all the books of the company and all the papers and vouchers referring to the business of the company which are in their possession or custody or under their control.

Judge's Award 30. The Judge, having heard such parties, their witnesses and evidence, shall fix and determine in a summary manner the sum or amount which he may consider right and just to allow for the management and running expenses of such company and the keep and maintenance of its ranch for the period complained of, and the sum or amount fixed and determined shall be the proper charge for such management and the directors will render themselves personally liable to the company for paying out of its funds any greater or larger sum, notwithstanding such greater or larger amount may have been voted at a meeting of the company's shareholders and a suit for the recovery of such greater or larger amount may be commenced and prosecuted by any shareholder in the name of the company in any Court in this Province having jurisdiction.

Procedure on Non-attendance of Directors 31. If the directors do not attend upon the return of such summons, the Judge may, if he sees fit, on proof of service proceed *ex parte* and on the evidence submitted before him by the petitioners hear and examine the matter of the petition and fix and settle on such evidence the sum which he may consider right and just to allow for the management and running expenses of such company and the keep and maintenance of its ranch for the period complained of and the sum or amount so fixed and determined shall be the proper charge for such management and the provisions contained in the preceding section for the recovery from the directors shall be considered as applicable to this section.

- Manner of Carrying on Proceedings** 32. The proceedings before the Judge of such Court shall be carried on as nearly as may be in the same manner as an ordinary suit within the jurisdiction of the Court and subpoenas *ad testificandum* and *duces tecum* commanding the attendance as a witness of any person who is within the Province, may be issued in the usual manner out of Court.
- Application of County Court Act** 33. The powers of amendment conferred by the County Court Act in proceeding in the County Court shall apply to all proceedings under this Act.
- Adjournment of Case** 34. The Judge may from time to time adjourn the hearing of such petition or make any interim or other order that he deems just.
- Fees** 35. The fees for witnesses shall be the same as in the County Court.
- Mode of Securing Costs** 36. The Judge may, if he sees fit, award costs to either party according to the scale of the County Court and every order for the payment of costs shall be deemed a judgment of the County Court, and may be enforced against the goods and chattels of the party ordered to pay in the manner in which judgments of the County Court obtained in any suit may be enforced.
- Contempt of Court** 37. Every witness appearing before the Judge on the return of such summons, who refuses without lawful excuse to answer any question put to him, shall be guilty of contempt of Court and shall be subject to all process and punishments of such County Court for contempt.
- Appeal to Supreme Court** 38. Any party to a proceeding before the Judge of the County Court, dissatisfied with the judgment of such Judge, shall have the right to appeal to the Supreme Court.

APPENDIX II

By-laws of the Silver Black Fox Breeders' Association of Prince Edward Island

REGISTRATION AND CLASSIFICATION

The rules for classification, registration, and enrolment of all foxes owned by members of this Association, shall be as follows:

SECTION 1

THE PRINCE EDWARD ISLAND STANDARD BRED SILVER BLACK FOX REGISTER

This Association shall open a Register for the registration of native-bred Prince Edward Island silver black foxes, or for those that meet the requirements laid down in the following rules of admission to this Register. This register shall be known as "The Prince Edward Island Standard Bred Silver Black Fox Register."

QUALIFICATION FOR REGISTRATION

*Rule 1. For the purpose of establishing a standard of breeding for Prince Edward Island silver black foxes, any silver black fox bred and held in captivity in Prince Edward Island prior to June 1st, in the year 1910, shall be considered foundation stock, and shall be eligible to registry in the Standard Bred Register, provided that each parent was a true silver black.

Rule 2. Any silver black fox bred in captivity after 1910 shall be eligible to registry in the Standard Bred Register, provided that the sire and the dam were mated previous to June 1st, 1910, and produced a litter of pups that are registered as foundation stock.

Rule 3. Any native Prince Edward Island ranch-bred silver black fox shall be eligible to registry in the Standard Bred Register, provided that for three generations all members in both the direct and collateral lines were true silver blacks.

Rule 4. Any silver black fox shall be eligible to registry in the Standard Bred Register whose progenitors for three generations were true silver blacks and whose sire or dam is a Standard Bred registered fox, provided that either the sire or dam in each mating in the second and third generation is a Standard Bred registered fox and that for the three generations all members in both the direct and collateral lines were true silver blacks.

Rule 5. Any silver black fox, whose sire and dam are recorded in the Standard Bred Register, shall be eligible to Registry in the Standard Bred Register.

NOTE:—By the term "native Prince Edward Island silver black fox," shall be understood a silver black fox that is exclusively the descendant of those foxes native to the Province, or of those that were owned and held in captivity in the Province, prior to June 1st, 1910.

*A form of application for registration under Rule 1 is given in Appendix III.

SECTION 2

THE IMPORTED RANCH-BRED SILVER BLACK FOX REGISTER

This Association shall also open a Register for the registration of ranch-bred silver black foxes that meet the requirements set down in the following rules. This Register shall be known as "The Imported Ranch-bred Silver Black Fox Register."

QUALIFICATION FOR REGISTRATION

Rule 1. Any silver black ranch-bred fox, wholly or in part of imported strains, not eligible for registration in the Standard Class, shall be eligible to registry in the Imported Ranch-bred Register, provided the parents and the grandparents are silver black ranch-bred foxes.

Rule 2. Any silver black fox whose sire and dam are recorded in the Imported Ranch-bred Register shall be eligible to registry in the Imported Ranch-bred Register.

Should it be ascertained that any fox recorded in either the Standard Bred or the Imported Ranch-bred Registers, ever produced, when mated with a fox of its own class, offspring showing red or rust, the Register shall cancel the certificate and expunge the records from the books of the Association.

SECTION 3

ENROLMENT BOOK

An Enrolment Book shall be kept, in which shall be recorded the age, sex, present and previous ownership, identification mark, place of birth, description and breeding, if known, of all foxes owned by members other than those registered in either of the two Registers of the Association.

APPENDIX III.

The Silver Black Fox Breeders' Association of Prince Edward Island

STANDARD BRED REGISTER

RULES OF ENTRY

1. (a) For the purpose of establishing a standard of breeding for Prince Edward Island Silver Black Foxes, any silver black fox bred and held in captivity in Prince Edward Island prior to *June first in the year 1910*, shall be considered FOUNDATION STOCK, and shall be eligible to registry in the Standard Bred Register, provided that each parent was a true silver black. (b) Any silver black fox bred in captivity after 1910 shall be eligible to registry in the Standard Bred Register, provided that the sire and dam were mated previous to *June first, 1910*, and produced a litter of pups that are registered as Foundation Stock. (c) Any native Prince Edward Island ranch-bred silver black fox shall be eligible to registry in the Standard Bred Register provided that for three generations all members in both the direct and collateral lines are true silver blacks. (d) Any silver black fox shall be eligible to registry in the Standard Bred Register whose progenitors for three generations are true silver blacks and whose sire or dam is a Standard Bred Registered fox provided that either the sire or dam in each mating in the second and third generation each is a Standard Bred Registered fox and that for the three generations all members in both the direct and collateral lines are true silver blacks. (e) Any silver black fox whose sire and dam are recorded in the Standard Bred Register shall be eligible to registry in the Standard Bred Register.

NOTE A: By the term "Native Prince Edward Island Silver Black Fox," shall be understood a silver black fox that is exclusively the descendant of those foxes native to the Province, or, of those that were owned and held in captivity in the Province, prior to *June first, 1910*.

NOTE B: No fox shall be described as silver black whose coat shows red or rusty hairs.

NOTE C: When registered Sire or Dam is reached give Registration Number. It will not be necessary to give any further information about the breeding of registered progenitors. The Registrar shall demand all necessary certificates of Breeding.

2. Blank forms will be furnished gratuitously to all applicants. The requirements of the blanks must be complied with. Nothing will be required that is not essential and all "Little Things" must be in their place. Applicants should go no further in filling the blanks than they can substantiate by competent evidence. All crosses must be clearly established. *Any attempt at fraud in the near or remote crosses will be promptly exposed when detected.* When a pedigree is forwarded that runs into that of an animal already registered, don't fail to refer to that animal and show the relationship. Three or four good names should be selected for each animal in the order preferred, and the first one not already taken will be accepted.

3. The application must be written in ink, and must state: the name and registered number of the sire and of the dam, if recorded, and any natural markings and abnormalities. The application must state under what rule the

application is made and *must be signed by the breeder* if the fox was whelped his property. If dam was sold after being bred the person owning her when the fox was whelped must sign application, but transfer of dam is necessary before owner's signature will be accepted. The owner of sire must certify to service on transfer form. It shall be sworn and certified to, or affirmed before an officer authorized to administer oaths. A duly appointed officer of the Association shall, after examination of the fox, affix the identification on the left ear and fill in the certificate form attached for the purpose.

4. The *Breeder* of the fox is the owner of the dam at time of mating.

5. The *First Owner* of a fox is the owner of the dam at time the fox was whelped.

6. The term *Owner* may be held to include: Ranch Manager or Ranch Superintendent; Board of Directors or Business Manager of Incorporated Companies; Owner of ranch in which fox was whelped, or individuals with proprietary rights in the fox.

7. When the sire of the fox offered for entry was not, at the time of service, owned by the breeder of the animal, the owner of said sire must sign the application in the place furnished for the purpose, giving year of mating, with the name and record number of sire and name of register in which he is recorded.

8. No application for registration or transfer shall be considered until the fees are paid, nor any number be assigned to the pedigree until every requirement has been complied with.

9. In the case of a change of ownership of an animal, the buyer must obtain from the seller a certificate of transfer written in ink upon a blank form procured from the Record Office which will, when returned to the Record Office, accompanied by the original certificate of registration, be entered upon the record. The certificate of transfer shall be endorsed on the back of the original certificate and returned to the applicant. In case of neglect or refusal of the seller to give a certificate of transfer, the record of transfer may be made on the written approval of a majority of the Executive Committee on evidence of the sale and delivery of the animal. *Transfers will be required from the first and succeeding owners to the applicant for entry.* If the animal is a female, it must be stated whether or not she has been served, if served, date of service must be given with the name and record number of the male, certified to by the owner, or his authorized agent.

10. In the application for registry of a fox whelped after the year nineteen hundred and fourteen it shall be stated how many foxes in the litter were reared to maturity and their sexes and color.

11. When an animal may have been admitted or transferred through misrepresentation, or fraud, the Executive Committee shall, on discovery of the same, declare the entry or transfer void, together with any entries or transfers of descendants of such animal, and subsequent applications for entry or transfer dependent on the signature of any person implicated in such fraud shall be refused.

12. No duplicate certificate shall be issued unless a Statutory Declaration of applicant before a notary or commissioner is provided, setting forth reasons why such a certificate is required. Such declaration shall be made on form provided.

13. No two foxes shall have the same name. To this end, the right shall be reserved to change any name when necessary, preserving, however, as far as practicable, some characteristic of the name given in the application. The word "Young" or "Old" shall not be used in connection with a name or "1st" as an affix to a name.

14. In making application for the registration of a pedigree it is understood that it shall be accepted only on the condition that the particulars as given are correct, and that if it should be ascertained previous to the publication of the succeeding volume that these particulars are in any way incorrect, the Association may, at its discretion, omit the pedigree or publish it in an altered form. It is further understood that, should the pedigree be published in the Record Book prior to the discovery of an error, the Association may cancel the entry, or publish the correction in such a form as the Executive Committee may decide. It is further understood that the Association is not liable for any loss or damage that may be sustained through inaccuracy, omission, alteration of a pedigree or cancellation of an entry.

15. The certificate of registration or transfer shall constitute a receipt for the fees, but such certificate shall not be binding upon the Association in case of error.

FEEs

Registration

(a) Standard Bred Fox	\$1 50
(b) Imported Ranch Bred Fox	1 50
(c) Ordinary Enrolment	1 00

Transfers	1 00
Duplicate Certificate	1 50

Membership

For every five pairs, or fraction thereof, up to twenty-five pairs	2 00
For every five pairs, or fraction thereof, over twenty-five pairs	1 00

All fees must accompany the application, and may be sent by Postal Note, P.O. Money Order, Registered Letter or Express Money Order. Postage stamps will not be accepted. If remitting by cheque, exchange must be added.

Address all correspondence and make all fees payable to the Treasurer, Silver Black Fox Breeders' Association of Prince Edward Island.

APPLICATION FORM FOR FOUNDATION STOCK

UNDER RULE 1

NOTE:

(1) If the person signing the Certificate of Breeding for this application is not the recorded owner of dam, transfer of dam is required.

(2) If the person signing as owner of service sire is not the recorded owner of sire, transfer of sire is required.

Standard Bred Register: Number(to be filled in by Registrar)

Application by..... Address

Made under Rule.....

NAME OF ANIMAL	SEX	WHEN WHELPED	WHERE BRED
.....			
.....			
.....			

Natural Markings.....Malformation (if any).....

Number of pups in litter.....Male.....Female.....

	POST OFFICE	PROVINCE
Bred by.....
Whelped property of.....
2nd Owner.....
Date of sale to second owner..		
3rd Owner.....
Date of sale to third owner....		

Also all other owners down to present with Post Office Address.....

.....

SIRE.....No..... DAM.....No.....

Bred by..... Bred by.....

Whelped property of..... Whelped property of.....

When whelped..... When whelped.....

2nd owner..... 2nd owner.....

Date of sale to 2nd..... Date of sale to 2nd.....

Present owner..... Present owner.....

Date of sale to present..... Date of sale to present.....

Colour Markings..... Colour Markings.....

CERTIFICATE OF BREEDING

of Fox to be Registered

I/WE HEREBY CERTIFY that the male.....No. (if any).....was mated with the female.....No. (if any).....in the year.....and that they were both true Silver Black foxes; that from this mating.....male andfemale pups were reared to maturity, that they were whelped the property of.....and that the fox, for which application is hereby made, is one of this litter.

.....Breeder

.....Owner of Sire

(The owner of sire and dam at the time of mating must sign here.

Date.....19....

CERTIFICATE OF BREEDING OF SIRE

I/WE HEREBY CERTIFY that the male.....No.....was bred by me/us at....., and was whelped the property of.....and that he was descended from native Prince Edward Island foxes; or, that he was imported from.....in the year....., and purchased from..... Address....., and that he was a true Silver Black fox.

.....Breeder

.....Importer

Date.....19....

CERTIFICATE OF BREEDING OF DAM

I/WE HEREBY CERTIFY that the female.....No.....was bred by me/us at....., and was whelped the property of.....that she was descended from native Prince Edward Island foxes; or, that she was imported from.....in the year....., and purchased from..... Address....., and that she was a true Silver Black Fox.

.....Breeder

.....Importer

Date.....19....

I hereby declare that the foregoing pedigree is, to the best of my knowledge and belief, true, that I have taken all available means to satisfy myself that it is correct, that I have omitted no fact known to me relative to the pedigree of the above-named fox, and that I make this Solemn Declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of The Canada Evidence Act.

Declared before me at..... this day of19..... A Commissioner, Notary Public, or J.P.	}	Sign here Owner of dam when fox was whelped. (In case of death legal representa- tives must sign.)
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In consideration of the certificate to be issued and delivered to me in pursuance of this application, I hereby agree that I will deliver the same up to the Registrar of the Silver Black Fox Breeders' Association upon demand, and will, in case of sale of the above-named fox, execute a transfer of sale to the purchaser in the form prescribed by the said Association, and thereupon deliver the said Certificate with said transfer so executed to the Registrar, or to the purchaser, as the case may require. It is further agreed that the certificate shall always be the property of the Association and subject to its control and direction at any time.

Signed.....:Applicant

I certify that I have examined the above described fox, that the description is correct, that the age is apparently correct, and that I have placed the following identification on the left ear, viz:.....

Signed.....:Registrar

APPENDIX IV

LEITH NAUTICAL COLLEGE

Leith Nautical College, Edinburgh, Scotland, was opened on the 4th February, 1903. It is wholly devoted to technical instruction in subjects directly connected with the sea. It is a three-storey structure, plain but handsome, situated within the Docks, the front being in the broad business street called Commercial Street, near the railway termini and the tram cars.

It has well-equipped physical and mechanical laboratories and excellent classrooms, well supplied with appliances for every branch of nautical education, special care having been taken in the physical laboratory to provide for experimental work in magnetism and electricity in regard to their seafaring applications, matters in which every modern ship-master and officer should be expert; and, in the mechanical laboratory, for the teaching of seamanship, mechanical testing, and shipbuilding.

The teaching arrangements are framed to suit the needs of the migratory seafaring community. Students can enter at any time, and attend for long periods or for recurring short periods, as may be convenient to them.

The programme of instruction is as follows:—

- (a) Preparation for the Board of Trade Examinations;
- (b) Higher Nautical Education, including Naval Architecture and Marine Engineering;
- (c) Elementary and Special Nautical Instruction;
- (d) Radio-Telegraphy (Wireless Telegraphy).

The Elementary and Special Nautical Instruction (c) is on the following lines:—

- (a) *Special classes for fishermen*, in fishermen's navigation, weather knowledge, knotting and splicing and rigger's work, and a short course of ship surgery and medicine.
- (b) Courses of instruction to Teachers in the fishing and smaller sea ports.
- (c) A short course of popular evening lectures on nautical subjects.
- (d) A short course of elementary navigation, and rope knotting and splicing, for boys who will shortly go to sea. Boys who are going to sea should come to the Nautical College, for a period not exceeding six months, for this specialized instruction. This will make the teaching on board, by the ship-master, easier and pleasanter, as they will not be altogether ignorant of the subject when they join, and so will be likely to get much more benefit from any teaching given them on board.

Apart from fishermen's classes carried on in the College, arrangements have been made for similar classes being carried on in outlying fishing ports. Part of the instruction is usually given by one of the day schools' teachers of the locality. The College sends a special instructor to undertake such part of the teaching as the day schools' teacher cannot give.

TECHNICAL SCHOOL FOR FISHERMEN, GRIMSBY

A technical school for fishermen, carried on at the Fisherlads' Institute, has been established at Grimsby, England, the admission being free to all men and boys engaged on fishing vessels. The nature of the instruction given may be inferred from a resolution of the Education Committee, of the 25th February, 1907: That the instruction at present be confined to navigation, seamanship, net-making and mending, and conducted in a similar manner to the classes established in Hull.

During the year, 1913-1914, 893 students attended the school for short courses, the average daily attendance being 66. The majority of the students take the courses in navigation, although the instruction in braiding and mending of nets, wire splicing and knotting is not the least valuable part of the education given. Prizes are offered in all subjects and, so keen is the competition, that successful first candidates often score very close to a possible. The Institute boasts of turning out the first actual going-to-sea fisherman to pass the Special Compass Syllabus. For this examination a good knowledge of the laws of terrestrial magnetism is required, a knowledge and application of the rules in spherical trigonometry, and a practical demonstration of the method of compensating for the deviations of the compass. The excellent results attained in this and other lines are a tribute to the intelligence and enthusiasm of the fishermen.

The class in net-mending, as well as other classes, has suffered lately in attendance on account of the War but, no doubt, on the cessation of hostilities, renewed interest will be taken in this branch of fishermen's instruction.

APPENDIX V

An Act to provide for the Inspection and Branding of Pickled Fish

(4-5 George V, chap. 45, assented to 12th June, 1914)

HIS Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

1. This Act may be cited as *The Fish Inspection Act*.
2. In this Act, unless the context otherwise requires:—
 - (a) "Minister" means the Minister of Marine and Fisheries;
 - (b) "Department" means the Department of Marine and Fisheries;
 - (c) "inspecting officer" means an officer appointed under this Act;
 - (d) "regulations" means regulations made under the provisions of this Act.

3. This Act shall apply to salted herring, alewives, mackerel and salmon, and the barrels, half-barrels or other packages in which such fish are salted and marketed: Provided that the Governor in Council may at any time extend any or all of the provisions of this Act to any other kinds of fish.

4. The Governor in Council may appoint a general inspector and other officers for the carrying out of the provisions of this Act, and shall fix and determine the qualifications and duties of such officers.

5. Every inspecting officer appointed for the purpose of this Act shall, previous to his entering upon the duties of his office, take and subscribe to the following oath:—

I, _____ of _____ in the county of _____ in the Province of _____ do swear that I will faithfully and honestly execute the office and trust committed to me of (name of the office), and that I will not, either directly or indirectly, engage in or in anywise carry on the business of trading or dealing in fish barrels or fish during my term of office as _____ So help me God.

6. The Governor in Council may make such regulations, not inconsistent with the provisions of this Act, as to him seem necessary for the carrying out of the provisions hereof. Such regulations shall have the same force and effect as if herein enacted, and shall take effect from the date mentioned in the regulations, and shall be published in *The Canada Gazette*.

7. The brand provided by this Act shall not be put on any barrel containing herring, alewives, mackerel, salmon or any other fish that may hereafter be brought under the provisions of this Act, or on any half-barrel containing herring or alewives, unless such fish have been caught, cured and packed by such persons, in such manner, and under such conditions as may be prescribed by regulations made by the Governor in Council.

8. The inspection of barrels, half-barrels or other packages, and of the fish they contain, shall take place at the port or place where such fish may have been cured and packed: Provided that when curing and packing have been performed at sea the inspection shall take place at any port of landing in Canada.

9. Any curer or packer of herring, alewives, mackerel or salmon having cured and packed any or all of such fish for the purpose of obtaining the brand hereinafter described shall give notice in writing to the nearest inspecting officer, at his office or residence, of the number of barrels, half-barrels, or other packages of each of the kinds herein named, or which may hereafter be named, which he desires to present to the said officer for inspection.

10. The inspecting officer on arrival at the place designated in the aforementioned notice shall require the owner or packer to sign a statutory declaration that the fish presented for inspection were cured and packed in Canada or on board of a Canadian vessel or boat within the period prescribed for the various classes of fish by the regulations, and that such fish have been in salt for such number of days as are prescribed for the different classes thereof in the regulations.

11. The brand hereinafter described shall not be placed on any barrel, half-barrel or other package containing cured herring, alewives, mackerel or salmon, the liquid capacity of which is less than that prescribed in the regulations, and which barrel, half-barrel or other package is not made and marked in accordance with such regulations.

12. On the presentation of the filled barrels, half-barrels or other packages to a qualified inspecting officer to be inspected for the brand, such officer shall open, or cause to be opened, so many of the barrels, half-barrels or other packages and shall remove therefrom so many of the fish, as may be prescribed by the regulations, for the purpose of ascertaining whether such fish are of the quality represented and otherwise in accordance with the standard for that particular kind of fish as prescribed by this Act and the regulations.

13. On every barrel of herring, alewives, mackerel or salmon and on every half-barrel of herring or alewives, which on such inspection as aforesaid shall be found by the said officer to be in all respects packed in accordance with the regulations for that particular kind of fish, there shall be branded with a hot iron, by the inspecting officer, or by his order and in his presence, such mark or marks as shall be directed by the regulations. Such mark or marks shall denote the quality of the fish, the year of branding, and the officer by whom or by whose order and in whose presence the brand has been applied.

14. The Governor in Council may appoint inspecting officers to be commissioners to administer oaths and to take and receive affidavits, declarations and affirmations for all the purposes of this Act.

15. Any inspecting officer may at any time when herring, alewives, mackerel or salmon are being cured, packed or repacked, enter the warehouse or other packing establishment, or go on board of any vessel or boat where such curing, packing or repacking is being performed, for the purpose of ascertaining whether such fish are being cured, packed or repacked, in accordance with this Act and the regulations.

16. Any person who, without the authority of the inspecting officer, burns, brands or otherwise marks, or causes to be burnt, branded or otherwise marked, on any barrel, half-barrel or other package of fish any mark or marks which by virtue of this Act or the regulations made under it are required to be burnt, branded or otherwise marked on any barrel, half-barrel or other package of fish, or any mark so nearly resembling the mark prescribed by this Act or the regulations as to be calculated to deceive, or who without lawful authority has in his possession any instrument such as is used for branding, burning or otherwise marking on any barrel, half-barrel or other package of fish in accordance with the provisions of this Act and the regulations, shall be liable to a penalty of not less than twenty dollars and costs, and in default of payment to imprisonment for a term not less than one month, or both, and not more than five

hundred dollars or six months' imprisonment, or both: Provided that nothing in this section contained shall operate so as to prevent any person or firm from applying to any barrel, half-barrel or other package containing fish of any kind whatsoever, any private trade mark.

17. Any person who alters, destroys, erases or falsifies any declaration or other document prescribed for use under the provisions of this Act or under the regulations shall be liable to a penalty of not less than twenty dollars and costs, and in default of payment to imprisonment for a term of not less than two months, or both, and not more than five hundred dollars or six months' imprisonment, or both.

18. Any person who empties, or partially empties, or causes to be emptied or partially emptied, any barrel, half-barrel or other package of fish which has been inspected and branded, in order to put into such barrel, half-barrel or other package any fish of the same kind or of any other kind, not contained therein at the time of inspection, or who uses any barrel, half-barrel or other package which has previous to such use been inspected and branded, without completely obliterating the brand or marks, shall be liable to a penalty of not less than one hundred dollars and costs, and in default of payment to imprisonment for a term of not less than three months, or both.

19. If any marks branded on any barrel, half-barrel or other package of fish by any qualified inspecting officer pursuant to this Act, or to the regulations, are altered or defaced, so long as such barrels, half-barrels or other packages contain the fish inspected in them, every such barrel, half-barrel or other package with the fish therein contained shall be forfeited to His Majesty, and may be seized by any inspecting officer.

20. If any dispute arises between any inspecting officer and the owner, packer or possessor of any barrels, half-barrels or other packages of cured fish inspected by said officer, with regard to the quality or condition of such barrels, half-barrels or other packages or the fish they contain, such dispute shall be forthwith referred to another inspecting officer whose decision in the premises shall be final: Provided that no appeal from the inspecting officer's decision shall be considered in any case where the identity of the article in dispute has not been preserved.

21. If the opinion of the inspecting officer is confirmed, the travelling expenses of the referee in connection with the re-examination shall be paid by the owner, packer or possessor of such articles; and if otherwise, by the Department.

22. The Governor in Council may make regulations for the guidance of inspecting officers re-examining any article, on appeal from the decision of any other inspecting officer.

23. Any inspecting officer or constable may arrest without a warrant any person found committing an offence against the provisions of this Act, and shall forthwith take any person so arrested before a justice of the peace to be examined and dealt with according to law; a person so arrested shall not be detained in custody, without the order of a justice of the peace, longer than twenty-four hours.

24. Any inspecting officer charged with the enforcement of this Act may enter upon any premises to make examination of any barrel, half-barrel or other package of fish suspected of being or having been falsely marked or packed in violation of the provisions of this Act or the regulations, whether such barrel, half-barrel or other package is on the premises of the owner, or elsewhere.

25. Every offence against this Act, or against any regulation, shall for the purposes of legal proceedings be deemed to have been committed, and every

cause of complaint under this Act, or any such regulations, shall be deemed to have arisen in the place in which it actually was committed, or the place where it was first discovered by the inspecting officer, or where the defendant resides or is found.

26. Nothing contained in this Act shall compel any person to present for inspection any fish, or barrels, half-barrels or other packages in which they are contained.

27. This Act shall come into force on the 1st day of May, 1915, but the officers referred to in this Act may be appointed, and the regulations authorized by this Act may be made, at any time after the passing of this Act.

28. Except as in this Act otherwise provided, every one who violates any provision of this Act, or any regulations made under it, shall be liable to a penalty of not more than five hundred dollars, and in default of payment to imprisonment for a term not exceeding six months, or to both.

29. Every penalty and forfeiture imposed under this Act or under any regulation made under it shall be recoverable and enforceable with costs upon summary conviction under Part XV of the *Criminal Code*.

30. Part VII of *The Inspection and Sale Act*, Revised Statutes of Canada, 1906, chapter 85, is hereby repealed, except in so far as it relates to the inspection of fish oils.

Regulations made under The Fish Inspection Act, 1914

CONSTRUCTION AND CAPACITY OF BARRELS AND HALF-BARRELS

1. The staves and heading of every barrel and half-barrel shall be composed of well-seasoned close-grained wood of good quality and capable of retaining pickle.

2. In course of construction, every barrel and half-barrel shall be well fired so as to admit of the staves being bent to the requisite extent, and the staves shall not be cracked, broken or patched.

3. The staves of every barrel, when completed, shall be not less than five-eighths of an inch, and the heading not less than three-fourths of an inch in thickness; and the staves of every half-barrel when completed, shall be not less than nine-sixteenths of an inch and the heading not less than five-eighths of an inch in thickness.

4. The staves of every barrel and half-barrel shall not exceed five inches, and shall not be less than two inches and one-half inch in breadth at the bilge.

5. The heads of barrels and half-barrels shall be composed of not less than three pieces and shall be securely fastened with either hardwood or iron dowels. All heads shall be bevelled one-third outside and two-thirds inside, and shall fit properly in a clean-cut croze, one-eighth of an inch deep.

6. The chimes shall be one inch in length from the top to the croze.

7. Every barrel and half-barrel shall be hooped in one of the three following ways, viz.:

- (a) entirely with wooden hoops;
- (b) partly with wooden hoops and partly with iron hoops;
- (c) entirely with iron hoops.

8. Every barrel hooped entirely with wooden hoops shall be full-bound on both ends, that is, from the quarter to the end.

9. Every barrel hooped partly with wooden hoops and partly with iron hoops shall have an iron hoop on each end, two inches wide of wire gauge No. 16 if of black iron and No. 17 if of galvanized iron, and shall have not less than three good wooden hoops on each quarter.

10. Every barrel hooped entirely with iron hoops shall have an iron hoop on each end as defined in Clause 9, and shall have two iron hoops black or galvanized on each quarter, one and one-fourth inches wide of wire gauge No. 18, and there shall be one and one-half inches between the upper and lower quarter hoops, on each quarter.

11. Every half-barrel hooped partly with wooden hoops and partly with iron shall have an iron hoop on each end one and one-half inches wide of wire gauge No. 17 if of black iron and No. 18 if of galvanized iron, and shall have three good wooden hoops on each quarter.

12. Every half-barrel hooped entirely with iron hoops shall have an iron hoop on each end as defined in Clause 11, and shall have two iron hoops, black or galvanized, one inch wide of wire gauge No. 18 on each quarter, and there shall be one and one-quarter inches between the upper and lower hoops on each quarter.

13. Every barrel shall have a space of ten inches, and every half-barrel a space of nine inches across the bilge between the quarter hoops.

14. The wooden hoops on every barrel and half-barrel shall be of sound hardwood, and be not less than three-fourths of an inch for barrels, and five-eighths of an inch for half-barrels in breadth at the small end; and each hoop shall be properly notched, perfectly fitted and firmly driven to its place.

15. Every barrel and half-barrel shall be made perfectly tight and before they leave the maker's hands he shall bore a hole, three-eighths of an inch in diameter, through the head of every barrel and half-barrel, and by blowing into them test their air-tightness. A half pint of weak pickle should be poured into every barrel and half-barrel before the head is put in, to assist in the detection of leaks.

16. The staves of every barrel, intended to be filled with cured herring or alewives shall be twenty-seven inches in length and the heads seventeen inches in diameter, i.e., a seventeen-inch cut head; every such barrel shall be twenty inches in diameter at the bilge, outside measurement, and be capable of containing not less than twenty-two gallons imperial measure.

17. The staves of every half-barrel intended to be filled with cured herring or alewives shall be twenty-two inches in length, and the heads fourteen inches in diameter, i.e., a fourteen-inch cut head; and every such half-barrel shall be seventeen inches in diameter at the bilge, outside measurement; and be capable of containing not less than eleven gallons imperial measure.

18. The staves of every barrel, intended to be filled with cured mackerel or salmon, shall be twenty-nine inches in length and the heads seventeen inches in diameter i.e., a seventeen-inch cut head; and every such barrel shall be twenty-one inches in diameter at the bilge, outside measurement, and be capable of containing not less than twenty-six gallons imperial measure.

19. The staves of every half-barrel intended to be filled with cured mackerel or salmon shall be twenty-four inches in length, and the heads fourteen inches in diameter, i.e., a fourteen-inch cut head; and every such half-barrel shall be

eighteen inches in diameter at the bilge, outside measurement, and every such half-barrel shall be capable of containing not less than thirteen gallons imperial measure.

20. The heads of every barrel and half-barrel shall be planed on the outside.

21. On every barrel and half-barrel the name of the maker and the place of making shall be stamped in small but legible letters in the space between the upper quarter hoop and the end hoop, on quarter hooped barrels, and close to the lower hoop on full bound barrels.

22. The capacity of barrels and half-barrels intended for use in curing herring in what is known as the Scottish style, shall be either as defined in the foregoing clauses, or as defined in Appendix 1.

23. When any curer or packer of herring, alewives, mackerel or salmon has completely cured and packed any or all of such, for the purpose of obtaining the brand, he shall give notice in writing to the nearest inspecting officer, at the office or residence of such officer, of the number of barrels or half-barrels of each of the kinds of fish herein named which he desires to present to the said officer for inspection; and he shall state in such notice the place where inspection is desired.

24. An inspecting officer, on receipt of such notice as is mentioned in the foregoing section, shall so govern his movements over his district that the least possible time shall elapse between the receipt of such notice and the carrying out of the desired inspection.

25. The inspecting officer, on arrival at the place designated in the aforementioned notice, and before proceeding with the inspection, shall require the curer or packer to sign, in his presence, a declaration that the fish presented for inspection were cured and packed in Canada or on board of a Canadian vessel or boat, within the time herein prescribed for each particular kind; and that such fish have been in salt for such number of days as are herein prescribed for the different kinds thereof.

26. On the outside of the bottom of every barrel and half-barrel presented for inspection there shall be legibly written with a lead pencil at the time of packing, the class of fish and the date on which the fish were first put in salt, as the case may be, in the following manner:

<u>No. 1</u>	or	<u>No. 2</u>
Aug. 10		Sept. 3

27. The name of the packer or owner and the name of the place of packing shall be legibly stencilled on the outside of the bottom of every barrel and half-barrel presented for inspection.

28. The barrels and half-barrels presented for inspection shall be laid out in such a way that the marks on the bottom ends may come at once under the eye of the inspecting officer.

29. Barrels and half-barrels filled with cured herring, alewives, mackerel or salmon, and presented for inspection for the brand shall be closely examined by the inspecting officer, to see that such barrels and half-barrels are made strictly in accordance with the regulations; and he shall, if considered necessary, empty the fish out of at least one barrel and one half-barrel from the lot of such fish so presented by each packer, and shall test the capacity of at least three others of each type by calipers, and the inspecting officer may, if he considers it necessary, weigh the fish from one barrel in each parcel.

30. The minimum number of barrels to be opened for examination by an inspecting officer shall be as follows:

In parcels of fifty or more barrels or half-barrels, ten per cent shall be opened and examined.

In parcels of less than fifty barrels or half-barrels, twenty per cent shall be opened and examined.

31. Inspecting officers are not restricted to the scale mentioned, but, if need be, shall open as many more barrels or half-barrels as they may deem requisite to satisfy themselves that the fish are worthy of the brand, for the granting of which officers will be held responsible to the Department.

32. From any parcel presented for the brand, the inspecting officer alone shall select and indicate the barrels or half-barrels that are to be examined.

33. In the case of a parcel containing fish cured on different dates, the inspecting officer, in selecting the barrels or half-barrels to be opened, shall select some containing fish cured on each of the different dates.

34. The barrels or half-barrels selected for examination shall, as a general rule, be opened at the bottom end and the head end alternately; that is to say, if the first barrel examined is opened at the head end, the second shall be opened at the bottom end, and so on until the whole examination is concluded.

35. From one in every five barrels or half-barrels opened for examination the inspecting officer shall remove and examine the fish down to the middle of the barrel or half-barrel; and from each of the remaining barrels or half-barrels opened, he shall remove and examine the fish down to the lower quarter hoop of the end opened. In small parcels where fewer than five barrels or half-barrels are opened, one barrel or half-barrel shall be examined down to the middle, and the remaining barrels or half-barrels opened shall be examined down to the lower quarter hoop of the end opened.

36. The inspecting officer, on completion of the examination, shall see that each barrel or half-barrel which has been opened and examined is filled up with the same fish which were removed from it—all objectionable ones being excluded, and replaced by fish conforming to the standard—and headed with proper care.

37. The curer or packer shall be responsible for the coopering and packing necessitated by the examination.

38. The inspecting officer shall himself remove the fish from the barrels or half-barrels when conducting the examination.

METHOD OF CURING, PACKING, ETC., OF HERRING AND ALEWIVES NECESSARY TO SECURE THE BRAND

39. Herring to be cured round should have the gills and entrails taken clean away by cutting just below the two upper fins, with a sharp knife, and should be thoroughly salted into perfectly tight clean receptacles immediately after being caught.

40. Herring to be cured as split herring should be neatly opened with a sharp knife, and have the blood scraped from the bone, washed and thoroughly salted into perfectly tight clean receptacles immediately after being caught.

41. Alewives should be thoroughly salted into perfectly tight clean receptacles immediately after being caught.

42. Herring and alewives should be well turned over in salt, and as much of it as possible allowed to stick to each fish before being placed in the afore-

mentioned receptacles, in order to prevent one fish from sticking to the other and becoming discoloured when cured.

43. Herring and alewives shall have been in salt and pickle for not less than ten free days before being presented for the brand.

44. Herring and alewives should be carefully laid in tiers in the barrels or half-barrels and each tier uniformly salted and completed with two fish laid across the heads of those in the tier, and each successive tier laid transversely to the tier underneath, and the heads of the fish kept close to the sides of the barrels or half-barrels.

45. Barrels and half-barrels should be soaked in clean water before filling.

46. In finally packing barrels or half-barrels after the fish have been in salt and pickle not less than ten days fish of the same quality and of the same date of curing should be used, and every barrel should contain two hundred pounds and every half-barrel one hundred pounds of fish when completely packed.

47. Barrels and half-barrels after being packed should be immediately headed up, made perfectly tight, and filled through a bung hole in the centre of the bilge, with clean pickle made strong enough to float a herring.

48. The fish during the process of curing and handling, and the barrels and half-barrels after being filled must be carefully protected at all times from the weather.

49. After barrels and half-barrels have been finally filled, the top quarter hoops and the chime hoops when of wood should be securely nailed with nails not exceeding one and one-quarter inches in length.

50. The curing of herring in what is known as the Scottish style for the brand shall be carried out in the manner described in Appendix I.

METHOD OF CURING, PACKING, ETC., OF MACKEREL AND SALMON NECESSARY TO SECURE THE BRAND

51. Mackerel and salmon should be well split with a sharp knife and should have the blood removed from the back bone, thoroughly washed in at least three changes of water, and salted into perfectly tight clean receptacles immediately after being caught.

52. Mackerel and salmon should be well dredged in salt before being packed in the aforementioned receptacles.

53. In packing, the bottom of the receptacle should be covered with salt, and the first tier of fish laid thereon with their backs downward, care being taken to keep the packing level; when the tier is completed it should be covered with salt. The second tier should be laid in the same manner, and so on till the barrel is filled. The top tier should be back up.

54. Mackerel and salmon shall have been in salt and pickle for not less than twelve free days before being presented for the brand.

55. In finally preparing mackerel and salmon for the brand they shall be emptied out of the receptacle, washed in pickle, selected in accordance with the sizes hereinafter mentioned, and weighed into lots which, when packed in a barrel, would each weigh two hundred pounds, and in a half-barrel, one hundred pounds.

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56. The process of repacking mackerel and salmon should be the same as that of packing in the original receptacles except that a little less salt should be used. The top tier should be back up.

57. When the repacking is finished the barrels should be headed up and made perfectly tight, the hoops nailed, as described for herring barrels, and the barrels filled with clean, strong pickle, through a bung hole in the centre of the bilge.

NUMBER OF CLASSES AND GRADES INTO WHICH HERRING SHOULD BE DIVIDED, AND THE REQUIREMENTS FOR EACH IN ORDER TO OBTAIN THE BRAND

58. There shall be three classes of branded herring, namely: Fat July Herring, Fat August Herring, and Spring and Fall Herring; and there shall be two grades in each class, namely: Number 1 and Number 2.

59. Herring to be classed as Fat July Herring shall consist of fat herring taken during the month of July.

60. Herring to be classed as Fat August Herring shall consist of herring taken during the month of August and early September, before they have spawned.

61. Herring to be classed as Spring and Fall Herring shall consist of herring taken during the spring months, including June, and herring taken during the fall months after the spawning period.

62. Number 1 herring of either of the foregoing classes shall consist of perfectly sound fish measuring not less than eleven inches from the extremity of the head to where the flesh and tail meet. They shall be free from rust, bright in colour, uniformly salted and thoroughly cured.

63. Number 2 herring of either of the foregoing classes shall consist of perfectly sound fish measuring not less than nine inches from the extremity of the head to where the flesh and tail meet. They shall be free from rust, bright in colour, uniformly salted and thoroughly cured.

NUMBER OF GRADES INTO WHICH ALEWIVES SHOULD BE DIVIDED, AND THE REQUIREMENTS FOR EACH IN ORDER TO OBTAIN THE BRAND.

64. There shall be two grades of branded alewives, namely: Number 1 and Number 2.

*65. Number 1 alewives shall consist of perfectly sound fish, measuring not less than ten inches from the extremity of the head to where the flesh and tail meet. They shall be free from rust, bright in colour, uniformly salted and thoroughly cured.

*66. Number 2 alewives shall consist of perfectly sound fish, measuring not less than eight inches from the extremity of the head to where the flesh and tail meet. They shall be free from rust, bright in colour, uniformly salted and thoroughly cured.

*Sections 65 and 66 have been rescinded by Order in Council, June 2, 1915, and the following substituted in lieu thereof:

65. Number 1 alewives shall consist of perfectly sound fish, measuring not less than nine inches from the extremity of the head to where the flesh and tail meet. They shall be free from rust, bright in colour, uniformly salted and thoroughly cured.

66. Number 2 alewives shall consist of perfectly sound fish, measuring not less than seven inches from the extremity of the head to where the flesh and tail meet. They shall be free from rust, bright in colour, uniformly salted and thoroughly cured.

67. The brand shall be refused to any class or grade of herring or alewives presented for examination if such fish are not packed in barrels or half-barrels such as are hereinbefore described.

NUMBER OF CLASSES AND GRADES INTO WHICH MACKEREL SHOULD BE DIVIDED, AND THE REQUIREMENTS FOR EACH, IN ORDER TO OBTAIN THE BRAND

68. There shall be three classes of branded mackerel: Spring Mackerel, Summer Mackerel and Fall Mackerel. Spring Mackerel shall be graded as "Large," "Medium" and "Small." Summer Mackerel as No. 2 and No. 3; Fall Mackerel as Bloaters, No. 1, No. 2 and No. 3.

69. Mackerel to be classed as spring mackerel shall consist of mackerel taken during the spring and early summer.

70. Mackerel to be classed as summer mackerel shall consist of mackerel taken during the month of August and early September.

71. Mackerel to be classed as fall mackerel shall consist of fat mackerel taken during the fall months.

72. Large spring mackerel when finally packed for the brand shall consist of mackerel not less than 15 inches from the extremity of the head to where the flesh meets the tail (measured down the centre of the fish).

The mackerel shall be properly split and well washed. They shall have all blood removed, and be regularly packed, uniformly salted and thoroughly cured.

73. Medium spring mackerel when finally packed for the brand shall consist of mackerel under 15 inches and not less than 13 inches from the extremity of the head to where the flesh meets the tail (measured down the centre of the fish.)

The mackerel shall be properly split and well washed. They shall have all blood removed and be regularly packed, uniformly salted and thoroughly cured.

74. Small spring mackerel when finally packed for the brand shall consist of mackerel under 13 inches and not less than 11 inches from the extremity of the head to where the flesh meets the tail (measured down the centre of the fish).

The mackerel shall be properly split and well washed. They shall have all blood removed and be regularly packed, uniformly salted and thoroughly cured.

75. No. 2 summer mackerel when finally packed for the brand shall consist of mackerel not less than 13 inches from the extremity of the head to where the flesh meets the tail (measured down the centre of the fish).

The mackerel shall show distinct signs of fat, be properly split and well washed; they shall have all blood removed and be regularly packed, uniformly salted and thoroughly cured.

76. No. 3 summer mackerel when finally packed for the brand shall consist of mackerel under 13 inches, and not less than 11 inches from the extremity of the head to where the flesh meets the tail (measured down the centre of the fish).

The mackerel shall show distinct signs of fat, be properly split and well washed; they shall have all blood removed and be regularly packed, uniformly salted and thoroughly cured.

77. Bloaters when finally packed for the brand shall consist of extra fat fall mackerel, and shall count not more than one hundred fish to a full barrel.

The mackerel shall be properly split, well washed, white in colour, free from blood stains, regularly packed, uniformly salted and thoroughly cured.

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78. No. 1 fall mackerel when finally packed for the brand shall consist of fat mackerel not less than 15 inches from the extremity of the head to where the flesh meets the tail (measured down the centre of the fish).

The mackerel shall be properly split, well washed, white in colour, free from blood stains, regularly packed, uniformly salted and thoroughly cured.

79. No. 2 fall mackerel, when finally packed for the brand shall consist of fat mackerel under 15 inches and not less than 13 inches from the extremity of the head to where the flesh meets the tail (measured down the centre of the fish).

The mackerel shall be properly split, well washed, white in colour, free from blood stains, regularly packed, uniformly salted and thoroughly cured.

80. No. 3 fall mackerel, when finally packed for the brand shall consist of fat mackerel under 13 inches and not less than 11 inches from the extremity of the head to where the flesh meets the tail (measured down the centre of the fish).

The mackerel shall be properly split, well washed, white in colour, free from blood stains, regularly packed, uniformly salted and thoroughly cured.

NUMBER OF GRADES INTO WHICH SALMON SHOULD BE DIVIDED AND THE REQUIREMENTS FOR EACH IN ORDER TO OBTAIN THE BRAND

81. There shall be one grade of branded salmon, namely: No. 1.

82. No. 1 salmon when finally packed for the brand shall consist of good, sound fish, properly split, well washed, free from blood stains, regularly packed, uniformly salted and thoroughly cured.

83. The brand shall be refused to any class or grade of mackerel or salmon presented for examination if such fish are not packed in barrels or half-barrels such as are hereinbefore described.

METHOD OF DECIDING DISPUTES BETWEEN INSPECTING OFFICER AND OWNER

84. In the event of a dispute arising between an inspecting officer and the owner, packer or possessor of any barrels or half-barrels of cured fish inspected by the said officer, regarding the quality or condition of such barrels or half-barrels or the fish they contain, the owner, packer, or possessor may notify another inspecting officer that a re-examination of the articles in dispute is desired.

85. On receipt of such notification the inspecting officer shall at once proceed to the place designated and carry out the re-examination with the least possible loss of time.

86. No re-examination shall be undertaken until the inspecting officer has satisfied himself as to the identity of the articles in dispute, but no new declaration shall be required.

87. A re-examination shall be carried out in a manner similar to a first examination.

88. If the decision of the first inspecting officer is confirmed by the second inspecting officer, the travelling expenses of the latter in connection with the re-examination shall be paid by the owner, packer, or possessor of the articles in dispute; and if otherwise, by the Department.

DESCRIPTION OF BRAND AND STENCIL TO BE USED, AND METHOD OF APPLYING THE SAME

Every barrel and half-barrel containing cured herring, alewives, mackerel or salmon, presented to an inspecting officer for inspection shall, if the construction and capacity of the barrel or half-barrel and the quality, cure, selection and packing of the fish contained therein, are, in the opinion of such officer, such as satisfy the requirements for its particular class and grade:

(a) have branded in his presence, by means of a hot iron, on the bilge, a crown surrounding the word "Canada," a description of the grade of the fish, viz: No. 1, No. 2, or No. 3 (as the case may be), letters indicating the name of the inspecting officer, and figures representing the month and the year of branding;

(b) have stencilled in his presence, on the head end, a crown surrounding the word "Canada", the kind and quality of the fish, letters indicating the name of the inspecting officer, and figures representing the month and the year of branding.

In addition to the foregoing all branded mackerel shall have the word "Spring," "Summer," or "Fall" (as the case may be), branded with a hot iron below the crown, all branded herring shall have the word "July," "August," or "Spring" and "Fall" (as the case may be), branded with a hot iron below the crown, and all branded herring shall have the word "split" or "round" (as the case may be), stencilled on the head end below the crown.

FORM OF DECLARATION TO BE MADE BY PACKER OR OWNER TO THE INSPECTING OFFICER BEFORE INSPECTION, AS CALLED FOR BY SECTION 25

I..... declare that the fish and every part thereof contained in the barrels and half-barrels now produced for inspection have, to the best of my knowledge and belief, been caught by British subjects, and cleaned, salted, and packed by British subjects in Canada or on board of a Canadian vessel or boat, within the time prescribed in the regulations for each particular kind of fish, and that they have been in salt for not less than the number of days prescribed in the regulations for such particular kind of fish, and that none of the said fish have been before this time produced for inspection to any inspecting officer, either in the same or in different barrels or half-barrels, in order to obtain the official brand; and I make this solemn declaration, conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath by virtue of the Canada Evidence Act.

.....Packer or Curer

Declared before me at

the.....day of....., 19.....,

.....

Inspecting Officer

HERRING CURED IN THE SCOTTISH STYLE

1. The construction of barrels and half-barrels for the Scottish system of herring curing shall be as defined in clauses 1 to 15 of the main regulations.

2. The capacity of barrels necessary to secure the brand under the Scottish system of herring curing shall be either twenty-six gallons and two-thirds part of a gallon imperial measure, and of half-barrels thirteen and one-third part

of a gallon imperial measure, or twenty-two gallons imperial measure and eleven gallons imperial measure respectively.

METHOD OF CURING, PACKING, ETC., OF HERRING IN THE SCOTTISH STYLE NECESSARY TO SECURE THE BRAND

3. The herring must be perfectly fresh, bright and firm, and should not be allowed to be exposed to sun or rain.

4. The gills and gut must be taken clean away with a sharp narrow-bladed knife, by cutting just below the two upper fins, leaving the roe or milt in the fish.

The herring should be separated into three grades during the process of gutting, and be known as "Large Full," "Full," and "Medium Full."

5. "Large Full" shall consist of herring not more than 13 inches and not less than 11½ inches in length from the point of the nose to the tip of the tail, and showing the roe or milt at the throat when the gut has been extracted.

"Full" shall consist of herring under 11½ inches but not less than 10½ inches in length, from the point of the nose to the tip of the tail, showing the roe or milt at the throat when the gut has been extracted.

"Medium Full" shall consist of herring under 10½ inches, but not less than 9½ inches in length from the point of the nose to the tip of the tail, and showing the roe or milt at the throat when the gut has been extracted.

6. The gutted fish shall be placed in a tub or other suitable receptacle, each grade separately, and thoroughly turned over in, and mixed with salt.

7. When properly roused the herring shall be lifted from the rousing tub, allowing as much as possible of the rousing salt to stick to each fish, and packed in tiers in a barrel or half-barrel. The fish shall be laid back down, and kept close together, three herring being used to stretch across the tier, one at each side with their heads to the staves, and one in the centre; in packing Grade 1 into half-barrels, two herring may be used to stretch across the tier. When the tier has been completed two herring shall be placed on their sides, over the heads of the herring in the tier, with their tails crossed and their backs next to the staves. In packing Large Fulls into half-barrels one herring may be placed over the heads of those in the tier. The whole tier shall then be salted, and the next tier packed transversely to the one below it, and so on until the barrel is packed full, each tier being salted separately. The gutting and packing should take place at the same time, and shall be completed within twenty-four hours after the fish have been taken from the nets.

8. The quantity of salt which may be used in packing varies according to the size and condition of the fish. A safeguard is to evenly scatter as much salt on each tier as will almost cover the bellies of the fish in the tier, Large Fulls getting a little more than Fulls, and Medium Fulls a little less.

9. On the outside of the bottom of every barrel and half-barrel about to be filled, there shall be legibly written with a lead pencil, at the time of packing, the class of fish and the date of curing as for example:

<u>FULL</u>		<u>MEDIUM FULL</u>
Aug. 10	or	Sept. 3

10. On the third day after the original packing the salt will be found to have dissolved a little and, provided the barrel is not leaky, pickle seen almost up to the top tier. The herring will also be found to have sunk two or three inches in the barrel. On this day, therefore, the space left by the sinking of the her-

ring in each barrel shall be filled up to the croze, with herring of the same day's pack and grade, a little salt being added to the herring used in filling up. The head shall then be put in and made tight, and the barrel laid on its side for the stated number of days before the final filling up and preparation for market.

11. On the twelfth day, counting from the day of first packing, a bung-hole shall be made in the side of the barrel, midway between the centre of the bilge and the lower hoop on the bottom end, the barrel up-ended and the head taken out. The bung shall then be withdrawn and the pickle run off as far down as the bung-hole. This pickle should be retained for future use.

The space thus left shall be filled up with herring of the same date of packing, and of the same grade as is shown by the marks on the bottom.

The packing shall be as before, and the barrel so filled that the top tier shall be quite flush with the end of the staves.

Three herring shall be laid straight on their backs across the heads of the herring of the top tier, instead of two on their sides as in the other tiers.

The head shall then be pressed in and made perfectly tight, and as much of the original pickle as the barrel will take inserted through the bung-hole. This should leave the top tier slightly flattened, smooth and firm.

Herring used for the second filling up should be washed in pickle and slightly sprinkled with salt when in the tiers.

If barrels filled with herring lie for some time after being finally filled up, before shipment to market, they shall be supplied with pickle at least once in two weeks.

12. The method of notifying inspecting officer, and the method of inspection of barrels and half-barrels filled in the Scottish style, shall be as described in clauses 23 to 38 of the main regulations.

APPENDIX VI

Synopsis of the Report on the Otter Trawl Fishery, Submitted to Congress by the United States Commissioner of Fisheries*

The report on the otter trawl fishery recently submitted to Congress by the United States Commissioner of Fisheries, sheds much light on a vexed question which has aroused a very bitter controversy in Eastern Canada. It merits careful study and consideration from Canadian fisheries authorities.

The Sundry Civil Appropriation acts approved by Congress on August 24th, 1912, authorized the Commissioner of Fisheries "to investigate the method of fishing known as beam or otter trawling and to report to Congress whether or not this method of fishing is destructive to the fish species, or is otherwise harmful or undesirable." The granting of the foregoing authority was consequent upon an agitation against the operations of steam trawlers similar to that being carried on at the present time by the line fishermen of Nova Scotia. The points in dispute were substantially the same in both instances. The representations against and in defence of steam trawlers are quoted as follows, in the form in which they are stated by Commissioner H. M. Smith of the Bureau of Fisheries, in transmitting the report to the Secretary of Commerce:

"On the one hand it was charged:

(1) That the fishing areas where steam trawlers have already been operating have become seriously depleted of fish;

(2) That the spawn or eggs of fish are destroyed by the trawl net when being dragged along the bottom;

(3) That immature fish are taken in very large numbers, which are killed in the process of capture and are thrown away;

(4) That valuable shellfish are destroyed in large numbers;

(5) That steam trawlers carry on operations at night, as well as in the daytime, and that, although an effort might be made to keep clear of the ordinary fisherman's gear during daylight, no such effort would be made in the darkness, owing to the invisibility of the buoys and other floating marks;

(6) That it is not an uncommon thing for a steam trawler to come close to ordinary fishing vessels and their dories, and, when the gear of the latter is in the water and being overhauled, if fish appear plentiful, to sweep around the spot and, with the trawlnet, carry away the gear with all the fish on the hooks;

(7) Further, that while steam trawling has been prohibited within the territorial waters of Canada, such protection affords the inshore fishermen little protection, as their gear is frequently set even long distances beyond territorial waters, and it, of course, affords no protection whatever to the "bank" fishermen.

"On the other hand it is urged:

(1) That steam trawling is not an unduly destructive method of fishing, as an evidence of which is the fact that it has been intensively carried on in the North sea and other European waters for very many years without any diminution of the fisheries being apparent;

*See report on *The Otter Trawl Fishery*, by A. B. Alexander, H. T. Moore and W. C. Kendall.—United States Bureau of Fisheries, Document No. 136.

(2) That continuous supplies are necessary to meet the demands of the growing fresh-fish markets, and that, as steam trawling can be carried on in practically all weathers, it is the only means of providing such continuous supplies;

(3) That edible flat fishes, for which there is an ever-growing market, and which are taken in very limited quantities by hook and line, can be secured in large quantities by steam trawlers."

METHOD OF INVESTIGATION

Little time was lost in organizing the work, Mr. A. B. Alexander directing the field investigation. Bureau officials, selected for their practical experience and lack of prejudice, were placed on both otter and line trawlers operating out of New England ports, supplied with printed forms on which to record their observations in a very detailed manner and with respect to all phases of fishing operations. The field investigation, including the observation of 64 trips and 1,633 hauls by otter trawlers, and of 17 trips and 90 sets of trawl lines by schooners, was completed by December, 1913. The data collected were handed over to a committee specially appointed to draw up the official report for Congress. This committee based its conclusions respecting American fishing grounds wholly upon the material accumulated by the Bureau of Fisheries but, for comparative purposes and an adequate comprehension of the subject as a whole, found it necessary to make a very thorough study of the history of otter-trawling in Great Britain. Statistical evidence from British sources therefore occupies an important position in the discussion. The report was completed and submitted in January of the present year. A very significant statement, occurring in the letter of transmittal from the Bureau Committee to the Fisheries Commissioner, reads as follows: "When analyzed, the allegations against trawl-fishing seem to have had their origin in that one economic factor that has been an ever-present cause of complaint against each and every innovation in fishery methods and appliances in whatever country—competition."

INFORMATION REGARDING AMERICAN FISHERIES

Otter-trawling is a comparatively new development in American waters. The first vessel of this type in the American service was operated out of Boston in 1905 and numerical increase of the fleet was very slow until 1910. Even today, the Boston steam-trawling fleet numbers not more than a dozen vessels all told, but it is the rapid increase of the last four years that has caused apprehension regarding possible depletion of fishing waters. At the same time, recent years have witnessed a great change in the model and rig of fishing vessels of all types. Without going into detail, these may be roughly divided first into two classes, liners and otter trawlers. Line fishing itself may be subdivided into hand-line and trawl-line fishing, but the distinction has no special significance with regard to the respective effects of the two methods upon the continued productivity of fishing-grounds. Lines, whether hauled by hand from a dory or the deck of a schooner, or set as an extensive trawl-line system of buoys, ground lines and gangings, are not essentially different either in operation or effect. They are simply variations of the same system. The otter trawl, however, introduces an entirely new method. Briefly stated, it consists of a large, flattened, conical bag which is towed along the bottom of the sea. The bag or net commonly used is about 150 feet long; the upper edge of the mouth about 110 and the lower edge 140 feet long. The frontal third of the net has a mesh 3 inches square, the median section $1\frac{1}{2}$ inches square, while the mesh of the rear or cod end is $1\frac{1}{4}$ inches square. When in motion the net is kept open laterally by two heavy doors or otter-boards, one at each side, attached so as to act like kites. The typical trawling vessel is 115 feet in length, of from 248 to 296 gross tons, and equipped with engines of about 450 horsepower. In fishing, the trawl-net is towed along the bottom of the sea at a rate of from two to three miles per hour, usually for about $1\frac{1}{2}$ hours per haul. As fishing continues day and night, a steam trawler will average ten or twelve hauls per twenty-four hours.

The foregoing furnishes some slight conception of the innovation in fishing methods and of the revolution in the organization of the fishing industry that has been consequent upon the invention of the steam trawl. It represents modern large scale production as contrasted with small individual enterprise. Whether it is really efficient and economical in the long run can best be answered by a consideration of the verdict of the report on each of the points at issue.

CONCLUSIONS

(1) The most serious accusation against the steam trawler was that first enumerated, viz., that the fishing areas where steam trawlers have already been operating have become seriously depleted of fish. The importance of this charge was fully realized and, during the course of the investigation, particular effort was made to secure all possible data in reference to it. The opinion of the committee on this point, so far as the American waters are concerned, is decisive. It is clearly expressed as follows: "Considering all the data available respecting the supply of fish and particularly the haddock, the species most conspicuous in the catch of the otter trawlers, we can see no evidence of the depletion of the supply on the fishing grounds frequented by the otter trawlers. The average catch per trip shows no diminution from that made prior to the introduction of the steam trawlers." Again, as No. 8 of the conclusions, this verdict is endorsed: "We have been unable to discover from the examination of official records, extending from 1891 to 1914, any evidence whatever that the banks frequented by the American otter trawlers are being depleted of their fishes." Such a finding was to be expected in view of the recent establishment and relative smallness of the otter-trawl fishery on this side of the Atlantic. The otter trawl would necessarily be a very efficient engine of destruction to have made any appreciable effect upon American fisheries in the short period during which they have been in operation. But even with respect to the fisheries of the United Kingdom, for which a wealth of statistical data is available, the committee strictly avoided making any dogmatic assertion or definite charge regarding the destructive character of the otter trawl. On the other hand, the committee are in no sense guilty of equivocation; they have simply refrained from expressing conclusive opinions except where the evidence was indubitable. This desire to be fair is well exemplified in the statement referring to the alleged depletion of United Kingdom fisheries. To quote: "While the statistical information, particularly that contained in the English reports, is more useful for the purpose than is that pertaining to our own fishery, it is in recent years only that it is given in sufficient detail. Proof respecting the depletion of the fisheries, on the contrary, cannot be deduced. The most possible has been the establishment of more or less strong presumptions one way or the other." The fisheries considered in this connection were those of the North sea, Iceland, the White sea and the Faroe islands. The three most important species taken in these regions are the haddock, cod and plaice. Without discussing in detail the evidence adduced, the main findings may be briefly stated. The North sea furnishes the most trustworthy evidence and the others mentioned are taken into consideration chiefly for purposes of confirmation. Two features stand out clearly. First, in practically no instance of importance does the cod show signs of depletion; in most cases the reverse is true. Secondly, plaice, the most important of the round fishes, almost invariably shows a heavy decrease in every respect, the total catch, the average per unit of effort and the proportion of large fish to the total. Here, the evidence of overfishing is unmistakable. Regarding haddock, the most important species of all, the decrease applies to the total catch and the average catch per unit of effort, which must be considered as the most valuable criteria; the decrease in the proportion of large fish is not so apparent. The other fisheries on the whole confirm the foregoing.

The general situation in the North sea is summarized as follows: "On whichever basis computed, the average catch of demersal fisheries has decreased from 1903 to 1912, the average catch of cod has materially increased, while the yields of haddock and plaice per unit of effort have decreased by over 53 and 37 per cent respectively." These facts comprise the basis for the "more or less

strong presumptions," that the operations of steam trawlers have had a tendency to deplete the United Kingdom fisheries.

(2) Much weight has been attached by opponents of the otter trawl to the charge that the spawn or eggs of fish are destroyed by the trawl-net when being dragged along the bottom. This accusation is disposed of summarily by a simple negation and by the statement that "the only destruction of spawn is that involved in taking spawning fish, and such fish are also taken on hand-lines on Georges bank at least and by nets along the coast."

(3) The most serious charge of which the otter trawl is convicted, and the one on which almost entirely the recommendations to limit its operations are based, is the third enumerated, viz., "that immature fish are taken in very large numbers, which are killed in the process of capture and are thrown away." On this point the evidence was plain and the case is clearly stated in the fourth conclusion: "Otter trawls, as compared with lines, take a much larger proportion of commercial fishes too small to market. From January to May, 3 per cent of the cod and 11 per cent of the haddock, and from June to December, 40 per cent of the cod and 38 per cent of the haddock were unmarketably small, while the lines caught practically no such fish. These proportions were fully maintained in the respective classes of vessels fishing at the same season on the same grounds. These young fish are practically all destroyed."

(4) The accusation that valuable shellfish are destroyed in large numbers by otter trawlers was passed over without any comment by the committee. However, from a careful perusal of the report, it would appear that the officials by whom the investigatory work was conducted found no evidence in support of the charge.

(5) The report is decisive in expressing the conviction of the committee that steam trawlers are not guilty of carelessness or intentional damage in respect to the gear of line fishermen. On the contrary, the evidence submitted would indicate that those engaged in steam trawling exercise all possible precaution. A less prominent accusation, namely, that the dragging of the trawl-net over the floor of the sea causes serious damage to marine life and fish forage in general, was also proven to be largely fiction. The committee's statement on this point is as follows: "Otter trawls do not seriously disturb the bottom over which they are fished nor materially denude it of the organisms which directly and indirectly serve as food for commercial fishes." In regard to the preceding contention, however, it was pointed out that trawling and line fishing carried on in proximity results almost inevitably in some unintentional damage.

(6) Turning to the representations made by the trawling interests in vindication of the otter trawl, the most important claim was to the effect that the otter trawl is not unduly destructive. The example of European waters, which have been fished intensively for many years, without any noticeable depletion, was cited in support of this claim. The North sea and other British fisheries were a rather unfortunate choice for this purpose. While the evidence from these fisheries is by no means conclusive, it is nevertheless unmistakably favourable to the view that constant steam trawling tends to ultimate depletion of the fishing grounds.

(7) The trawlers have further claimed the merit of ability to supplement the present supply of food fish by adding edible species for which a market can readily be created. There is some foundation for this contention but, as yet, in actual practice, very little development has been made in America along these lines. Thus far "sole" has been the only species for which an important demand has been created and it is well to note that the total weight of "sole" now marketed annually does not exceed one-third of the weight of the immature marketable species destroyed by the otter trawls. Moreover, any advantage that the trawlers possess in this respect is relative, not absolute. As stated in the report: "Both trawlers and lines catch considerable quantities of edible species for which they have failed to develop a market."

(8) Finally it was urged on behalf of otter trawling that only by that method of fishing could continuous supplies be provided for the growing

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demands of fresh fish markets. The discussion on this point centred around the trend of prices in recent years. As American evidence is of little value in this connection English statistics were relied upon almost entirely. These indicate that prices of fish decreased when the use of the otter trawl first became general but have recently been following an upward trend until new high records have been reached. Such a course need occasion very little surprise or comment; certainly, it affords no basis for conclusions unfavourable to the otter trawl. While the prices of fish have risen during the last couple of years, it must be conceded that they have manifested remarkable stability when compared with the range of prices of commodities in general in the last decade.

RECOMMENDATIONS

The conclusions contained in the report appear to have been drawn up only after the statistical evidence relating to both American and European fishing grounds had been thoroughly studied. They are submitted with full and candid recognition that proof of the depletion of American waters is entirely wanting. On the other hand, careful consideration and unprejudiced interpretation of English evidence furnishes ample ground for the belief that otter trawling tends ultimately toward depletion. The main point established is that the otter trawl captures and destroys an excessive proportion of immature fish. The effect is not yet apparent on this side of the Atlantic but can reasonably be anticipated and should be prevented. To quote from the report: "Our present information indicates that it is not fishing with the otter trawl, but over-fishing, which is to be guarded against."

The recommendations, as the conclusions, have been the result of due consideration of all sides of the case and represent no narrow view of the problems involved. Four means of lessening the destruction of small fishes presented themselves, viz.:

- (1) An increase in the size of the meshes of the net;
- (2) Absolute prohibition of the use of the otter trawl or similar apparatus;
- (3) Restriction of the number of otter trawls;
- (4) Restriction of the area on which otter trawls might be used.

The first mentioned was dismissed as being neither feasible nor effective. Number two, the most drastic proposal, did not appear justified in view of the fact that it is excessive use of the apparatus that is to be considered. Moreover, it has not yet been determined to what extent the destruction of young fishes actually injures the fisheries. The obvious and quite sufficient objection to restriction of the number of trawls is that it opens the way for the creation of a monopoly.

Restriction of the area for the operation of otter trawls is the recommendation submitted. This seems in every way the most satisfactory solution. It combines the merits of localizing any inherent evils appertaining to otter trawling and of ease of enforcement, with assurance against wasteful methods, discrimination and monopoly. The recommendation is stated as follows:

"We, therefore, recommend that the taking of fishes, excepting shell-fishes, by means of the otter trawl or beam trawl, or any adaptation or modification of either, or by any other apparatus drawn over the bottom by a vessel in motion, be prohibited on all bottoms in the Atlantic ocean, outside of territorial jurisdiction, north of the fortieth degree of north latitude, excepting Georges bank, South channel, and Nantucket shoals east of the meridian of Sankaty head on the island of Nantucket."

A final quotation voices the Committee's firm conviction that the whole problem is one of international character and requires an international solution: "In conclusion, we emphatically state it to be our opinion that this regulation will prove futile and an unnecessary imposition on American fishermen unless Canada particularly, and, possibly, Newfoundland and France will take such action as will prevent or restrict the use of the trawl on the banks in the western North Atlantic."

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