REPORT

OF THE

SELECT COMMITTEE OF THE SENATE

ON

CERTAIN DOCUMENTS RELATING TO THE RESOURCES

OF THE

GREAT MACKENZIE BASIN.

SESSION, 1891.

OTTAWA:
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1891.

REPORT.

EXTRACT FROM THE JOURNALS OF THE SENATE, WEDNESDAY, 24th JUNE, 1891.

THE SENATE, COMMITTEE ROOM No. 2,
WEDNESDAY, 24th June, 1891.

The Select Committee appointed, by order of your Honourable House on Thursday, the 18th of June instant, to take into consideration all letters and documents submitted to them, relating to the subject of inquiry made in the Session of 1888, by the Select Committee of the Senate appointed to inquire as to the resources of the Great Mackenzie River Basin, which have been received by the Senate, or by the then Chairman of the said Committee, the Honourable John Schultz, at present Lieutenant Governor of Manitoba, or any public Department, since the date of the Third Report of the said Committee, made on the second day of May, 1888, and adopted by the Senate on the 11th May, 1888, and which are not included in the said Third Report, or in the Appendices thereto; to report, with all convenient speed, as to the value of the information, if any, given in the said letters and documents, and as to what action should be taken thereon in the public interest, in pursuance of the following recommendation, made in the said Third Report, namely :—"Your Committee desire that this "Report be considered an interim one and the estimates given to be approximate, inas- "much as they are based upon evidence received up to this date, and a final report can "only be made when answers shall have been received to questions sent to officers of "the Hudson's Bay Company, missionaries, Arctic explorers, and others, now resident "in, or who have visited parts of, the country within the scope of your Committee's "enquiry;" have the honour to make their First Report, as follows :—

At pages 19 to 23 of the Third Report of the Select Committee appointed, in 1888, to enquire into the resources of the Great Mackenzie Basin, as printed in the Appendix No. 1 to "The Journals of the Senate, Vol. XXII, 1888," will be found a List of Questions sent to persons mentioned, in order to elicit information. For the better understanding of the documents which form the subject of the present inquiry, a copy of the said List is herewith submitted.

When the Committee appointed in 1888 made their said Third Report, it was known that it would not be possible to receive replies from some of the persons to whom these Questions had been addressed until after the close of the Session, on account of the great distance to, and the difficulty of communication in, the almost unknown parts of Canada which formed the subject of enquiry. That Committee, accordingly, made the recommendation above quoted, which was adopted by your Honourable House and referred to in the Order appointing the present Committee, whose work thus became simply a completion of the work commenced in 1888.

Through the exertions of His Honour Judge Schultz, Lieutenant Governor of Manitoba, who had been the Chairman of the Committee of 1888 and continued, after leaving the Senate, to take an active interest in the subject, a number of communications bearing thereon have been received by him and transmitted in due course to the proper authorities, by whom they have been submitted to your Committee. Among these are the following :—

1. From His Lordship Bishop Farand, dated Mission du Lac La Biche, 11th September, 1888.

2. From His Lordship Bishop Bompas, dated Mackenzie River, 18th July, 1888.

3. From His Lordship Bishop Young, dated Fort Chippewyan, Athabasca, July 20th, 1888.

4. From Magnur Anderson, Esquire, Presbyterian Mission School Teacher, dated Edmonton, ———, 1888.

5. From William Cornwallis King, Esquire, of the Hudson Bay Company's service, dated Fort Pelly, ———, 1888.

6. From W. E. Trail, Esquire, of the Hudson's Bay Company's service, dated Fort Vermilion, 1st August, 1888.

7. From George Elmare, R. H. Armstrong and M. P. Elmare, Esquires, formerly traders in the Mackenzie River District, dated Sioux Falls, Dakota, 1st December, 1889.

8. From His Lordship Bishop Bompas, dated Mackenzie River, August, 1888.

The documents enumerated, together with certain letters from and to His Honour Lieutenant Governor Schultz, forming part of and explanatory thereof, are herewith submitted. They have been carefully examined by your Committee, who are of opinion that the information therein contained would form a valuable addition to the Third Report of the Committee of 1888, and they recommend that these documents be printed, as was the evidence accompanying that Report, as a supplement to the Journals of the Senate, and also that the present Report and the said documents be referred to the Joint Committee of both Houses on the printing of Parliament, with the view of having the same printed for general distribution.

All of which is respectfully submitted.

M. A. GIRARD,
Chairman.

(Extract from the Journals of the Senate, Tuesday, 11th August, 1891.)

On motion of the Honourable Mr. Girard, seconded by the Honourable Mr. Read (Quinté), it was

Ordered, That the Answers sent by R. Macfarlane, Esq., Chief Factor of the Hudson Bay Company, Fort St. James, New Caledonia, District of British Columbia, to the List of Questions sent out by the Select Committee of the Senate appointed in 1888 to inquire into the resources of the Great Mackenzie River Basin, and the Lists of Birds and Mammals accompanying the said Answers, which Answers and Lists have only recently been received by the Honourable Mr. Girard and are herewith submitted, be added to the documents which, by order of the Senate, made on Thursday, 2nd July last in pursuance of the Report of the Select Committee appointed to examine and report upon documents relating to the Great Mackenzie River Basin received since the Third Report of the Select Committee appointed in 1888, are to be printed as a supplement to the Journals of the Senate; and that the said Answers and Lists be referred to the Joint Committee of both Houses on the Printing of Parliament with the view of having them added to those which have, upon report of the said Joint Committee, been ordered to be printed for general distribution.

LIST OF QUESTIONS SENT TO PERSONS MENTIONED TO ELICIT INFORMATION REGARDING THE RESOURCES OF THE GREAT MACKENZIE BASIN.

With instructions to forward answers to nearest post office and a direction to "fill in on the above lines your full name, occupation, residence and post office address, and for convenience of reference and comparison please write in your replies opposite the questions, and if more space is needed continue the answers on the back of the same sheet, indicating the connection by reference to the number of the enquiry."

Series A.—Relating to Navigation and Communication.

1. Please give in your answers all the information which you have obtained by actual travel, or from other reliable sources, and state the particular part of the region to which your answers refer, and give generally the sources whence you obtained the information.

2. Please mention the portions of the various rivers of the region mentioned which you regard as continuously navigable. Give the approximate length of each stream, with depth of water during the season of navigation, the velocity of the current, etc. Give also the kind and size of steamer suitable for such navigation.

3. At what points would it be desirable to connect these navigable reaches by road or railway with other navigable reaches of the same or different rivers, or with lakes for the purposes of affording facilities for traffic? Give the approximate lengths of land carriage in each of such cases as will be necessary.

4. Give the name and general description of all the lakes of the region which you are familiar with; their extent, depth, harbours, general suitability for navigation, their connection with navigable streams; and if no connection with other navigation, what length of road or railway, and at what points will it be necessary to make such connection. Give also the size and kind of steam or sail craft suitable for these waters.

5. Give all possible information regarding the character of the navigation of the sea-coast of this region, with particular reference to the portion adjacent to the mouth of the Great Mackenzie River, the depth of water, the average length of open water, the character of the harbours formed by the different mouths of the river, the navigation of the estuary itself, and the kind of craft suitable for such navigation. Also your opinion as to whether whaling and sealing craft, if built at the head waters of the Mackenzie River, could descend that stream early enough and ascend it late enough to permit of some months of fishing near the mouth of the river.

6. How far is the Athabasca or any of its affluents navigable for vessels drawing 30 inches of water above the mouth of the Clearwater? Is any portion of it suitable for steam navigation? What is the nature of the obstructions?

7. Give the same information regarding the Athabasca and its affluents below the Clearwater, and is the Clearwater itself navigable for steamers?

8. What is the character of the Great Slave River; size, depth, obstructions, velocity of current, craft suitable for navigation, etc.

9. Give the same information regarding the Liard River.

10. Give the same information regarding the Peace River, both to the east and west of the Rocky Mountains.

11. Give general character of the Beaver River and the lakes along the upper part of the Churchill River.

12. Give the same information regarding the Mackenzie.

13. Give all possible information regarding Lake Athabasca, particularly as regards its navigation and generally as regards such of its mines, timber, fish and other products as are available for transportation by water.

14. Give the same information regarding Great Slave Lake.

15. Give the same information regarding Great Bear Lake.

16. If you know of any other body of fresh water such as the Lesser Slave Lake, give all possible information relating thereto.

17. Can sea-going steamers ascend the Mackenzie? If so, how far and with what draft of water and during what period of the year?

18. Give the Committee all information as to the steamers which are now actually running on the Athabasca and Mackenzie Rivers.

19. Do you know anything as to the west coast of Hudson Bay? If so, please describe it to the Committee.

20. What are the principal lakes and rivers between the west coast of Hudson Bay and the Mackenzie River? What is known in regard to any of these?

21. Give the quantities of rain and the depth of snow at any or all the parts of the Mackenzie Basin which you have mentioned.

22. Give any possible information you can as to the depth to which the winter frosts penetrates the soil at the different places.

23. Please give any additional information upon this portion of the subject which has not been elicited by the foregoing enquiries.

SERIES B.—EXTENT OF ARABLE AND PASTORAL LAND.

24. Indicate generally on a map or otherwise those portions of the region in question which are alluvial and diluvial, and those which are rocky and sterile, generally called barren grounds.

25. What is the nature of these barren grounds? Give the Committee as full information as you can as to this region.

26. How far north have barley and potatoes been grown, and how far to the east and west on various parallels of latitude?

27. How far north has wheat been grown?

28. How far north, east and west have the hardy varieties of Indian corn arrived at maturity?

29. Give the time of planting and reaping at any of the places mentioned in your answers to the foregoing questions.

30. When does spring open in these different localities, meaning by spring the first appearance of flowers?

31. How long before the flowering of plants at any of these places is the ground fit for seeding.

32. What is the average time of ripening at any of the places you have mentioned of wheat, barley, rye, oats, potatoes, turnips, Indian corn, strawberries, gooseberries and other small fruit?

33. What is the general character of the three growing months, June, July and August, at all of the places you have mentioned?

34. Are there summer frosts during these three months at any of these places? (Meaning by frost, a local white frost.)

35. Are these frosts general or local?

36. Will the settlement of the region make it less liable to such frosts?

37. When do summer rains begin?

38. What is the character of the climate of September and October at the various places you have mentioned?

39. What effect has the intensity of cold in winter upon vegetation?

40. What is the character of the natural grasses of the country in different parts? Compare them with those in the eastern Provinces.

41. Does the wild pea or vetch grow in any portion of this region, and if so, at what places?

42. Is any other plant indigenous that would make good food for cattle other than the natural grasses?

43. What is the character of the soil of the district you mention? Is it clay, loam, sand, etc.?

44. What percentage of the whole area is fit for pasturage, and what area is fit for the production of the more hardy grains?

45. Give your general knowledge of the climate and its effect upon plant life?

46. What insect pest, if any, is vegetation subject to in any portion of the Mackenzie Basin?

47. Do you know of any records which have been kept as to the climate of different localities, and what is your general impression as to the climate in any district you have spoken about? If you have any records please attach them in a separate sheet to the last page of your answers.

48. Do the larger lakes and rivers exert any influence in keeping off the summer and autumn frosts, giving examples, and give dates when rivers and lakes in different portions of these regions freeze over in autumn and break up in spring?

49. What are the prevailing winds of different seasons, and how do they affect the climate?

50. Over what portion of the Mackenzie Basin is the warm effect of the south-west chinook wind felt?

51. In the region under consideration what attempts have been made at agriculture and stock-raising, and with what results?

52. Is there any class of domestic animals which could find food in that region known as the barren grounds?

53. What animals now find sustenance there and elsewhere in the region in question, giving particular information regarding the size, habits, weight, food, value of outer covering of the following animals: Cariboo, musk ox, wood buffalo, moose, elk, and all other animals, except those which are carniverous.

54. Give all information regarding the numbers, localities, quality of covering, habits and methods of capture of the following animals: Lynx, Arctic fox, black fox, silver fox, cross fox, red fox, fisher, wolverine, otter, beaver, martin, mink, ermine, musk rat.

55. Give the amount of shipments of peltries of the foregoing animals during the last ten years.

56. Please state in addition to your other answers all the information you possess in regard to the information sought to be obtained by Series B of these questions, and if you have records bearing upon the climate of the region please copy these and attach them to the end of your communication, and give opportunities you have had for acquiring information.

SERIES C.—RELATING TO FISHERIES, FORESTS AND MINES.

57. Describe the fish existing in all the waters mentioned in Series A of these questions, giving size, weight, quality, species, method of taking, probable increase or decrease, and any other information bearing upon this subject.

58. State particularly all the knowledge you possess of whales and other sea animals in the mouths of rivers or along the coast of the Polar Sea, giving localities, probable quantities, and methods by which they are now taken.

59. Give your view as to the value of these sea coast fisheries, the class of vessels suitable for its pursuit, and the point from which such vessel could sail, with particular reference to the possible use of the head of navigation on the Mackenzie River as a starting point and depot of supplies.

60. Is there timber suitable for the construction of seal and whaling craft on the head waters of the Mackenzie River proper?

61. Give any further information regarding the fish and fisheries of the region which you have not embodied in the foregoing answers.

62. Please indicate on a map or otherwise the nature and extent of the wooded region. Also the various kinds of trees found there; the size, commercial value, quantity, etc. What would be the best outlet for sending this timber to market in the future?

63. Are there any economic plants of small size in the forest or plains of these regions? If so, state locality, quantity, quality, etc.?

64. Have you any knowledge of medicinal plants used by Indians or others? If so, state fully?

65. How far west and north does the Labrador tea plant extend, and to what extent is it used in these northern regions?

66. What is your opinion of it as a substitute for the Asiatic tea?

67. Please state opposite the different minerals mentioned hereunder, the localities of any of them, the extent of the deposits, the means of export, commercial value, and all other information regarding them: Gold, silver, copper, iron, sulphur, salt, petroleum, asphaltum, gypsum, alum, precious stones, coal, lignite, plumbago, lead.

68. Give all the information you can regarding brick, pottery clay, moulding sand, marble, lime and sandstones, granites, etc.?

69. Give all additional information you can relative to the mineral resources of the Mackenzie Basin which you have not given in reply to the foregoing questions.

NOTE.—The Committee will be glad to receive and acknowledge the receipt of any small specimens of any of the minerals mentioned, if sent from the nearest Post Office

in packages not exceeding two pounds weight, marked "Free." These will be placed in one of the Government offices with your name upon them and such description attached to it as you choose to send with them.

SERIES D.—GENERAL QUESTIONS RELATING TO MACKENZIE BASIN.

70. Give all the information you possess as to the breeding grounds of migratory wild fowl; locality, numbers, species, date of hatching, time of arriving and leaving, and all other information bearing upon these points?

71. What kind of wild fowl are considered of the most value in the spring and fall migrations? Are they in great numbers?

72. During the migrations do these birds stop to feed in any of the districts you are acquainted with, and where?

73. What is the food of the different varieties of these migratory birds during the breeding season?

74. Give the time of their appearance in the spring, going north, and their return flights in the autumn, going south, at different places?

75. What is the usual food of these wild fowl after the hatching season is over?

76. Give a list of native berries and fruits in the various portions of the country that you are acquainted with?

77. Has the natural pitch of the Athabaska River any prospective value?

78. What quantity is there of this deposit?

79. Should petroleum be discovered in large quantities by boring wells in the Athabaska region, what would be the best way of bringing it to market?

80. What would be the approximate cost of taking in machinery and sinking—say three wells to the necessary depth to test this important question?

81. Is there any geological evidence that would enable us to trace the gold of the North Saskatchewan to its probable source?

82. Give all information regarding the Indians of the district, the different tribes, their localities in the summer and winter, their increase or decrease, the epidemic diseases to which they are subject, and all other information which bears upon their food and bodily welfare?

83. What is the food used by them at different times of the year in different localities, and to what extent have they endeavoured to cultivate the soil and with what success? Give the localities and full information?

84. Can you give any reasons for the occurrence of years of comparative plenty and comparative scarcity?

85. What is the cause and nature of disease which periodically kills off rabbits?

86. How many varieties of rabbits are there in the Mackenzie Basin?

87. Are all equally affected by this disease?

88. Give a list of all the food animals not included in your former answers, their locality, present and future importance, and necessity for protection or otherwise?

89. What effect would the opening up of the Mackenzie Basin to civilized men have upon the Indians of the region?

90. Could their labor be employed much to the advantage of employers and employed, and how far would such employment tend to civilize and make them self-supporting?

NOTE.—In closing these series of questions the Committee will be glad to receive and acknowledge any assistance in the way of information to be derived from original memoranda, journals or other documents, or from little known maps, pamphlets, etc., bearing upon the region to which this enquiry relates; and generally have to request that you will add on separate sheets any information of a general or particular character which is directly or indirectly within the objects of this enquiry. State also your opportunities for procuring information.

MISSION OF LAC LABICHE, 11th September, 1888.

Mr. JOHN SCHULTZ,
Secretary Senate Committee,
Ottawa.

SIR,—I have been for some time in possession of the letter addressed to me by the committee at Ottawa, on the 5th April, 1888. The object of the letter was to ask me for sundry details respecting the arable lands, the plains, the mineral wealth, the geographical position and superficies of the lakes, the course and the navigability of the rivers, &c., of the great Athabaska-McKenzie Basin.

Having lived in this region for the last forty-one years, I could no doubt tell what I know, and elucidate certain obscure points. It would be a long story and one I would gladly undertake, in order to enlighten the Government as to the true interests of the country. The difficulty is that, in respect to many points, I am only imperfectly informed; and that in order to be accurate, it would be necessary for me to carefully revisit and examine again everything I have only the opportunity of glancing at superficially as a passing traveller.

This would not be to attain the end in view, and and this it is that stops me. It is better, in my opinion, not to add to the number of more or less unreliable reports, published in bulky volumes, of which the Government is already in possession. It is, moreover, easy for you to secure orally all the information I could give you, by applying to my assistant, Mgr. J. Clut, who is spending the winter in Montreal, and who has travelled more, and has consequently seen more than I have. He will deem it a pleasure to reply to the full extent of his ability to any questions you may put to him.

I beg, therefore, Mr. Secretary, that you will commend to the Senate Committee the reasons I have submitted. It is quite possible that I may spend the winter of 1889-90 at Winnipeg. If it should be considered that I can be of use there, my services shall not be wanting. It is the interest of every one of us to secure for our adopted country an honourable position amongst the nations of the world.

I purpose forwarding shortly samples of wheat, barley and splendid oats harvested this year at Lac LaBiche. I will also send some plugs of tobacco grown and manufactured here.

I have, &c.,

† HENRI J. FARAND,
Bishop of Arsemour, Vicar Apostolic, Athabasca-McKenzie.

MACKENZIE RIVER, 18th July, 1888.

SIR,—I have to acknowledge the receipt of your circular requiring for the information of the Senate of Canada very detailed and exhaustive particulars regarding this country.

To reply hastily to the inquiries made might cause dissatisfaction, and as I am expecting to be occupied all summer in voyaging, I can but postpone my answer till the autumn, when I may hope, if spared in life, to address myself to the task.

Meanwhile, I may take the liberty of replying to a pamphlet which is, I think, recently published by the Society for Promoting Christian Knowledge, Northumberland Avenue, London, England, entitled a "History of the Diocese of Mackenzie River," which, I think, contains in condensed form most of the information desired, so far as it lies in my possession, with reference also to other sources of knowledge regarding the same matter.

I am, Sir,
Your obedient servant,
W. C. BOMPAS, D.D.
Bishop of Mackenzie River.

The Hon. Dr. SCHULTZ,
Lieutenant Governor, Senator, &c., &c., &c.

ST. PAUL'S MISSION, FORT CHIPEWYAN,
ATHABASCA, 20th July, 1888.

DEAR DR. SCHULTZ,—As I understand that you are taking a special interest in the North-West and that the results of your efforts in the committee of enquiry upon its resources which has been sitting during the early part of this year, I venture to enclose for your perusal copy of a memorial sent by the Synod of Athabasca to the Minister of the Interior respecting the serious condition to which the Indians of this country are at present reduced. I feel sure that your influence will be exerted in securing for them if possible, the same help which is extended to the Indians in other and more southerly parts of the North-West by the Government.

Without such assistance they must die off in large numbers, as the scarcity of food is becoming every year more serious.

One great need, and without it I cannot see how the Government can render any effective assistance, is the opening up a road into the country.

I read with interest, Dominion Surveyor Ogilvie's report as to the best route which was laid before the North-West Council last year. Perhaps, however, a proper survey with this object in view would discover a more practicable route, than either of those mentioned by him.

Trusting you are enjoying improved health, and with kind regards to Mrs. Schultz.

I remain,

Yours very sincerely,
RICHARD YOUNG,
Bishop of Athabasca.

ST. LUKE'S MISSION, VERMILION,
ATHABASCA, N.W.T., 6th July. 1888.

The Right Honourable, the Minister of the Interior.

SIR,—We, the undersigned, as members of the Synod of the Anglican Church in Athabasca diocese, now in session, venture to lay before you for your consideration the present condition of the Indians generally throughout this portion of the North-West Territories, including the Provincial District of Athabasca.

There is a great decrease throughout this part of the country of both the larger and smaller game as well as of fur-bearing animals, excepting one or two kinds, such as martens and fishers, which are not used as food. The consequence is the Indians, not only during the winter, but also in summer, are in an almost constant state of semi-starvation. This condition is, of course, seriously aggravated during the winter month's and you will perceive from the facts which we beg to lay before you, the very serious results which arise therefrom:—

1. The almost total disappearance of rabbits and scarcity of partridge.
2. A great mortality amongst the beaver during last winter.
3. Present scarcity of lynx which will, in all probability, continue at least two years longer, as they are affected by the rise and fall of rabbits.
4. The above affects not only the food supply of the Indians, but also their power of procuring clothing, ammunition, &c.

Many of the Indians are almost destitute of clothing, and owing to their small take of furs are unable to provide themselves with the necessary clothing and hunting outfit for the coming winter.

The above scarcity has greatly decreased the number of their dogs (so necessary to the Indian travelling and hunting) which have perished, thus seriously increasing the difficulty of obtaining a livelihood.

The Beavers, who used to have a considerable number of horses, have killed so many of them on account of the scarcity of other food, that they now possess very few.

5. At Lake Athabasca, and at some other lakes, a great failure of the fall and winter fisheries.

6. During the winter of 1886 and 1887, between the Peace and Athabasca Rivers, on account of starvation and consequent cannibalism, a party of twenty-nine Cree Indians was reduced to three.

In the Mackenzie River district there were several cases of death by starvation, and one or more of cannibalism.

7. During the last winter of 1887 and 1888, amongst the Fort Chipwewyan Indians, between twenty and thirty starved to death, and the death of others was accelerated by want of food.

A party of about twenty Beavers had to be conveyed from Grande Prairie, near Dunvegan, Peace River, to Lesser Slave Lake, to prevent their starving to death; some of them died after arriving there.

Within the personal knowledge of the undersigned, many other Indians, Crees, Beavers and Chipewyans, at almost all points where there are missions or trading posts, would certainly have starved to death but for the help furnished by the traders and misssionaries at those places—furnished very often at great personal inconvenience,

8. Owing to the above facts recorded and previous mortality, a great number of widows and orphans are left without natural providers.

9. Owing to strong competition in the fur trade and other causes, the Indians cannot now look to the Hudson Bay Company for help as they used to do.

In face of the above facts and with the prospect, at no very distant date of this country forming a valuable and important portion of the Dominion; and as we understand that Parliament has already taken action by granting a committee of enquiry on this country and its resources, we would respectfully press on the Government the urgent necessity of rendering speedy help to preserve the survivors.

(Signed,)

RICHARD YOUNG, Bishop of Athabasca.
MALCOLM SCOTT, Incumbent of St. Luke's, Vermilion.
G. HOLMES, C.M.S., Missionary, Lesser Slave Lake.
W. E. TRAILL, J.P., Vermilion.
A. C. GARRIOCH, C.M.S., Missionary, Dunvegan, P.R.
E. J. LAWRENCE, Principal of Irene Training School.
WM. J. MELROSE, Farmer.
A. J. KNEELAND, Mechanic, Vermilion.
W. D. REEVE, Archdeacon of Chipewyan and Secretary of Synod.

RESOURCES OF THE GREAT MACKENZIE BASIN.

Answers from Magnus Anderson, late of the Hudson Bay Service, teacher of the Presbyterian Mission School on Stoney River Indian Reserve, near Edmonton.

Series A—Relating to Navigation and Communication.

1. The following answers are from the personal knowledge of Mr. Anderson acquired during his service in the Hudson Bay Company.

2. The Mackenzie is navigable from its mouth to Fort Smith. It is there unnavigable for about 12 miles, where it passes through a spur of mountains. Above these rapids it is navigable to Fort McMurray. The Hudson Bay Company have ten steamers running repectively above and below the obstruction spoken of. They draw about 2 feet of water when loaded.

The Hudson Bay Company is now building a steamer at the Athabasca Landing to run to the head of the Lesser Slave Lake, from whence there is a portage of 64 miles to Peace River. She will also run down the Athabasca to Grand Rapids, some 80 miles from Fort McMurray. On the portage to Peace River waggons are used, as also on that at Fort Smith. At the Grand Rapids York boats are run down with light loads and men pack the remainder along the bank for upwards of a mile. The York boats run

the succession of rapids from Grand Rapids to Fort McMurray loaded, but steamboat navigation is said to be impossible on this stretch of river. There is a pack trail from Grand Rapids to Fort McMurray, but no waggon road. The Peace River is navigable from Vermilion to St. John for light draught steamers, say of 18 inches. The interruption at Vermilion is a ridge of rock which runs across the river, so that steamers cannot pass. The portage is about 1,200 yards. From there to Athabasca Lake steamers can run.

3. From Edmonton to Athabasca Landing is 90 miles. Freight comes by steamer to Edmonton from Winnipeg or by waggon from Calgary, and is taken by waggon to the landing.

4. Great Slave Lake is suitable for boats or sailing vessels such as are used on Lake Superior, as it is as large or larger. Great Bear Lake is also similiarly navigable, but the stream which connects it with the Mackenzie is not navigable for steamboats. Lake Athabasca, which receives the Athabasca and Peace Rivers, is navigable.

5. The mouth of the Mackenzie cannot be got into by sailing vessels, being shut up by ice. For information regarding the mouth of this river, get McClintock's & McClure's travels in that region.

6. The boat from Athabasca Lake runs to Fort McMurray, at the foot of the series of rapids on the Athabasca and from the head of these rapids. Another (now building) will run to the head of Lesser Slave Lake. Ordinary river steamers are used for this purpose.

7. The Clearwater, the chief affluent of the Athabasca, is not navigable for steamers.

8. The obstruction is that mentioned in paragraph 2 as being at Fort Smith. Current 3½ to 4 miles per hour, and in some parts only 1½ miles; water very deep, from 8 to 10 feet.

9. The Liard River is not navigable for steamers unless locks were put in, having many rocky bars across it. The boats which the Hudson Bay run on it only draw from 18 inches to 2 feet of water.

10. The Peace is navigable to Fort St. John's, only for the short interruption before mentioned. Before Fort Vermilion I only know of the east side of the mountain.

11. Such information can be furnished by some other one.

12. Described already.

13. Minerals—Gold, copper, iron and sulphur; timber plentiful, also fish; clay is found suitable for cement and also pottery clay.

14. Timber plentiful, also fish. Have no knowledge of minerals there, worth exporting.

15. Copper is found; timber and fish plentiful.

16. On Lesser Slave Lake coal oil can be found, and also on the river.

17. Sea-going vessels could come up the Mackenzie but for the mouth being packed with ice, as before mentioned.

18. Mentioned already.

19. Know nothing of the matter.

20, 21, 22. Same answer.

23. Salt River falls into the Mackenzie below Fort Smith, and runs from a plain where salt springs and rock salt also are abundant.

SERIES B—EXTENT OF ARABLE AND PASTORAL LAND.

24. Peace River district is of fertile soil and suitable for agriculture, as are the Liard and Mackenzie districts.

The Salt Plains are the only barren lands I know of, the abundance of salt being the cause.

25. No answer.

26. Potatoes have been grown as far north as Fort Good Hope and also barley, but how far east or west I could not say.

27. Wheat is grown at Fort Simpson and Fort Liard, but whether any further north or not I could not say.

28. Cannot say.
29. Sow in May and reap in August or September.
30. End of April or beginning of May.
31. Only a few days.
32. Potatoes, beginning of August; strawberries, July; gooseberries, later; other small fruit; Saskatoon, July.
33. Warmer and more genial than that of Edmonton district.
34. No frost to my knowledge.
35. No answer.
36. If there was such a thing as local or general frosts, settlement would undoubtedly make them less liable to injure plant life or vegetation, were the ground properly drained by the settlers.
37. About the month of June.
38. Generally dry.
39. No answer.
40. No answer.
41. Grows in most places, but especially in the Peace River district.
42. Can't tell.
43. Black loam and clay underneath.
44. No answer.
45. The climate is not so severe as to prevent cattle from feeding out in winter.
46. I know of none.
47. The only record I know of is taken by the Hudson Bay factors at the different posts.
48. This information can be obtained from the above source.
49. No answer.
50. It is felt as far as Fort Yukon, in Alaska, on the Yukon River.
51. Stock-raising has done well on the Peace River and Mackenzie, including Fort Simpson, Fort Liard, Fort Resolution, Fort Confidence and Fort Chipewyan. Farming has been carried on at all these places with good results.
52. I cannot say.

Evidence of Magnus Anderson, taken by Frank Oliver, Edmonton, Alberta.

Answers from Wm. Cornwallis King, Hudson Bay Company, Fort Pelley, Assa., P. O. Ardpatrick, Manitoba.

SERIES A—RELATING TO NAVIGATION AND COMMUNICATION.

1. I entered the Hudson Bay Company in 1862, and resided 20 years in McKenzie River and Athabasca, also at Ile à la Cup and Fort Pelley; came out and returned home *via* York Factory and Hudson Bay. Travelled from Winnipeg *via* Ellice, Carleton, Emerson, Lesser Slave Lake to Fort Dunvegan, also on to McLeod Lake and mostly all over the north.
2. Needless to reply to this—as the information you already have (*see* the Senate Debates) is very very nearly correct. Useless for anyone to deny or cavil at it.
3. There are many other routes—for instance, the Peace and Liard start at Halfway River above St. Johns, and strike the head waters of the Liard, *not* west bank; again, Athabasca Lake and Great Slave Lake start from the bottom of Christie's Bay, Slave Lake, and strike across, land direct to Athabasca Lake; much waters or solid land, whichever you wish; also start from Great Bear Lake, and strike Chesterfield Inlet. If Hudson Bay route is practicable that is too. Get a good map, and you will be able to follow me.
4. Great Slave Lake.—North, deep blue water and rocky; west, stoney and shoal close to land; east, sandy and also shoal close to land.

Great Bear Lake.—Very deep and clear water; shoal close to land.

Athabasca Lake too well known; no use to describe.

5. See Government maps, &c. by Captain Pullen. Can be bought at the Poultry, London, for 1s.

6. After a short distance rapids begin; above the rapids the water is good. The proof is the company is building a steamer.

7. The Clearwater is subject to a very great rise and fall; at the sand banks close to Fort McMurray for about a mile it would require dredging; after that it would be good mostly always. In places stones would require to be removed; then it would be good as far as the Humpher Springs.

8. Shifting sand bars; varies in size from ¼ to ½ mile; no obstruction of consequence except the five rapids; some sand bars, and planted drift, sticks or snags, or whatever they are called (I don't know how they are spelt), what I mean is drift sticks, caught by their roots and end buried in the sand, the small end sticking up, dangerous to travel at night. Current not very strong except at certain points.

9. Current strong; 3 to 500 yards wide; upper part stoney; battures below the Grand Rapid; mostly sandy; rise and fall of water rapid and severe. High water twice after ice goes off, and when the snow water from mountains come down in early summer, and after severe rain. Not a good river for steamers, but might be used.

10. The Peace River is a noble stream, broad, in places deep and current strong, but still it is possible to have steam, but at the same time it has many drawbacks, and would require much care. The Athbasca and Slave River are far better adapted for it. But the noble Mackenzie is fit for anything, and boats could travel day or night with but little risk. Seeing is believing—in fact, it is a wonderful river.

11. No answer.

12. Some of the reaches or views are 20 to 30 miles almost straight; nice sloaping, stoney banks and wooded, in places open out like lakes. The level of the country is from 3 to 5 miles back; some beautiful views could be taken, say from the top of the Horns Mountains also at the forts, as Fort Simpson, and many other places. I could talk for ever of it, and still not say enough.

13. If the proposed Hudson Bay Railroad tapped the Fond du Lac end, timber might be towed or rafted across the lake; quantity boundless. Minerals, etc., require experts to speak about. Lots of lead and copper and varieties of valuable stones, and agates and flints.

14. Fish plentiful. Canning might be undertaken, also fruits exported, say blueberries, raspberries, gooseberries, Saskatoon, yellow berries, strawberries, pembin-berries, crow-berries, &c., &c., &c. Geese and ducks also might be canned. Athabasca is one of the best wild fowl hunting spots in the North-West.

15. The same holds good for all two outlets: 1. *Via* the mouth of Mackenzie River, and the other portage land and water to Chesterfield Inlet; then by Hudson Straits.

16. There are so many very large united lakes, directly N. E. to S. W., many 50 to 60 miles long, with narrows, which separate the barren lands from the timber country, just as if it had been marked out by man. North of the lakes you will find the strata turned up on end as a belt.

17. Steamers (ocean) might very likely ascend as far as Point Separation if of right draft, August and September; but can't say positively, which would only be known after a proper sounding had been taken.

18. A new steamer is being built at Athabasca Landing running down to head of rapids above Fort McMurray. A stern-wheel steamer runs from Fort McMurray down the Athabasca, crosses Athabasca Lake and on to the head of the rapids above Fort Smith, also ascends the Peace River to (Fort) Little Red River, at the "Chutes" which bar the river, a fall of 12 feet. Another steamer runs from below the rapids at Fort Smith across Slave Lake, down to Point Separation, or on to the sea. (Seine boat). For description, &c., apply H. B. C. office.

20. It is one mass of lakes, some about 100 miles long and others very small, and all full of fish. Large lakes—small fish, and medium-sized lakes, strange to say, have

larger fish (whitefish). Great Bear Lake, Martin Lake, and Lac de Marde or Dirt Lake, and legions of others.

21. The rainfall is light. Snow about 2 feet deep on the land; chance years deeper.

22. Digging pillars and sinking posts for pickets, graves for Indians, &c., I never knew of it over 3 feet, say at Fort Rae, or Great Slave Lake, Fort Nelson on the Liard, also at Fort Resolution on Great Slave Lake. Of course, if a person tried in wet soil like muckages, it would be more, but I allude to sandy or gravelly soil.

23. Almost everywhere water can be struck at from 5 to 20 feet. Sulphur and mineral springs are most common. Nearly everywhere.

24. Barren lands. Bounded—sea coast on one side, then take the Mackenzie River all to the west, varying in distance from 5 to 100 miles in places and on to Slave Lake. Banks of Coppermine River, Anderson Bank, Yellow Knife and Big Fish Rivers. Rivers all timbered and pretty heavy. They abound with fur-bearing animals; then east of Slave River, on to Athabasca Lake and bounded by the English River, and on down to Churchhill. Different spots; different distance back from the aforesaid rivers.

25. Fancy an immense plain, of heaven knows what size; fill this up with innumerable lakes, mostly connected by small rivers, the lands in places large flats, also other parts, rocky and gravelly knolls in places, hills and sometimes almost mountains. In summer it looks like an immense park, minus trees. Parts lime-stone, other places granite proper, some places sand-stone, iron and copper ore. In fact great scope for a scientist or geologist. Many places grapes, and the hills covered with blueberry bushes, raspberries, cranberries, yellow berries, and all this teeming with game and wild fowl in summer, and nothing in winter, except "barrenness." No spot is so rich with game in summer, and no spot so dreary and God forsaken in winter. Make this the talked-of penal settlement; and you soon will be short of criminals. But for heaven's sake don't send them to Mackenzie River, to spoil a veritable paradise, only to be contaminated by the march of civilization, and where you will find the Indian far ahead of his white brethren. Of course, there are some bad instances. By all manner of means establish-mines, and turn the barren lands into daenal settlement.

30. You can't say when spring begins or autumn ends. Mostly two seasons—1st October to 1st June, winter; the balance summer.

31. You can almost fancy you see the flowers growing. It is nigh all day light for so long.

The barren lands are subject to immensely heavy rains at times, in July, and frightful storms or squalls rather, for why I can't say. I have known it unbearably hot; suddenly comes a storm on, rain, then hail, and within two or three hours about 4 or 5 feet of snow. Clears away equally quick.

Let a survey party start for Churchill, strike for old Fort Anderson on the Anderson river and thence to Fort Good Hope, then strike back from Good Hope to Bear Lake, Hudson's Bay post; call at Fort Rae, touch at Fond du Lac, Great Slave Lake, strike on to Fond du Lac, Athabasca; call at Lac La Hache and come to civilization at the Grand Rapid, and the report they would give, I fully believe, would astonish Canada and the Canadians, especially if my old friend Prof. McCowan, was there as botanist, I would envy the trip. It can easily be done with the aid of birch canoes, plenty of amunition and nets. No use to take provisions, except tea and tobacco, and only young healthy men, and they who like adventure and "roughing" it.

Amateurs talking geology is likely to amount to rubbish. I once sent a stone to Prof. Selwyn, A.R.C., which I thought a lot of as gold. He told me it was copper pyrites, so I pitched away the rest of my specimens which cost me trouble and expense to collect.

If you wish a right and correct account of the barren lands, send along a chap who will take it down in writing, as I am lazy and a poor hand at composition; let him also be a decent coon, and I will give him facts enough. I came to this country with the desire of thinking and keeping my eyes open and I have done so, and expect at

some future day to turn it to some use. I am known by Dr. Schultz in 62 at the Lower Fort, also by Mr. Sanford Fleming, A. R. C. Selwyn, Prof. McCowan, V. N. Coté, Half-Breed Commissioner, and many others. Not forgetting my much respected friends R. Goulet, Esq., Bishop Grandin, Favard, Bompas.

Remarks on the Great Mackenzie Basin.

I firmly believe this spot when known properly will astonish many, not only for what can be grown or produced, but also for its mines, coal, salt, tar, oil, &c., but I do believe, and that firmly, that for the next 20 or 25 years Providence intends it only as a large fur preserve. The difficulties of geting in and out are too great, and it would never do to attempt aiding settlers, as they could not get on; they might exist, but what could they make or better themselves and where get their supplies. Let Manitoba and the North-West fill up and prosper, 20 or 25 years hence; then cast an eye towards the Great Mackenzie Basin. Canada has a great work before her, let her attend to this just now and in the distant future, then let her drive in railroads and develop the Great Mackenzie Basin. But by all manner of means let it alone just now, except survey parties in the barren lands.

I forgot to mention, between the chain of lakes and barren land there is a belt of rock strata turned up just like ploughed land, only straight up, which has passes through; these passes always tally with the narrows on the lakes, hence the cariboo know it and choose the routes. Strange, but true, I have a painfully vivid recollection of this fact, as I sprained both ankles and cut up my feet pretty badly once, whilst crossing. I had been off with the Indians one summer hunting deer; my interpreter Wm. Hoole, accompanied me, who is now dead, and never enjoyed myself more in my life.

Sand flies are the curse of the barren lands, but when the deer approach the flies leave you. When the deer are coming it reminds you of the rumbling you hear when living close to London.

A fact, and strange at that, badgers, skunks, fishers, snakes and lizards are never found north of or across the Salt River or Slave River, although it is but a very small stream. This spot is one of the most valuable in all the North-West as a farming and grazing centre, and the only one I could recommend as a settlement or town site. It is worth looking into.

W. C. KING.

Answers from W. E. Waite, Fort Vermilion.

SERIES A.—RELATING TO NAVIGATION AND COMMUNICATION.

1. Know only Athabasca River from mouth of River LaBiche to mouth of Little Slave River, Little Slave River and Lake, and Peace River from Lake Athabasca to Dunvegan, a survey of which was made by W. Ogilvie, D.L.S.

2. Athabasca River is navigable from head of Grand rapids for some distance above the mouth of Slave River. In high water probably nearly to the Jasper House. Lesser Slave River navigable for steamers in high water only, for vessels not drawing more 20 than inches water. The chutes below Vermilion are the only real break in the navigation of the Peace.

3. To connect Upper Peace River with Athabaska River a road from mouth of Little Slave River to Little Slave Lake, say 30 miles, north end Slave Lake at Smoky River Crossing 75 or 80 miles. To connect Upper and Lower Peace River, canal or tramway (3) three miles.

4. Am only acquainted with Little Slave Lake which has been surveyed and described by W. L. Thompson, D.L.S., and W. Ogilvie, D.L.S. *Vide* their reports on the same.

5. No answer.

6. *Vide* Report of William Ogilvie, D.L.S.

7. Same answer.
8. Do no know by personal observation.
9. Do not know.
10. No obstruction except chutes below Vermilion. Average strength of current above Battle River probably 4 miles per hour; below that point about 2½ miles per hour. Average width in low water about half a mile below Vermilion. Above that point about 600 yards. Above Dunvegan do not know.

For average depth, see W. Ogilvie's report; also for Little Rapid, about half way between Fort Vermilion and Lake Athabasca.

11. Know nothing of this river and its lakes. Great quantities of drift wood during June freshet.
12. No answer.
13. No answer.
14. No answer.
15. No answer.
16. Lesser Slave Lake quite navigable for crafts of all kinds, of light draft. The lake is shoal and subject to high winds. North shore very irregular, giving many deep bays. North shore very few good harbours.
17. No answer.
18. Am not sure of exact dimensions of steamer "Graham." Think it is 150 feet with 28 feet beam, 20 inches draft, stern-wheeler. Steamer "Wrigley" on Mackenzie, screw propeller, 80 feet, 14 foot beam. Don't know what draft steamer now building or just finished on Upper Athabasca; same size or rather bigger than "Graham."
19. Nothing.
20. No answer.
21. For rainfall and snowfall *vide* reports of Toronto Meteorological Office. Observations have been taken for some years at Dunvegan, Lesser Slave Lake and Fort Chipewyan.
22. Can give none.
23. No answer.

W. E. TRAILL.

Fort Vermilion, 1st August, 1888.

Series B.—Extent of Arable and Pastoral Land.

24. No answer.
25. No answer.
26. Both wheat, barley and potatoes have, I believe, been grown at Fort Liard; I believe barley and potatoes are grown there yearly. Fort Providence is the most northern part where barley and potatoes can be grown with any amount of success.
27. No answer.
28. I am not aware of Indian corn having matured at any point north and west of Lac LaBiche. I raised good corn at that station, seasons 1877 and 1878, which matured well. Have not tried corn at any other station.
29. During my charge of 7 years at Lac LaBiche, was always able to sow wheat and barley from 20th April to first week in May. Wheat ripened in August. Lesser Slave Lake, the spring is usually a little late, and the harvest corresponds. Have, however, sown wheat and barley at the latter place in April.
30. The earliest flowers are a species of anemone which flowers almost as soon as the snow is off the ground which frequently happens early in April, on slopes having a southern aspect.
31. From 10 days to 2 weeks—much, however, depends upon the nature of the soil. Light ground being dry enough immediately after the snow is off and the frost out sufficiently for ploughing. Stiff clays do not admit of such early culture.

32. Wheat, at Lac LaBiche, 1st Sept.; at Lesser Slave Lake, 15th Sept.

Barley	do	do	15th Aug.	do	do	1st Sept.
Potatoes	do	do	1st Oct.	do	do	1st Oct.
Strawberries		do	1st July	do	do	10th July
Gooseberries		do	15th Aug.			

33. June is usually the month of greatest rainfall ; July and August, warm with light rainfall and that principally thunder showers, particularly at Lac La Biche.

34. There is a prevalence of summer frosts at both Lac La Biche and Lesser Slave Lake, particularly the latter place, but these frosts are not usual in the immediate vicinity of the lakes. The influence of the lakes seems to be confined to a radius of three or four miles from those bodies of water.

35. Local as a rule.

36. I should judge so.

37. Early in June.

38. September, bright and warm as a rule with little real heat. October, cool and very often a great deal of smoke in atmosphere which prevents the sun from having any power—hence the coolness of the month.

39 and 40. No answer.

41. The wild pea or vetch of several kinds grows in all parts of the North-West except on the prairies. Ridges of dry land between muskegs and low ground seems to be its favourite habitat, also ground that has been burned a year or two before.

42. I cannot call to mind any.

43. Loamy clay with stiff clay subsoil. This applies to Lac La Biche, Lesser Slave Lake and the prairie country round Dunvegan.

44. From Athabasca River south to Saskatchewan, west of Lac La Biche, I should judge that one-fourth of the area was fit for agriculture. From Athabasca River north to Lesser Slave Lake there is very little land fit for agriculture or even pasture. From west end of Lesser Slave Lake to Peace River and west, I should say that there was comparatively little land unfit either for pasture or agriculture. Am not prepared to say in what proportion, as a considerable area is covered with jack pine. Very little muskeg country exists in this region. From Slave Lake east and north there is a great deal of muskeg country with ridges of jack pine. This remark is also applicable to the country between that and Athabasca River.

45. No answer.

46. The turnip fly is common to this whole region as far as my knowledge goes. Cut-worms are also very troublesome some years. For several years in succession caterpillars were very numerous, but they seemed to confine their ravages to the poplars, which they kept almost bare of foliage for several seasons. I know of no other insect pests.

47. I have already referred to the reports of Toronto Meteorological Office. Observations have been kept for some years at Dunvegan, Lesser Slave Lake and Fort Chipewyan.

48. The larger lakes certainly exert great influence in keeping off summer frosts, but the influence does not generally extend any great distance except where there is a wind blowing off the water.

49. The meterological report above referred to, will give the answer to this question better than I can from memory.

50. It is generally allowed by those who are competent to judge that the chinook winds affect the upper Peace River. The effect was quite observable at Lesser Slave Lake by a rise in temperature whenever the wind blew any length of time from the west. In fact the west wind at that place is the warmest wind that blows in winter. I do not think the influence is felt at any station further east.

51. Bishop Faraud could give particulars of results of agriculture at Lake La Biche. At Slave Lake nothing decided has been done more than the raising of potatoes and barley for some years by the Hudson Bay Company and a few settlers. Wheat has not been raised yearly as a crop, but when it has been tried it has generally ripened.

52. None.

53. Wood buffalo, these animals are undoubtedly the same as the plain buffalo which have become cut off from the plains by the growth of forest, and other causes; elk, this animal is now extinct in this region if they ever did exist. Have never come across old antlers north of the Athabasca River.

54. No answer.

55. Have not the necessary data. The Hudson Bay Company could, if willing, supply the necessary information.

56, 57, 58, 59, 60, 61, 62, 63, 64. No answer.

65. I believe the Labrador tea-plant grows in all muskegs east of the Rocky Mountains. It is very little used by the natives—never when they can obtain the teas of commerce. It is said that it has an injurious effect upon the urinary organs, causing stricture, if used too freely.

66. I do not think it at all suitable. Few persons care for the flavour, which may be described as medicinal. Have used the infuson myself as a change. The flowers are considered superior in flavour to the leaves.

67. Gold, Upper Peace River; Salt, Salt River on Great Slave River; Petroleum, Peace River (Smoky River perhaps), Athabasca River below Grand Rapids; Gypsum, Lower Peace River at Rapid de Boger; Coal, Smoky River in thick seams.

68, 69, 70. No answer.

71. Grey geese (two kinds) brant or grey wavy, white wavy (2 kinds) ducks of many varieties, swans of two kinds. These fowl are very numerous in some localities, Lesser Slave Lake, Athabasca Lake, Great Slave Lake and other places being passes for them. In some localities removed from large lakes or feeding places very few of the larger fowl are seen.

72. At the various places above mentioned there exist feeding places where they congregate in great numbers especially in the fall, only leaving when the hard frosts set in. The ducks leave the smaller lakes as they freeze up and congregate in the larger lakes, some varieties only leaving when the lakes set fast.

73. The wild swamp grasses seem to be the principal food of these fowl except such kinds as feed on fish such as the loon, cormorant and of such as feed on insects as several varieties of ducks particularly of black ducks of which there are several varieties.

74. The first of April may be given as the average time of the appearance of geese and a few days later of ducks, although sometimes ducks are the first seen. These fowl however do not come in any great numbers until the 20th April. The wavies and swans are later. The great flight of these birds does not take place until May.

75. To the best of my knowledge the same as at other times.

76. Missaskatoon or service berry, rasberry (red), strawberry, sand hill cranberry, swamp cranberry, huckleberry, gooseberry, black currant (3 kinds), red currant (2 kinds), moose berry, high bush cranberry, red cherry, choke cherry, whortle berry? A large yellow berry like white raspberry (growing in muskegs and very luscious), 2 kinds of creeping raspberry.

77. Specimens of this pitch were taken to Ottawa by W. Ogilvie, D. L. S. and no doubt have been analysed.

78. I believe there is a great quantity.

79. Either a railroad connecting the navigable waters of the Peace and Athabasca with the existing railway system or a railroad from Athabasca Lake to Churchill Bay. A road from 500 to 600 miles would connect Churchill Bay with Athabasca and open out this whole region.

80. Cannot say.

81. I understand not.

82. Very few Indians proper exist between the Athabasca and Peace Rivers, proper. Those at and trading at Lesser Slave Lake and outposts, are principally Metis of French and Cree extraction with a dash of Iroquois blood here and there.

The Indians of Peace River proper, are all Beavers and are very few in numbers. They are fast dying out. They have been subject to some kind of scrofula or venereal

disease which carried them off in great numbers. The disease seems to have run itself out but the survivors are a waste and degenerate race. They are opposed to making treaty and yet if not assisted by government they must speedily disappear. The country is now very poor in game and fur bearing animals ; and the Indians are consequently naked and unable to make a living.

83. At the larger lakes fish is the principal diet, at Lesser Slave Lakes they cultivate a few potatoes, elsewhere they depend almost wholly on the chase. They say they would like to raise crops but have nothing to subsist on while engaged in farming operations and have no tools.

84. The increase and decrease of rabbits is periodical, and the lynx live on rabbits and increase and decrease to a great extent with them. The moose seem to migrate but not periodically. No cause has been assigned for these migrations. The caribou are also somewhat erratic in their migrations, even the partridge or arctic partridge is to be found some winters in great numbers, other years there are none, as last winter. No cause can be assigned unless the severity or mildness of the season.

85. The cause cannot be stated. The disease seems to be a swelling about the neck but many die without any appearance of this swelling.

86. I only know of two, one of which the great arctic hare is confined to the open country. The other also a hare I believe is common to the whole North-West.

87. I am not aware of the great arctic hare (which is scarce at all times), being affected by the disease to which the other kind is subject.

88. Jumping moose not found on the Lower Peace, beaver now getting scarce an epidemic having killed off great numbers winter 1887–8, one year, porcupine very rare except near and in the Rocky Mountains. The other animals such as wolfe, wolverine, fisher, marten, mink and otter are only eaten when scarcity of other food compels the Indians to do so. Musquash when plentiful are a considerable stand-by, but in the north they are scarce at all times and now almost extinct.

89. I am of opinion that they would soon disappear from the earth, however I am not acquainted with the northern Indians. The foregoing remark was in reference to the Beaver tribe.

90. The Cree and people of mixed blood could be advantageously employed by white men at many kinds of work both as regards employer and employed. I think such employment calculated to civilize them. It must be borne in mind however that the natives are more apt to copy the vices of white men than their virtues.

NOTE. Being pressed for time I can give no further information but will send later a copy of the dates of the opening and closing of the Peace River at the post for a number of years from the year 1835 to the present time. These records are not complete as there occur gaps of several years. The journals have either been removed or destroyed.

W. E. TRAILL.

FORT VERMILION, 1st August, 1888.

GOVERNMENT HOUSE,
WINNIPEG, 17th November, 1890.

SIR,—Very much of the information I transmit herewith does not relate directly to the District of Keewatin, but to that vast and in some parts unknown region to the West; as, however, it contains much information that is isothermally and otherwise important to the District of Keewatin, which cannot be very well culled with that special reference, and, as moreover, it adds, and from a reliable source, materially to our knowledge of the North and North-West Territories of Canada, I have caused it to be attached hereto in its entirety.

In the spring of 1888 I caused to be sent, together with a series of questions, to the writer, His Lordship Bishop Bompas of the Mackenzie River, then residing at Fort Simpson, a small bag each of Ladoga and Onega wheat, Polar barley, and Onega oats,

respectively, requesting him to plant them at Fort Simpson and report upon the result. The grain sent, with some Saskatchewan barley, was planted and gathered in 1889, and this spring I received a small bag of the different grains reaped, a portion of which being sent by me to the Department of Agriculture at Ottawa for examination and test of vitality, I have recently received the letter, of which the following is a copy :—

CENTRAL EXPERIMENTAL FARM, DEPARTMENT OF AGRICULTURE,
OTTAWA, 7th November, 1890.

Lieutenant Governor SCHULTZ, Winnipeg, Man.

DEAR GOVERNOR SCHULTZ,—The tests of the germinating power of the samples of grain received from Bishop Bompas, of Fort Simpson, on the Mackenzie River, have been completed and the results are as follows:—Wheat, Ladoga and Onega mixed, germinated in the proportion of 85 per cent., 75 per cent. of the plants making strong growth and 10 per cent. weaker growth. The Polar barley 92 per cent., 80 per cent. making strong growth and 12 per cent. weak growth. The common country barley 54 per cent., 41 per cent. strong growth and 13 per cent. weak. The Onega oats 93 per cent., 90 per cent. strong and 3 per cent. weak. You will see from this that these newer introductions promise to be of more value to them than the grain they have in cultivation, if we can judge from the samples of barley they have sent, as it only has 54 per cent. of germinating power. I am sorry that the result of this test could not have been sent you earlier. It is very interesting, and shows that the grain of that district ripens well and makes very good seed; it also shows the importance of introducing new varieties there for test. I shall take the opportunity of sending to Bishop Bompas several varieties more for test very shortly. Thanking you for the kind interest you have taken in this matter,

I remain, yours very truly,
WILLIAM SAUNDERS,
Director.

I have the honour to be, sir, your obedient servant,
JOHN SCHULTZ.

The Honourable the Minister of the Interior, Ottawa.

ANSWER FROM WILLIAM CARPENTER BOMPAS, D.D. BISHOP OF MACKENZIE RIVER, NORTH-WEST, CANADA.

1. Except where otherwise stated the following answers are intended to refer especially to the course of the Mackenzie river from Great Slave Lake to the Artic Sea, a distance of nearly 1,200 miles. The information is gained from superficial observation during 23 years residence.

2. The whole of the above course of the Mackenzie is navigable for the months of June, July and August, for river steamers of light draught, say not over 6 feet, but in September, in some seasons, the navigation may be obstructed by low water. The current is mostly from 3 to 4 miles an hour, but in places 6, 7 or 8 miles an hour. The depth of the main stream where there is no obstruction may be from 5 to 10 fathoms. The lake might be navigable for a swift steam launch in spring only, but there is a difficult rapid near its mouth.

3. The navigation of the Mackenzie river from the sea is for 1,400 miles continuing to Fort Smith portage, (Lat. 60), which it is very desirable to bridge by a tramway, length 15 miles. Thence the southerly navigation is good for about 400 miles to the falls of the Peace river. These would be bridged over again by a tramway, length 3 miles. This would throw open another stretch of navigable water on the Peace river to Rocky Mountain House, about 600 miles further, depth 6 feet in summer to 3 feet in all over obstructions. The 2,400 miles of navigation would be open, with breaks of only 18

miles. A tramway on the Athabasca river would open about 600 miles of further southerly navigation in another direction, but the tramway might be difficult of construction, and 30 miles long or more. The Peace river tramways are quite easy.

4. The lakes in connection with the Mackenzie river are the Great Slave lake and Great Bear lake. The former is about 300 miles long and average breadth of about of 50 miles, and say 10 fathoms deep. It is, of course, navigable throughout, with many islands and river mouths to afford shelter from the wind to small craft. But the navigation would not be safe for the ordinary flat bottoned river steamers, but vessels with a keel are required, if it can be judged of by the Canadian lakes.

Great Bear Lake is about 200 miles long, and nearly as wide as its length. It contains therefore probably a larger body of water than Great Slave Lake. It has many deep bays and harbours. The waters are of crystal clearness and very deep. It is only open for navigation for three months, and is connected with Mackenzie river by a very swift and limpid river with rapids (Bear river) which would with difficulty be mounted by a steam launch, though navigable by canoes and cork boats. A steamer drawing 5 or 6 feet of water with a keel is needful for Great Bear or Great Slave lakes. There are no other important lakes in the same region, though many smaller ones inland. Athabasca Lake may be reported of by others. It is in figure like Great Slave lake, but smaller. Both these lakes taper off at their eastern ends to narrow channels or bays, which have the likeness of, and in fact, estuaries of rivers and are filled with number less islands of picturesque beauty. Athabaska lake is perhaps 200 miles long and 30 wide.

5. The surroundings of the mouth of the Mackenzie River and its neighbourhood are laid down on a published British Admiralty chart, which can be referred to. The general depth of water in the estuary of the Mackenzie River and along the sea-coast is shallow, say from 4 to 6 feet, but there is deeper water to be found. The navigation might be open for three months of July, August and September in favourable seasons, but in July, especially, a north wind would bring in the Arctic ice on the coast. Steam launches or light draught steamers would be the best vessels for navigation. They could be built at Fort Nelson, on the east branch of the Liard River, where the timber is good, and could descend the Mackenzie in time for the coast navigation and mount again at its close. The draught should be 3 or 4 feet. The engines must be brought in either from the Pacific coast by way of Dease Lake, or by the Saskatchewan. It is not likely that the seal or white fishery at the mouth of the Mackenzie would answer unless the little craft above mentioned delivered their cargoes to large vessels waiting at Point Barrow, to go out by way of Behring Straits.

6. This question I cannot answer from personal knowledge. I believe that a steamer with the draught mentioned could run for 30 miles about the Clearwater, and that above that distance the obstacles are mainly boulder stones, which might be removed by blasting.

7. The Athabaska below the Clearwater is navigable and already navigated by a steamer of the draught mentioned. The Clearwater is itself only navigable for steamers safely to the mouth of the Pembina River (about 50 miles). The lower Arthabaska has no important affluents beside the Clearwater River. The timber on the Athabaska is valuable, and it may be asked how it is to be exported. The only possible scheme seems to be that of a railway from the east end of Athabasca Lake to the coast of Hudson's Bay, a distance of about 400 miles, but 300 miles might suffice by using navigable water. This would form an outlet for all timber and other produce on the Peace and Athabaska Rivers, and a wide district round. The plan has been already projected and postponed.

8. Great Slave River is about 400 miles long, nearly half a mile wide, and with depth from 1 to 5 fathoms, the current about 3 miles an hour, and suitable for river steamers. but the lower part has at times rough water, and vessels with a keel would suit it best. The only obstruction is at Fort Smith. At this point the rapids are passed either by 5 short portages averaging 100 yards each, or by any portage with a good level-road of 15 miles. This should be bridged by a tramway.

9. Liard River is at present navigated by canoes and york boats. Its length from its junction with the Mackenzie to Fort Halkeft on the west branch or Fort Nelson on the east branch, is about 500 miles. It is about 500 yards wide. There are obstructions, especially a rapid about 30 miles from the mouth of the river. In the months of May, June or July, however, there is depth of water for a steamer of light draught to mount. The current is strong, with an average in spring of 4 or 5 miles, mounting at certain places to 8 to 10 miles an hour, and caution with the steamer would be necessary in descending the rapid.

10. Peace River is a finely navigable river for about 800 miles upward from Athabasca Lake, with only one obstruction, which could be easily bridged by a tramway of about 3 miles, and might be removed by blasting. Peace River is nearly half a mile wide and its depth from a fathom and upwards. But in the fall its depth may fall a fathom on obstructions.

11. Of this I have no personal knowledge.

12. This has been anticipated. The Mackenzie is about 1,300 miles long, north of Great Slave Lake, and averages about 1 mile wide, with a depth from 1 to 10 fathoms, or more. The average current is 3 to 4 miles, but increased at certain points to 6 or 8 miles, or even 10. It is suitable for navigation by the steamer now running on it, which draws about 6 feet. The obstructions are chiefly :—1st. Sand at the entrance from Great Slave Lake, which reduces the depth of water in the fall of the year to about 6 feet ; and in certain years, when the water of the lake happens to fall very low, this depth might be further reduced. 2nd. Between Good Hope and Normand, latitude 66, is a rapid, where in fall the depth might be not over 6 feet, and the current 10 miles an hour. 3rd. At Good Hope close to the Arctic circle, is a flat shelf of rocks, where in the fall of the year (September) is said to be only 3 feet of water.

13. Lake Athabasca is about 200 miles long and about 30 miles wide, with varied depth. It needs a lake steamer of light draught for its navigation. The "Graham" a flat river steamboat, crosses only the shallow end of the lake, which it is unable to navigate. Valuable minerals have not yet been discovered, but the timber on the Athabasca River and the Peace River is valuable, and would all naturally be floated down to this lake for shipment. Timber might float to this lake on the Athabasca River and its adjoining lakes and affluents for more than 1,000 miles, and down the Peace River for 1,500 miles at least, and driftwood probably does come from these distances. A vast amount of large and very valuable timber could thus be gathered in Athabasca Lake with little expense beyond that of hewing. The timber of 100,000 square miles of country could probably be floated to Athabasca Lake. The natural outlet for this would be either by a railway to Hudson's Bay, or by improving the navigation thither. There are fish (white-fish) in Athabasca Lake that might suffice to feed those engaged in the timber trade there, but not enough for exporting. Nothing else but timber and fur is yet known that would pay for exporting, unless rock oil or mica.

14. This has been anticipated. Great Slave Lake is about 300 miles long and 50 miles wide, and with a depth of 10 fathoms and upwards. It is of course navigable for lake steamers and other vessels. A large number of rivers run into it, and some of considerable size, as Slave River, Hay River, Yellow Knife River and others. Rock oil or tar springs are found it it, and sulphur abounds at Sulphur Point on it southern shore. It is possible that a manufactory of gunpowder might be advantageously carried on here, but the saltpetre required might have to be imported. Salt is very abundant on Slave River, but saltpetre is not known here. Sulphur and charcoal being accessible, it might be better to import saltpetre than manufactured gunpowder, for the greater need of the country is ammunition. Lead is said to exist in the same neighborhood on Buffalo River, and that may imply the presence of silver, which has long been reported of in the neighborhood of Peace River. White-fish and large trout are numerous in Great Slave Lake, but not enough so for export. They might suffice to support those engaged on its shores in mining or mineral industry. The timber round Great Slave Lake is not large or valuable for exports, but suffices for building on the spot. No other valuable product is known besides fur, unless it be mica.

15. Great Bear Lake has been described in paragraph 4. It is the haunt of the reindeer. The fish are mostly trout and herring, but there are white-fish fisheries in places. The trees around Bear Lake are small. There is a portage of only 6 miles from water running into Great Bear Lake to water running into the Coppermine River; so that if copper is worked on the Coppermine, this might be the readiest way of bringing it to market. A tramway might be made over the portage. But at present the cost of transport from Great Bear Lake to Manitoba is reckoned at fully 25 cents per pound, and this appears too close upon the value of raw copper to leave sufficient margin for mining, repairs and profit.

16. I have no personal knowledge of "Lesser Slave Lake" or "Hay Lake" or other important lakes, except La Lacte and Ile à la grosse lakes.

17. Sea-going steamers would only ascend the Mackenzie if constructed for it. But a light draught steamer drawing say 6 feet might make the round from Victoria, British Columbia, through Behring Straits and mount the Mackenzie. It is true that Point Barrow is often encumbered by ice, but I make no doubt but that a passage could be effected by a steamer either inside or outside the ice, according to the wind and weather. On a large sea-going vessel being brought as far as Point Barrow, a steam launch could be despatched thence along the coast to meet the Mackenzie.

18. On the Athabasca River it is understood that two steamers are this year (1888) run by the Hudson's Bay Company, one the "Graham", about 150 feet long and carrying about 100 tons, and running between the Grand Rapids and Clearwater River and Fort Smith Landing on Horn River, and also up Peace River as far as the Falls. Another steamer has been built for the Upper Athabasca River, above the Grand Rapids to run to Athabasca Landing and Lesser Slave Lake.

On the Mackenzie River only one steamer is at present running about 100 feet long and 14 feet beam, carrying about 60 tons, with high pressure engine and screw. This is a lake steamer, drawing about 6 feet of water, but hardly enough for the traffic required. It is named the "Wrigley", and is also run by the Hudson Bay Company.

19. I know nothing of Hudson's Bay.

20. What little knowledge I have of these would hardly be of service. The old route from York Factory to Portage La Loche, formerly used by the Hudson's Bay Company for their York route, is well known. It runs through Nelson River, Lake Winnipeg, Saskatchewan River, Sturgeon River, English River, La Leche River and many lakes, including Cross Lake, Cedar Lake, Cumberland Lake, and Fleet Cross Lake. The route is very much impeded, having about 100 portages enroute. It could not be adopted in these days of steamers and railways.

21. This question is very general. The rainfall varies much in Mackenzie River in different seasons. We have wet summers and dry summers, but dry weather predominates. If there occur sufficient showers in spring to promote vegetation, the crops are unusually successful. Unsettled weather often occurs about the end of July or early in August. I cannot give the rainfall in inches. The average depth of winter is probably about 4 feet, but varying from 2 or 3 to 6 feet in special seasons; and the snow may be deep towards the south and scanty towards the north in the same season, or *vice versa*.

22. This is a difficult question, but can be determined probably by general principles, after ascertaining average annual temperature of the air at any given point. It is understood that a certain known distance below the surface, the soil will be found permanently of this average annual temperature, and below that point the temperature of the soil rises as you descend, at a known fixed rate. Where the temperature at the surface is averaging below freezing point, there is permanently frozen ground at a certain depth. Such is the case in latitudes higher than 65.

23. At Peel River, latitude 68, the soil hardly thaws more than 2 feet from the surface in summer. Below this is permanently frozen ground for a good depth, say 20 feet at least. At Fort Simpson I do not think the ground is permanently frozen: I suppose, therefore, the average temperature of the place is above freezing point, but I think the winter frost will penetrate the ground to the depth of 8 or 10 feet. In Peace

River, root crops can be preserved in pits at a depth of 6 or 8 feet, the winter frost not reaching them; but this cannot be done in Mackenzie River.

24. A belt of country, fringing the artic shore, and varying in breadth from 100 miles on the west to 200 miles on the east, is called the barren lands, simply because devoid of trees, which are killed by the salt sea breezes. South of this line the whole country is entirely covered with spruce and pine forests. These are firs and stunted in the north and they increase in size towards the south till on the Peace River and Liard or Upper Yoma they mingle with poplar or cotton wood and tamarac.. Among these pine forests are numerous lakes and swamps and more or less underwood of willows or other scrub. The ground is a good deal covered with a white moss known as reindeer moss, because the chief food of the reindeer.

25. On the barren ground as trees will not grow, so neither of course will crops. The soil is partly rocky or stoney, and partly mossy. On the rocks grow the edible lichens known as "Tripe des Roches." Unless some edible or medicinal extract should have or may be made from those mosses or lichens, the barren grounds are not known to have commercial value. They form the permanent home of the musk-ox and the summer haunt of the reindeer, which are hunted there by the Indians with success and waste. The deer leave the forests in summer to escape the flies, and resort to them in winter for shelter from the wind.

26. Barley and potatoes have been grown as far north as the Arctic Circle, on the Mackenzie and Yukon Rivers, though the crops are hardly safe from frost at that latitude. East of the Mackenzie, the most northern place at which I am aware potatoes have been grown is Fort Ray, Great Slave Lake, latitude 62, 30.

27. Wheat has been grown at Fort Simpson, Mackenzie River, latitude 62, and ripens there in a favourable season, and yields good grain. For a permanent crop and profitable increase it needs careful cultivation and a selection of the most desirable seed.

28. On the Mackenzie, Indian corn will not ripen, but it might be used green.

29. Barley, wheat and potatoes are planted and sown on the Mackenzie River immediately after the spring plowing, which is done after the melting of the winter snows, as soon as the soil is dry enough. At Fort Simpson this is generally from the 20th to the 25th May. At Good Hope, about the 1st June. The reaping will be some time in September, according to the season. The potatoes are taken up at the first sign of frost, about the middle of September.

30. Spring opens on the Mackenzie River from the 1st to the 15th May. Within the Arctic Circle, say of Red River, about the first week in June. At Peel River the low cranberry bushes may be found in flower as the snow melts off them, so powerful is the unsetting sun, even through the snow.

31. It is obvious that in such case the ground is only fit for seeding after the flowering of the berry bushes. Even at Great Slave Lake you may see the buds burst on the gooseberry bushes one week, the leaves fully out the next week, so speedy are the spring's advances. I should say the seeding time is usually about the same as the flowering time.

32. Wheat, September; barley, September; rye and oats, untried; potatoes and turnips, September; Indian corn, does not ripen; strawberries and gooseberries, August.

33. There is a liability to summer frosts on Mackenzie River as on Athabasca, Peace River and the Saskatchewan, but I should think with care potatoes would yield their seed about ten-fold in three seasons out of four; barley, its seed five-fold in three seasons out of four; and wheat, its seed five-fold in two seasons out of four; but selected seed, careful cultivation and dressing of the land is required. Turnips and other quick-growing crops and beet answer well.

34. The frosts in these months are generally only occasional night-frosts, but are at times enough to wither the potato stems. The length of the summer day, approaching perpetual sunlight near the Arctic Circle, hastens vegetation, and makes the night frosts, if any, very short till towards the fall. The present year, 1888, there were night frosts at Great Slave Lake in July, but probably none at Peel River after the 1st of June, there being perpetual sunlight from that date to the middle of July.

35. The frosts are general, but a field sheltered from the north wind, or bordering a river which runs from the south may escape the frosts.

36. The settlement of a region is known to make it less liable to frost, and the annual working of the soil will in a few years abate its liability to frost. It is generally thought that the winter temperature of Mackenzie river has abated since its occupation by the whites. This may be owing to the fires, which may have been allowed to run more frequently in the woods, causing large tracts of burnt woods where the underwood being consumed, the summer sun can take the frost from the soil. The burnt woods have the same effect as so much land cleared.

37. At Peel river, Lat. 68. the summer rains seem to be expected regularly about the last week in July, to last to the middle of August. Further south there is no such regularity, but unsettled weather more or less is generally experienced about the same time.

38. September and October are generally fine and pleasant months, but navigation closes on the Mackenzie river through drifting ice in October; about the first week in October north of the Arctic Circle, and down to the 20th further south. The winter snows begin to lie from the 20th to the 25th October.

39. Autum-sown crops have hardly been tried, but self-sown barley grows in the spring. The grass withers in the winter, but it is renewed in the spring. The sap in the spruce and birch rises in May, and the willows become green from May to June, according to latitude. but seasons vary much, some being about a month later in the spring than others. Small spruce is more easily felled when hard frozen, but hardly so large trees.

40. The grasses are mostly confined to the Hay swamps or river banks, and are not abundant. They suffice, when collected, for the keep of a few cattle. On Peace river there are grass prairies, intermingled with forest land, and in the neighbourhood of Dunvegan and Smoky Rivers the hills are quite free from trees, and are clothed with short grass, suited for horses or cattle pasture.

41. I have not noticed it to any extent. It may exist to a slight extent on Peace river and the Upper Yuckon.

42. Not that I am aware of. The cattle are at times fed with chopped willows in spring in default of hay.

43. The cultivated soil on the Mackenzie River is mostly the product of decayed vegetation, and on the banks of the rivers mixed probably with some amount of alluvial mud brought down by the stream. In some parts the soil is stony and in some sandy. Mostly when the trees and brushwood are cleared off there is enough vegetable soil for the growth of some crops. In some parts this is better and in some worse, but there is much mossy ground.

44. There is no part of Mackenzie river region or the country north of Athabasca that is fit for profitable farming or pasturage; but in most parts a patch of ground can be cultivated as a field or garden by a resident to eke out his existence, with the produce of the chase or imported provisions. If there are residents for the purpose of the fur trade, or operations in minerals, the cultivation of the soil should be pushed forward by them for their subsistence, and a Government farm might be attempted on the Upper Mackenzie or Liard rivers, for the behoof of starving Indians, and a large amount of vegetable crops could doubtless be raised upon it.

45. On parts of the Liard River the soil is only lightly covered with small poplars and could be easily cleared. Cattle could be raised and kept by artificially sown grass, and fair and safe crops of barley and potatoes could be relied on, according to the extent of land brought under cultivation.

A Government farm here I should view as a blessing to the country. This in Lat. 60. On the Upper Mackenzie River, Lat. 61, cattle and crops could also be raised, and the access to and from them would be more easy and convenient here, in consequence of the rapids in the Liard River.

46. Occasionally grasshoppers have destroyed the barley crops, but not frequently.

47. Printed tables are published of meteorological observations of Fort Simpson, Mackenzie River, in 1851, examined by Col. Sabine. Meteorological observations at Fort Ray were lately taken and published by Capt. Dawson, of the circumpolar expedition. Meteorological observations of Peel River were made by Mr. Holland, sent to the Smithsonian Institute. Observations have been made by Archdeacon Sterne and sent to the Toronto Observatory, etc., etc. The ordinary lowest temperature at Fort Simpson is about 50 below zero, Fahrenheit; and of Peel River about 60 below zero. The temperature of Fort Ray, observed by the circumpolar expedition, was the lowest but one observed in the world. But Fort Ray is milder than Peel River. The climate of Mackenzie River is a very healthy one for hardy Europeans, but not for delicate ladies, who suffer from exposure, damp feet, etc. Patients with weak lungs or consumptive tendencies generally recover in Mackenzie River.

48. The influence here spoken of is uncertain. When a frosty wind drives up from the north, an open river or lake may increase this by affording free space for the wind. When there is no wind, water of a lake or of a river flowing from the south will tend to preserve from frost the crops on its immediate banks. Great Slave Lake usually opens from 20th to 25th June, but this year (1888) it was closed till 10th July. It closes about 1st November. Great Bear Lake usually opens about the middle of July, and closes by the middle of October. The Mackenzie River opens about the 15th May and closes for navigation about 20th October. The Liard River opens the first week in May and closes navigation the middle of October. The Mackenzie River sets fast about the 20th November. It is not free from ice at its exit to the sea till the beginning or middle of June.

49. The winds are variable, but generally blowing up and down Mackenzie River alternately for a few days or a week at a time. In spring time northerly winds prevail, and sometimes continue for six weeks.

50. A three days' west wind will sometimes produce a thaw in Mackenzie River, even in January. This is rare, but a westerly wind is usually mild.

51. At Fort Liard 20 or 30 head of cattle have been raised, but they have now but six. Some hundreds of bushels of barley and potatoes are generally raised there without difficulty. At Fort Simpson are now about 12 head of cattle and there have been more. About 1,000 bushels of potatoes have been raised at Fort Simpson, and about 100 bushels of barley; but that is above the average crop. Further north the cattle are few and the crops small, but cattle are kept and potatoes raised at Good Hope on the Arctic Circle.

52. I think not.

53. The musk-ox permanently, and the reindeer in summer, have their haunt in the barren grounds. The reindeer or cariboo averages about 100 pounds of meat per carcase. The skin is of little value, as the hair is loose; but the fawn skins make good robes. The reindeer is migratory, travelling south to the woods in winter and to the Arctic Circle in summer. Its food is reindeer moss.

Musk-Ox. These are confined to the barren grounds and are not very numerous. The meat is coarse and of a disagreeably, musky flavour. The robes are valued, being more shaggy than the buffalo robes.

Wood Buffalo. These have almost or quite disappeared, but some cows have been killed not long since near Fort Smith. Their only haunt seems to be Slave and Peace Rivers, where they are attracted probably by the salt.

Moose. They have been numerous on Mackenzie River, the past three years, during which seasons there have been no reindeer on the river.

It would seem that in these seasons the reindeer have, in their migrations in the fall, taken a more easterly course, towards Hudson's Bay, being turned aside either by burnt woods, which frightened them, or possibly by rotting carcases of deer incautiously killed and forsaken. Providence has kindly supplied their lack by large numbers of Moose, which seem probably to have been driven eastward by the wolves from the west side of the Rocky Mountains. The Cariboo is a gregarious animal, and is hunted

running. The Moose is a solitary animal, and is stalked with great caution. The meat weighs from 300 to 500 lbs.

Elk. This animal is generally considered to be the same as the moose, but some apply the same to the red deer, called also the wood deer or biche, which is found throughout the woods in small bands, but not in large numbers. It is much larger than the reindeer, and its meat will weigh from 150 to 200 lbs. Its robe is not valuable, nor is that of the moose, but the leather of both is good. The moose feeds on the willow. The red deer probably on the leaves or grasses.

Bear. These are rather numerous, and are black or brown. The grizzly bears are in the mountains. The common bears are timid and not dangerous. Their flesh is good. They hibernate the whole time the snow is on the ground.

Goat. These are rather numerous on the mountains, and their flesh is good meat.

There are no other carnivorous animals in Mackenzie larger than wolves, which are not dangerous.

54. Numbers rise and fall. Skin good. Follow the rabbits. Caught in steel traps, or snared, or shot.

Arctic Fox. White, on the Arctic coast. Traded from Esquimaux only. Caught in steele traps.

Black, Silver, Red and Cross Fox. Apparently an accidental variety, generally distributed, caught in steel traps. The numbers vary. The skins are good. Foxes are pretty numerous on the Arctic coast.

Fisher. Found at the lake side, and trapped or shot.

Wolverine. A troublesome enemy to the trapper and hard to trap. Caught in trip stick or steel traps, or at times poisoned.

Otter. Found in the lake and shot.

Beaver. Their numbers seem diminishing through wanton destruction of the young. The hunt should be limited by a close season, but this seems impossible unless the number of petty traders is limited by requiring a license to trade.

Martin, Mink, Ermine, Musk-rat. The martin rise and fall in number. They are widely distributed and taken in trip-stick traps. The mink are trapped or shot. The Ermine are not thought of value for trade, and muskrat are little sought for, though numerous in McKenzie River, as they are thought hardly to pay the expense of trade and export.

55. This is intended for those engaged in the trade.

56. The general result as to agriculture is that immigration cannot be invited to Mackenzie River, nor agricultural pursuits for export or for profit; but for the purpose of raising food for the inhabitants, whether whites or Indians, farming should be urged forward, and any assistance or encouragement by the Government, would be valuable. Regarding the fur trade, there certainly seems to be some danger of the extermination of the fur-bearing animals through indiscriminate trade, and it is for the Government to consider whether it would be well in this view to restrict the number of traders by a lease or exclusive license of trade over the more northern part of the country.

57. In Great Slave Lake the fish are trout, whitefish, inconnu, perch, roach, jack-fish, etc., but the two first are most valued. About 100,000 whitefish are taken in Great Slave Lake with nets every fall, and these fisheries might be increased. But neither here nor elsewhere in MacKenzie River must any provision be thought of for export, as provisions are too scanty even for the sparse inhabitants. Nor could a penal settlement or any large colony find provisions, but Indians settled around the lake and provided with nets might find food, and a small number of men engaged in any industry connected with rock oil, mica, sulphur, or other minerals, might be fed largely on fish. The trout in Great Slave Lake are good, and weigh from 30 to 50 lbs. They are taken chiefly with hooks. In Bear Lake the fish are chiefly trout and fresh water herrings. The latter are taken in nets, or attracted by lights and speared through a hole in the ice on winter nights. In MacKenzie River the fish are scanty. There are inconnu, jack-fish, blue fish, perch, loach, which afford a summer subsistence to Indians on the banks. At Peel River are good whitefish in summer, with herring and delicious mountain trout

of small size, and blue-fish. West of the mountains, on the Porcupine and Upper Yukon are salmon and salmon-trout in numbers, which mount from the Pacific Coast. The special use of the fish in the north is as food for the dogs, which are used in winter for hauling meat and fuel, etc. Each train of dogs consumes about 1,000 white-fish per

58. Whales, walrus and seals, that is, the hair seal, are hunted by the Esquimaux in the Artic Sea, off the mouth of the Mackenzie. Not many whales are killed. If two or three are killed in a summer, this is thought a good supply for the following winter. The ivory of the walrus tusk is good, but it is not brought by them for trade, though used by them in making needle-cases, fish-hooks and other small articles. There are no fur-seals off the Mackenzie such as are so valuable on the Pacific coast. The skin of the hair-seal is not highly valued. There do not seem to be more seals taken by the Esquimaux than are required for their own food. The flesh is very coarse meat, and the oil, though a luxury to the Esquimaux, is of mawkish and sickly taste. The whales, walrus and seals seem to be all taken by the Esquimaux with fish-spears.

59. I do not think these fisheries likely to be very valuable or to pay for exporting their produce overland. I think they must probably be approached for profit by way of Behring Straits, and any vessels used for whale fishery should be constructed outside, and brought in by way of Behring Straits. If a fishing station was formed at the mouth of Mackenzie River, it should be chiefly provisioned from outside by way of Behring's Straits, though herring and deer's meat, as well as seal meat, might be obtained on the spot for future use Though Point Barrow is said to be often encumbered with ice, I am of opinion that it could be passed by a properly protected steamer every summer, or if not, a vessel could be loaded there across the ice. The rest of the coast west of the Mackenzie River seems to be free from ice during the summer months.

60. The best place for the construction of vessels to be used on the Arctic Sea in connection with the Mackenzie River might be Fort Smith on Slave River, or Fort Nelson on the east branch of the Liard River. At the latter place the timber is very large and good, and at Fort Smith it is very fair. But provisions must be imported for those building the craft, and the expense of importing nails and ironwork would be great, raising the cost far too high for any profit. Any such vessels had far better be built outside and brought by way of Behring's Straits.

Light draught steam launches would seem the best vessels for the purpose. There is plenty of driftwood along the Arctic coast for their fuel, and harbours of refuge from storm. If Point Barron were impassible, such light vessels could be crossed on the ice and launched to the eastward.

I think if a single Government Station were established at the mouth of Mackenzie River, a successful and inexpensive expedition might probably be conducted thence to the North Pole, either by a small steamer (say a gunboat) in summer, or by dog-sleds in winter. Instead of a million pounds sterling, the cost of the old Arctic expeditions, I should think a few thousand might cover the cost. The distance would be about 1,500 miles each way, say a week's run each way for a steamer in summer, including detours for ice, or about two months' journey each way for dogs in winter. But for the winter trips, a train of provisions must be laid beforehand. Probably the voyage would be begun in the steamer and completed with dog-sleds on encountering ice.

61. The introduction of salmon or sturgeon spawn into northern waters by the Government might be tried with the view of increasing the supply of fish.

62. This has been anticipated. The whole of the Mackenzie River region is already covered with spruce pine, except on the Liard and Peace Rivers and Upper Yukon, where poplar and cotton-wood and tamarac mingle with it. Birch is also sparsely scattered on many parts. The timber on the Mackenzie River is not large, and it is unlikely that it would pay the cost of export, but there is large timber up the Laird River.

On the Peace and Athabasca Rivers and their affluents the timber is very plentiful and valuable, and implies a vast amount of wealth. The timber of about 100,000 square miles of country could be floated down these rivers to Athabasca Lake. Reckoning only $1 per stick, and a million sticks to the square mile, this would be worth 100,000 million

dollars. If timber rights were leased by the Government at $10 per annum per square mile, it would bring an annual income of $1,000,000 ; or if sold at $100 per square mile, would fetch a price of $10,000,000.

The best outlet for this timber would seem to be a railway from the east end of Athabasca Lake to Hudson's Bay, or to rivers running thither, unless timber shoots could be made to connect the east end of Athabasca Lake with Hudson's Bay by water, in the way of a timber aqueduct or canal, which might or might not be cheaper than a railway. The railway would be about 300 miles long. But the Government have not yet bought the Indian Title to the lands on Peace and Athabasca Rivers. It is doubtful, however, whether the Indians can fairly claim ownership in the timber, or whether the Indians now resident on Peace and Athabasca Rivers can claim any hereditary ownership of the country, except one or two insignificant bands, for the resident Indians are now mostly late immigrants. The original Beaver Indians on Peace River, and Chipewyans of Athabasca River have nearly died out, and have been replaced by Crees and half-breeds from the plains, and Chipewyans from Athabasca Lake.

63. Sarsaparilla and Liquorice are found on Peace River, and of course any amount of Salacene could be made from the red willow throughout the country ; but I know of no plants useful for export. There is a root on the Mackenzie and Yukon Rivers said to be good for chest complaints.

64. The Indians of Mackenzie River do not use herbal medicines themselves, but Crees, Saulteaux and half-breeds resident practice with herbal medicines on the natives. This seems to be partly trickery and deceit, but the Crees know some medicinal herbs, particularly astringent ones, as the raspberry root, and the Saulteaux appear to use at times poisonous and deleterious herbs for the purpose of mischief and revenge.

65. The Labrador Tea Plant extends west and north everywhere, but it is very little used except occasionally as a last resort and in want of Asiatic Tea. Tea made with the leaves is far too bitter to be palatable. The sprigs stripped of the leaves and boiled twice will make on the second boiling a fairly palatable tea. But the effect of drinking Labrador tea on the bowels is too astringent to be healthy, unless medicinally, as a remedy for Diarrhœa or Dysentery. Raspberry shoots or roots, or the twigs of the Saskatoon berry, or even birch twigs in spring, will make a more agreeable tea than the Labrador tea plant. The raspberry tea is also astringent ; I am not sure as to the others. Wild rhubarb is plentiful at Peel River, and along the rivers west of the Rocky Mountains. This is agreeable to eat with sugar when boiled, or for preserving. Wild leeks grow on the banks of the Mackenzie. Some of the weeds can be boiled as table greens, especially the garden weed known as "Fasten."

66. I am surprised to hear that the Labrador Tea Plant is well thought of as a substitute for Asiatic Tea, and only fear it may be used to adulterate that article. But if the Government think fit to essay the naturalization of the Asiatic Tea Plant in this country, it might be tried. North China is hardly south of Canada, and seems to be very cold, as bordering an eastern coast. Wild or swamp rice might be introduced from Manitoba, and sown in the swamps of Peace River and Athabasca and Liard Rivers. This might go far to keep the Indians alive in times of scarcity.

67. Nearly all the gold yet found in the north seems to have its origin in a single range of mountains which runs neary half-way between the true Rocky Mountain Range and the Pacific Coast Range. Peace River has one source in these mountains, and gold is found in the sand-bars and banks, down Peace River. None of this gold passes Slave Lake to enter the Mackenzie, and none of the affluents of the Mackenzie can easily come from this gold range, because the true Rocky Mountains intervene. However, both Peace River and the west branch of the Liard do flow through the Rocky Mountains, and on the latter river there are some traces of gold. The chief gold mines recently discovered are on the Yukon and its affluents, the Lewis River, Stewart River, etc. These mines are likely to attract many miners, and a judge will be required there, and a Custom House officer, etc. The access to the latter region, however, is from the Pacific Coast, and not from the Mackenzie River.

Silver. Silver was long since reported of on Peace River, and a mountain situate eastward from Battle River. It is also reported of on the west branch of the Liard River.

Copper exists on Copper mine River, west longitude 115; latitude, about the Arctic Circle.

Iron exists in large quantities at Sulphur Point, on the south side of the Great Slave Lake; also found at the mouth of Hay River and on Clearwater River, near Portage La Loche.

Salt is found in large quantities on Salt River, an affluent of Slave River, 60°. Also overspreading some miles of country between the same Salt River and Lower Peace River. Also on another Peace River, an affluent of the Mackenzie, latitude 64°, and near Fort Norman, 65°.

Petroleum is found on the Athabasca River, latitude 57; also on the west side of Great Slave Lake, latitude 61, and at Good Hope, on the Arctic Circle. The appearance on the surface is mineral pitch, and it is as such the substance found is used to pitch boats with; but there is little doubt but the rock oil would be reached by boring.

Asphaltum. This is considered to be the same substance as that last mentioned, in a more solidified form.

Gypsum is noticed in the banks of Peace River and on the Yukon.

Alum is abundant on the Upper Yukon.

Precious Stones. The Peace River pebbles are well thought of. Garnets are found in the neighbourhood of Dease Lake.

Coal is exposed on the Mackenzie River, latitude 65°.

Plumbago is not known of.

Lead is reported of on the Buffalo River, on the south side of Great Slave Lake.

68. There does not seem to be much brick clay in Mackenzie River. Pottery or pipe clay, or fullers' earth is found at Fort Norman, latitude 65°. There are some sandy bars on the river. Lime-stone is common on Mackenzie River and Great Slave Lake. Grind-stones are found on Laird River, and granite is reported in some places.

69. *Mica* is reported of near Fort Smith, latitude 60°, at the east end of Great Slave Lake, latitude 63°, and near Fort Norman, latitude 65°.

70. The general breeding-place of the migratory wild fowl is on the Arctic Sea Coast. The chief kinds that pass Mackenzie River, spring and fall, are swans, cranes, geese, wavies, various duck and tern. They pass north early in May, and south early in September. At Fort Chipewyan, Athabasca, Resolution, on Great Slave Lake, and Peel River, latitude 68°, are the best stations for a goose hunt on the Arctic Coast. A naturalist would probably collect on the Arctic Coast a great variety of specimens. The young are hatched early in July.

71. The geese are most numerous, but they are not killed in sufficient numbers for export, or to form an exclusive article of food even at the time of migration.

72. The geese stop to feed at suitable places especially where there is goose-grass, They seem to stay longer about the mouth of the Athabasca, near Fort Chipewyan, and on the sand banks near Peel river, latitude 68°.

73. I suppose they all live on the water plants and sedge, with perhaps gnats and insects for sauce, and possibly in part shell-fish, but the salt-worts and sea-weeds on the Arctic Coast are their more likely provisions. I have made no personal observation.

74. This depends on the season, whether early or late. The birds may be first seen by the 25th April, and the last will be passed by 30th May; and on their return they may be looked for in September, early or late, according to the season. The hunter's success is not such as is likely to attract hunters for pleasure, unless at Fort Chipewyan.

75. The same, I should think, as at other times, that is goose-grass and sedges.

76. On the Mackenzie River the chief berries are known as raspberries, gooseberries, strawberries, cranberries (high-bush and low-bush), crowberries, yellowberries, blueberries, partridgeberries and bearberries. They are not collected in sufficient quantities for export, and are gathered with difficulty among the mosquitoes. They suffice, however, to make a few kegs of jam for use at the Fort. Nothing in the way of provision

need be thought of in the way of export from Mackenzie River ; as to this, the only question is import. On Peace River are pears, or Saskatoon berries, and wild cherries.

77. The mineral pitch of the Athabasca River and Great Slave Lake is found very good for tarring boats, and could be used for all purposes of protecting wood from damp and perhaps iron from rust. If the communication were improved by a railway to Athabasca Landing and a tramway across the Grand Rapids on Athabasca River, I should think it might answer for export. But its value is hardly likely to be more than 6 cents per pound, and at present the transport to Manitoba is about 18 cents per pound.

78. I think the deposit large and deep, and I make little doubt but that coal oil would be found by well sinking. For the product is liquid when it exudes, and only hardens by exposure. I understand that the place has been already professionally examined by a messenger from Manitoba, and has been pronounced of value, but not so much as to pay for export.

79. The best road to market is by way of Athabasca Landing and Edmonton.

The railway now proposed to Edmonton should certainly be continued to Athabasca Landing, and if possible to Clearwater River. There is said to be a good dry level ridge reaching as far as the latter place and with houses already built at intervals.

80. I should think the cost of taking in a boring apparatus for making a bore only as a test would not be great : but to bore on a working scale would be more expensive. I think an expert would know from the surface there is oil there ; or the pitch could be distilled for oil.

81. I am no geologist, but I should think it probable that an eastern spur of the Great Gold Range strikes the source of the North Saskatchewan. I should think there was as much gold on Peace River as on the Saskatchewan, but provisions are too dear to encourage miners to enter.

82. The Indians and Esquimaux of MacKenzie River number nearly 5,000 in the east and west 5,000 in the west of the Rocky Mountains on British Territory. The Southern Indians are known as the Slave or Tenni Nation and the northern as the Loucheux or Tukuth Nation.

They do not migrate much, being discouraged from leaving their usual trading posts. They have not as a whole increased or decreased much during the past 20 years, nor have they been subject to epidemic diseases since that time. The Slave Indians are not a healthy race, being of a scrofulous habit, but their health seems improved of late years, which I attribute partly to the increased use of tea among them. Previously their diet was exclusively animal, with blood as a beverage, which I think unwholesome. Increased use of soap among them, both for persons and clothes, would be likely to improve their health. They value this, and it would be appreciated if bestowed by the Government as a gift. They are supported entirely by hunting and fishing and gifts by Government of fishhooks, net-twine and ammunition would mitigate the danger of starvation. To feed them would encourage idleness, unless in extreme want.

83. The Indians' food in Mackenzie River has been chiefly deer's meat for the last 20 years, unless in the three seasons now last past, when the reindeer have not visited the McKenzie River, but their place has been providentially supplied by moose. The latter are hunted with more difficulty, and some destitution has been the consequence, but not to the extent of much loss of life, at present, except in the Athabasca district. In summer the Indians live a good deal on fish, either on the river bank or at the fish lakes, but they also hunt the moose and the bears. The MacKenzie River Indians do not yet cultivate the soil, but at Hay River, on Great Slave Lake, one old Indian chief has of late years successfully lived on a field of barley and potatoes, with cattle, in connection with a fishery there.

84. Plenty of food usually accompanies plenty of snow (when the moose are easily killed) or the visit in their winter migrations of numerous bands of reindeer, or the periodical swarming of rabbits or wild rats, or an unusual abundance of fish and wild fowl. Scarcity is caused by a reverse condition of things. The moose can seldom be killed without wind.

85. The periodical disappearance of the rabbits may be caused partly by their exhausting their more favourite foods when they are exceptionally numerous, but more probably it is the excessive breeding which excessive numbers presupposes or induces that kills them. However, naturalists may explain it otherwise if they prefer.

86. There are large arctic hares spoken of as existing in the barren grounds, but only one species of rabbit is common in Mackenzie River, grey in summer and white in winter. Some naturalists call it an arctic hare, because it does not burrow, but it seems to be a true rabbit.

87. All the rabbits are liable to fluctuations of increase and decrease every 8 or 10 years, but not necessarily in the same season in all parts of the country. Some attribute the periodical increase in numbers to migration, but I hardly think this, as the rabbits are poor and dead ones are found when their numbers begin to fail. Similar increase and decrease applies to wild cats and martin, and perhaps also to foxes, bears and other animals, but probably not so much to beaver, though these are said to be also liable to occasional disease. The moose are more or less numerous in different seasons, but probably not in regular periods, being highly nervous animals, they are probably driven from one part of the country to another by wolves and perhaps by the hunters. A systematic destruction of wolves would be a blessing to the country, but the use of poison might be dangerous to other animals.

88. The important food animals have been already named, viz.: bears, beaver, rabbits, wild rats, wild fowl, fish, and for the Esquimaux, whales and seals. The only one of which it might be useful or profitable to protect, seems to be the beaver, which with other fur animals might be preserved by a restricted fur-trade. The moose and reindeer are probably diminishing in numbers, and their absence may have to be supplied, as in Athabasca and Isle à la Grosse, and other districts, by importations of flour and bacon.

89. There is no encouragement for civilized man to enter Mackenzie River for agriculture, and any settlements for working minerals would be probably local and not numerous. The entering of a numerous band of petty fur traders would probably have an injurious effect on the Indians, if we may judge from the experience of outside districts: 1st. By tempting them through high prices to dishonesty in trade: 2nd. By introducing possibly some illicit drinking: 3rd. If the traders were of reckless or vicious habits, the imitation of these habits by the Indians.

90. If a mining industry were opened in Mackenzie River, the Indians could be employed as crews, in any vessels used, in hunting or fishing for those engaged in the industry, and in digging or any other manual labour involved in it. This might be good for the men, but the families might suffer from want of food while the men were taken from the hunts and fishing. To support the Indian families by imported provisions might be too expensive. However, these difficulties would be solved by the necessities of the case, some being retained for hunters and fishermen, whilst the others were at work.

Conclusion. It is apprehended that the chief object of these questions is to ascertain if any profitable exports can be made from Mackenzie River or the neighborhood besides fur. As far as present discoveries extend, the following are the only hopeful industries. 1st. In Athabasca, the timber trade. 2nd. In Athabasca and Great Slave Lake, mica works. 3rd. On the Upper Yukon, gold. The Peace River country alone invites agriculture.

If the inquiry relates to any benefit to be done for the Indians by the Canadian Government, I should say:—

1st. An Experimental Industrial Farm might be started on the Liard River or Upper Mackenzie River or both, as well for example as for training Indians in a knowledge of cultivation, and for raising vegetable provisions as conducive to health.

2nd. A school or schools might be advantageously opened in connection with such farms for the instruction of Indian youth.

3rd. Some supply of fish-hooks, net twine, amunition and flour might be sent to Mackenzie River by the Government, to be held a reserve, and only to be distributed to the Indians in case of absolute necessity.

4th. If any medicine is agreed on by the medical faculty as a good remedy for a scrofulous habit of body, such as that known as chemical food or (Iodide of Iron), it might be sent by the Government for use among the Indians.

If the enquiry relates to the general duties of the Government towards the north, I should say:—

1st. A judge should be sent to register claims and keep order at the mines on the Upper Yukon.

2nd. A customs officer should be sent to the same place to abate the contraband import of liquors or any goods from the American border there.

3rd. On the Mackenzie River, the residence of a single police inspector or other Government official and an Indian agent, or at least a visit from such might be well to uphold the majesty of the law, and to accustom the Indians to respect it, and generally to offer a visible token of the Majesty of the Queen over this wide northern country, which is nearly as large as British India, and has not been deemed worthy of regard or occupation by the Government in any way.

4th. A quarterly Government mail would be a boon to the residents. We all pay taxes for our imports, but what do we have for it?

Further information might be obtained from a tract, which, I think, is lately published by the Society for Promoting Christian Knowledge, London, England, entitled: "A History of Mackenzie River," and as I hope, if life is spared, to be in Canada in the summer of 1889, I shall be glad then to offer at Ottawa any personal explanation that may be demanded of me.

W. C. BOMPAS, D. D.
Bishop of Mackenzie River.

MACKENZIE RIVER, August, 1888.

GOVERNMENT HOUSE, WINNIPEG, 10th March, 1890.

SIR,—I herewith enclose you as supplementary information regarding the Upper Yukon, Peel River and Lower Mackenzie, the copy of answers which I received from traders and travellers in these regions. Two of the signers of the annexed communication are British Columbia traders who pursued their adventurous trade from the cariboo country to the Upper Yukon and thence to Peel River, the most north-western affluent of the great Mackenzie River.

Their opposition was bought off by the Hudson Bay Company in the spring of 1889, when they returned to Winnipeg by the Mackenzie, Great Slave, and Athabasca rivers to near Edmonton, and thence here.

I have the honour to be, sir, your obedient servant,
JOHN SCHULTZ.

The Hon. the Minister of the Interior, Ottawa.

SIOUX FALLS, DAKOTA, 1st December, 1889.

SIR,—In accordance with your request, we have looked over the series of interrogations relative to the resources of the Great Mackenzie Basin, and herewith beg leave to contribute our mite of information pertaining thereto.

Hoping it may be of some little use to the Committee.

We are, sir, your obedient servants,
GEORGE ELMORE,
R. H. ARMSTRONG,
M. P. ELMORE.

DECEMBER 1st, 1889.

2nd Question.

On account of the extreme frosts during winter months, none of the smaller rivers in the basin of the Mackenzie are navigable, but during the summer the Mackenzie is navigable all the season, as are also the Great Slave, Athabasca, Peace and Fraser rivers.

The current varies in the different rivers, the Fraser having the most rapid current, being about 4½, while the Peace and Great Slave rivers will average not more than 2, and the Mackenzie 2½ miles per hour.

The Mackenzie can be navigated by steamers drawing 5 feet of water, and also, the Great Slave River from Fort Smith down to Great Slave Lake; but as the other rivers are shallow in many places, it would require vessels of less draught, not more than 18 or 20 inches.

For the Mackenzie and Slave rivers from Fort Smith to the Arctic Ocean, a side wheeler, would be the most suitable vessel, while for the other rivers, a stern wheeler, would answer best.

No 3.

It seems to us the best way to open up the Mackenzie for traffic would be a line of steamers from Vancouver to the mouth of the Mackenzie, connecting with steamers on the Mackenzie plying between the mouth of that river and Fort Smith, there being there about 20 or 25 miles of river impassable for steamers on account of rapids, which could be passed by railroad in a distance of from 16 to 20 miles, connecting there with stern wheelers plying between Fort McMurray and head of Fort Smith rapids.

After leaving Fort McMurray coming south, there are a number of rapids covering a distance of about 80 miles, impracticable for steamers of any kind; navigable at present only for small boats carrying from 10,000 to 20,000 pounds. In our opinion, it would be possible to make these rapids navigable for flat bottomed steamers up to the foot of Grand Rapids, by removing the rocks and blasting out channels; at the Grand Rapid the difficulties would be greater, and would only be surmounted by a succession of locks, their being 80 feet or more of fall in a distance of half a mile; therefore, on account of these obstructions, in our opinion the better plan would be a railroad from Fort McMurray to the head of Grand Rapid, connecting there with steamer, which would ply between the Athabasca landing and that point, thence by rail connecting with Canadian Pacific Railroad at Calgary, a distance of 300 hundred miles. Again a railroad could be extended from the Athabasca landing to the Peace River at the junction of Smoky River by way of Lesser Slave Lake, a distance of not more than 350 miles, connecting there with steamers that could ply from the head of Fort Smith rapids to this point, a distance of about 600 miles, with the exception of one obstruction, the falls and rapid close to Little Red River, impassable for steamers a distance of about 3 miles, thereby making uninterrupted connection with this one exception, which could be overcome by 3 miles of railroad, or with a succession of locks.

No. 4.

The Athabasca and Great Slave Lakes are navigablefor the steamers that would be used for making the foregoing connections.

No. 5.

We have already mentioned steamers suitable for navigating the Mackenzie River, and, in our opinion, they could descend that river early enough, and ascend it late enough to permit of about three months fishing at or near the mouth of the river, if such steamers could be used for fishing purposes; but as for building whaling or sealing crafts to descend the Mackenzie, in our opinion, it would not be practicable, as there is a shallow extending across the Mackenzie about 50 miles above Fort Good Hope, which would not allow vessels of so great a draught to pass.

No. 6.

The Athabasca is navigable for vessels drawing 30 inches of water 10 miles above the mouth of the Clearwater, and steamers of that draught can run that distance. The nature of the obstructions are a number of rapids already mentioned in reply to question No 2.

No. 7.

There are no affluents below the Clearwater navigable, and the Clearwater is only navigable for steamers about 40 or 50 miles. The Athabasca River is navigable for steamers to its mouth.

No. 8.

The river from Lake Athabasca to the head of Fort Smith rapids is more or less rocky, but there are no obstructions, and after leaving the foot of the rapids is a splendid river for steamers all the way to the mouth of the Mackenzie.

No. 9.

We know nothing of the Liard River, except by hearsay.

No. 10.

The Peace River is a fine river for navigation from the Athabasca Lake up as far as Fort Hudson's Hope, or the Rocky Mountain Cannon, a distance of about 700 hundred miles, with the one exception, already mentioned in question No. 3—the falls and rapids near Little Red River. From Hudson's Hope, a distance of about 15 miles, there are a succession of rapids and falls impassible for any kind of craft, even canoes, but after leaving this point, the river is navigable for a distance of about 70 miles to the confluence of the Parsnip and Findlay's branch of the Peace River for small boats carrying from 10,000 to 15,000 pounds, by making portages at several places where there are rapids difficult to pass with loaded boats. The Findlay's branch flowing from the north is navigable only for small boats, as is also the Parsnip flowing from the south, both joining their waters at this point.

Nos. 11 and 12.

The Mackenzie River is navigable from Great Slave Lake to the Arctic Ocean for steamers drawing 5 feet of water, and has an average current of about 3½ miles per hour. It is from ½ a mile to 2½ miles wide.

About 50 miles above Fort Good Hope there is a shallow or reef extending across the river, and from soundings taken on board the Hudson Bay Company's steamer "Wrigley" on the 28th of August, 1889, there was only one fathom in the shallowest place, however, a channel could be cleared out to the depth of 9 or 10 feet at a small outlay.

No. 13.

Athabasca Lake is a beautiful lake about 100 miles long and 20 wide, navigable for steamers of any size, abounding with fish of different kinds, white-fish being the most numerous, pike, pickerel, sucker and trout, some of the latter fish attaining a very large size.

The shores are generally rocky and barren, with little vegetation, and not at all suitable for agriculture.

No. 14.

Great Slave Lake, like the Athabasca in some particulars, is different, however, in many ways, it being much larger for one thing, and more straggling in appearance; the islands much more numerous and larger than those of the Athabasca Lake. It is suitabe for navigation, and steamers with any ordinary draught can ply on it with safety.

The shores for the most part are rocky, but there are many good harbours ; very little vegetation, and like the Athabasca, not at all adapted for agriculture. Fish the same as in the Athabasca Lake with the addition of the 'Inconnu,' or unknown fish, and called by some the 'Artic Salmon' and like the salmon of the Pacific coast, ascend the river in summer until stopped by some obstruction which they cannot surmount—the Fort Smith Rapids being the first and only obstruction on their journey from the sea up to that point, and above these rapids they have never been found.

Nos. 15, 16, 17 and 18.

There are three steamers now running on the Athabasca and Mackenzie Rivers, viz :—Stern-wheel steamer "Graham," plying between Fort McMurray and Fort Smith, screw steamer "Wrigley" plying between Fort Smith and Peel River, and the stern-wheel steamer "Athabasca," launched at Athabasca landing, 5th July, 1888. This steamer made several successful trips during the summer from the Athabasca landing to the head of the Grand Rapid, a distance of about 165 miles, also, up the Athabasca to the confluence of the Little Slave River, a distance of about 70 miles from the landing.

The attempt to ascend the Lesser Slave River was abandoned at that time, the water being so very low, but it is thought by practical men that the steamer can be taken up the river and across the lake.

The steamer "Graham" has been running from Lake Athabasca to Fort Smith and up to Fort McMurray since the summer of 1885, and doing good service. The steamer "Wrigley" plys the waters of the Mackenzie, the Peel River, Great Slave Lake and Great Slave River up to Fort Smith Rapid, drawing from 5 to 6 feet of water when loaded, and always doing very satisfactory work.

No. 19. No.

No. 20. Don't know.

No. 21.

The depth of snow that falls in the Mackenzie river district is from 18 inches to 2½ feet generally. In the Peace River district the fall of snow is greater, and as for the Fraser River country, we have often seen from 4 to 6 feet of snow on the level. Last summer was unusually dry, there being little or no rain in any portion of the Mackenzie basin, but usually the rain fall is quite sufficient for crops in that portion of country where crops are grown.

No. 22.

In any part of the Mackenzie basin that we are acquainted with, the frost penetrates from 4 to 8 feet, and without doubt in some places even more.

Nos. 23, 24 and 25.

The barren grounds get their name from the fact of their being barren and unproductive, there being no vegetation, and mostly a rocky and swampy country, destitute of timber.

No. 26.

We know of a certainty of potatoes being grown at Fort Good Hope on the Mackenzie River, and we have eaten new potatoes at Dunvegan on the Peace River on the 15th July, as large as a coffee cup, in fact, barley, potatoes and other vegetables grow abundantly at Fort Vermilion and Dunvegan on the Peace River.

No. 27.

We have seen good wheat grown at Chipewyan in small quantity. At Vermilion and Dunvegan, wheat will mature perhaps three years out of five.

No. 28.

In no part of the Mackenzie Basin have we seen corn mature.

No. 29.

As a rule they plant and sow at Vermillion and Dunvegan from the 15th to the 20th of May. At Athabasca a little later.

No. 30.

There is a species of wild flower that comes in some parts of the north with the going of the snow, but as a rule we count the opening of the spring with the breaking up of the rivers, which happens from the 5th to the 25th of April, and in some cases later.

Nos. 31 and 32.

From the 25th of August to 25th of September, wheat, barley, oats and potatoes. Along the Peace and Mackenzie Rivers there are very few gooseberries or strawberries, but the saskatoon grows very abundantly on some portions of Peace River, and ripens from the 26th of July to the 5th of August.

No. 33.

As a rule, sufficient rain falls for the crops that are growing. There are exceptions to this rule. It does not get very warm in June, but July and August are extremely so, and the mosquitoes are almost intolerable.

No. 34. Yes sometimes.

No. 35. Generally local.

No. 36.

Judging from what we have seen in other new countries, should think so.

No. 37.

There is less rain as a rule early in summer than later on.

No. 38.

Beautiful ; in fact the pleasantest part of the year.

Nos. 39 and 40.

There is the upland, short prairie hay, the low land swamp hay and pea vine, all in abundance.

No. 41. Yes, more or less.

Nos. 42 and 43.

In the portions of the country we are acquainted with, there is loam, clay and sand.

No. 44.

Throughout the Peace River country, there is a large percentage of it fit for pasturage, and would be a good stock country were it not for the long winters.

No. 45.

One of the most healthy climates in the world.

No. 46. None that we know of.

Nos. 47 and 48.

As a rule in all the rivers we have spoken of, ice begins to run from the 1st to the 5th of November, and breaks up in the spring from the 5th to the 25th of April, in some cases later.

The lakes are all much later in opening.

Nos. 49 and 50.

In the Peace River country.

No. 51.

At quite a number of places on the Peace River with very good results.

No. 52. We think not.

No. 53.

The Moose and Cariboo are to be found throughout the Athabasca, Peace and Mackenzie River countries. There are a few wood Buffalo still, ranging about one hundred miles west of Fort Smith somewhere between there and Buffalo Lake. The Musk Ox inhabits what is known as the barren lands on the Northern shores of Great Slave Lake. Elk, there are none that we know of.

No. 54.

The fur-bearing animals mentioned in this question are not nearly so numerous as formerly, particularly beaver. Some seasons Lynx are very numerous and other seasons very scarce. This is accounted for by the abundance or scarcity of Rabbits. Lynx are caught by snares or traps. The different species of Fox are caught by steel traps.

The other small fur-bearing animals mentioned, are caught by means of wooden and steel traps. Beaver are both trapped and shot.

No. 55.

The Hudson Bay Company can give the best answer to this question.

Nos. 56 and 57.

The most numerous are the White fish; nearly all the lakes abound with them. They are caught with nets. The Trout in the large lakes are plentiful, and are taken sometimes in the white fish nets, but generally by hooks. The Pike, pickerel and ling or losh are taken by both hooks and nets. The sucker by net, as it does not take bait. The inconnu are taken by net. They come from the sea up the river as far as Fort Smith. There is also another fish in the Mackenzie,—the Herring, taken in large quantities at Fort Norman. It is a very good fish, resembling the salt water herring. They have been taken as far up the river as Fort Simpson, but not so plentiful. They are taken by net.

Nos. 58 and 59.

No. 60.

There is spruce and tamarac. Spruce can be got of fair size, say two feet; Tamarac not so large.

No. 61.

It is a well known fact that Salmon ascend the Fraser River from the Pacific in great numbers, and continue their course to the very head waters thereof. There are several rivers emptying into the Fraser from the west, up which the salmon also ascend (one deriving the name of "Salmon River" from the fact of there being so many of them found therein.)

About twenty miles to the west, and three miles to the north of the confluence of these rivers, is Summit Lake, accessible by land portage of three miles from Salmon River. The waters of this lake flow to the Arctic, while that of Salmon River flows to the Pacific.

Now, in our opinion, it would be quite an easy matter to transport the live salmon from the Salmon River across this three mile portage into Summit Lake, and from thence the spawn would have an uninterrupted journey to the Arctic Ocean, thereby making a certainty of having the true salmon in the Arctic as well as in the Pacific Ocean. Those salmon, after attaining the proper age, no doubt would follow the instincts of nature and ascend the Great Mackenzie up as far as the Fort Smith Rapids; not being able to pass these rapids or falls, would naturally spawn and die, it being a well known fact that the old salmon never return to the sea, the spawn taking their place, and in like manner visit the sea, pass the allotted time allowed by nature, then ascend the river and like their predecessors, spawn and die.

At the present time there are a number of canneries at New Westminister, on the Fraser, for the purpose of canning the salmon, and they are shipped from there to all points of civilization. There are also several large canning establishments at Astoria, on the Columbia River, these being the largest probably in the world. They add a great source of revenue to the country, being a very profitable industry in themselves.

No. 62.

Should the country ever become settled, what timber is to be found there would be utilized for home consumption, but do not think there is sufficient quantity for export.

Nos. 63, 64 and 65.

To be found in all muskegs in the country. The Indians use it sometimes when they can get no other tea.

No. 66. Very poor indeed.

No. 67.

Gold is to be found in small quantities on the banks of the Peace River. Sulphur is to be found on Great Slave Lake and on Smoky River. Salt is to be found in large quantities on the Salt River, which empties into the Slave River twenty miles below Fort Smith. Petroleum and Asphaltum are found on the Athabasca River. Gypsum is to be found on Peace River near Little Red River.

Nos. 68 and 69.

The barron lands might contain mineral but have never been explored, and think it advisable that Government should make an appropriation for that purpose.

Nos. 70, 71, 72, 73, 74, 75, 76 and 77.

In our opinion, the natural Pitch of the Athabasca River will become very valuable, as the country is developed, and ways and means of traffiic is established.

No. 78.

As to the quantity, it would seem from outward appearances to be very great, for there are large hills of it in many places along the banks of the river, especially in or near the rapids.

No. 79.

If Petroleum were to be discovered in large quantities, we are of the opinion that the discovery would be in the immediate vicinity of the Pitch banks, and if traffic were opened by means of railroad connecting with steamers, as we have already suggested, it would naturally pass through, or close to, the Pitch or Petroleum country, thereby being easy of transportation by these means.

SIOUX FALLS, DAKOTA, 15th December, 1889.

Hon. Lieut. Governor SCHULTZ, Winnipeg, Manitoba.

DEAR SIR,—We have the honour to acknowledge the receipt of your letter 14th December. In reply we would say we have no exact knowledge of the depth of water at any of the sea outlets of any of any of the estuary branches of the Mackenzie, but would presume, without doubt, there necessarily must be one main branch, and further do not apprehend there would be any difficulty in finding and navigating this one main channel with river boats, such as we have already mentioned, viz:—

Side Wheelers. We may say the side wheeler is better adapted for navigation on the Mackenzie for the reason: In the first place, they require much less depth of water than a propellor, and as already mentioned in question No. 5, there is a shallow extending across the Mackenzie about fifty miles above Good Hope.

Secondly.—They are better able to stand a sea with less strain on machinery, especially steam pipes (which, necessarily, are long between boiler and engine aboard stern wheeler) and oftentimes during wind a heavy sea is to be encountered on the Mackenzie as well as on Great Slave Lake. Therefore, a side-wheel steamer of substantial build and powerful machinery, with a capacity of say, seventy or eighty tons, in our opinion would be the size and style of craft suitable for navigation in the above-mentioned waters.

As for kind and tonnage of craft from Vancouver, would say the ordinary sea-going vessel of about five hundred tons, with suitable protection in case of an encounter with ice.

We know very well, by about sixteen years of experience, the time and cost of getting into and out of the Mackenzie River country. The time, necessarily, would be about four months, and the probable cost of a boat lead line survey of the different mouths of the Mackenzie Estuary about $2,500 or $3,000.

We are, sir, your obedient servants,

(Signed) GEORGE ELMORE,
R. H. ARMSTRONG,
M. P. ELMORE.

Answers from R. MacFarlane, Chief Factor Hudson Bay Company, Fort St. James, Stuart's Lake, New Caledonia District, British Columbia.

SERIES A.—RELATING TO NAVIGATION AND COMMUNICATION.

The following answers refer to the principal portion of the Great Mackenzie Basin embraced within the boundaries of the Hudson Bay Company's Districts of English River, Athabasca, Peace River and Mackenzie River, while the information thus given is chiefly derived from personal observation :—

2. During a good stage of water, it is believed that a small steamer would be able to navigate the entire distance (200 miles) from the southern extremity of Green Lake to several miles beyond "Bull's House," Rivière La Loche, on the recently used Winnipeg Transport Supply route to the far north, by way of Carlton and Portage La Loche. Information in regard to the navigable lakes and rivers of the region under investigation will appear separately further on.

3. A railway from Edmonton to the Athabasca Landing (90 miles); a narrow gauge line from Grand Rapid to Fort McMurray, a distance of about 50 or 60 miles, and the building of a tramway (16 miles) from Smith Landing to Fort Smith, would afford continuous steam (by rail and boat) communication between Montreal and the lower Mackenzie River during the season of navigation. The employment of dynamite in effecting a passage over the chutes on Peace River, would open it up to navigation by steamers for upwards of 700 miles, while some improvements on the stream issuing from Lesser Slave Lake and the conversion of the existing waggon into a railroad, from the

end of the latter to Smoky River, would further similarly connect Peace River with the North-West and old Canada. A central, or better still a northern transcontinental line of railway to Fort Simpson on the Pacific by the Pine or Peace River Pass, would doubtless have an important bearing on the future of the entire region. A railway from Churchill to Fond du Lac, Athabasca, would, however, afford another and probably for a part of the year the cheapest and most direct way of transport with Europe.

4. The larger lakes of the aforesaid districts on the line of communication, such as the La Crosse, Lac Claire, Buffalo, La Loche, Athabasca, Lesser and Great Slave Lakes, are all well adapted for steam navigation; while those known and supposed to be thus inaccessible by water, may be mentioned the Great Bear Lake, the Reindeer, Wollaston, La Biche, Cree, Trout, Simpson, Colville and Petitot, with many others of lesser size.

5. From the published accounts of the Arctic explorations by Hearne, Mackenzie, Franklin, Richardson, Simpson, Rae, Pullen, McClure, Collinson and Anderson, as well as from Esquimaux report and a little personal experience, I have been long of the opinion that five or six weeks is about the average time during which the shores of Northern America might be annually coasted by properly constructed steamers, say from Point Burrow to the Mackenzie and from the latter to the estuary of the Great Fish River, not always continuously, but with occasional interruptions by ice. A late spring and inclement summer, conjoined with strong northerly or easterly winds, would doubtless adversely affect the navigation, while at the same time, at certain points, most seasons and under favourable conditions, smaller craft might reckon on having even two months and upwards of sufficiently clear water for sealing and whaling operations. In the foregoing connection, however, I would point out that Franklin, in 1820, was obstructed by ice on his first expedition to the eastward of the Coppermine River, and again, in 1826, at Return Reef on his way to Point Barrow. In 1837, Simpson could not get further west by water than Boat Extreme, 30 miles east of that point; and although Pullen and Hooper succeeded in taking two of the "Plover's" boats from Escholtz Bay to Forts Norman and impson, Mackenzie River, in the autumn of 1849, yet they were unable to get beyond Cape Bathurst, to the eastward of the Mackenzie, in an attempt they made the following season to cross over to Bank's Land—they missed seeing H.M.S. "Investigator," commanded by Captain McClure—and the party again wintered at Fort Simpson, and proceeded to England, in 1851, by the company's old transport route *via* Portage La Loche, Norway House and York Factory, Hudson's Bay. McClure wintered in Prince of Wales Straits and next year reached Mercy Bay, where he was subsequently (1854) obliged to abandon his ship, and she may possibly be still there. In 1851 Captain Collinson, in H.M.S. "Enterprise," wintered near the aforesaid Strait, and the year after at Cambridge Bay. Returning in 1853, he could not, owing to the ice, get further west that season than Camden Bay. In 1855, Anderson encountered much ice at Point Ogle, and was unable, with his birch bark canoes, to cross Simpson's Strait to King William Island, and had to retrace his steps up Back's Great Fish River. On the other hand, although Dease and Simpson failed to get beyond Cape Alexander, east of Coronation Gulf, in 1838, yet they not only managed to make a successful boat voyage to Montreal and King William's Islands the following summer, but also to pass their starting point (Fort Confidence, Great Bear Lake) and get back to winter on the Mackenzie. Thomas Simpson left Fort Simpson on 1st December, 1839, and reached Fort Garry about the middle of Febrnary, 1840. Four months later he perished miserably, and the remains of this able Arctic explorer have since reposed in an unknown and unhonoured grave at St. John's Cemetery, Winnipeg. In 1851, Dr. Rae was equally fortunate in navigating the same seas, and penetrated to within 80 miles of the position in the Victoria Strait pack ice, in which the Franklin ships "Erebus" and "Terror" had been abandoned by their unfortunate crews in April, 1848. Rae's men also returned, *via* the Coppermine River and Great Bear Lake to Big Island, at the head of Mackenzie River, while the doctor himself proceeded to England by way of Fort Garry and New York.

6. During the navigable season of the years 1884, 1885 and 1886, the steamer "Grahame" repeatedly ascended and descended (with difficulty in places owing to

extreme low water) the Clear Water River for 60 miles above its outlet at Fort McMurray. In August, 1885, she made one trip to the foot of the Mountain Rapid, 8 miles above that post. It has, however, been the opinion of some experienced steamboat men who have seen them, that certain existing obstructions in the Athabasca River rapids could be removed, probably at enormous cost, so as to admit of steam navigation from McMurray to a considerable distance above the mouth of the stream which issues from Lesser Slave Lake. Last year (1888) the new stern-whaler "Athabasca" experienced no difficulty on any of her trips between Grand Rapid and the aforesaid stream.

7. Since 1884 the Athabasca River has been navigated by the steamer "Grahame" from Fort Chipewyan to Fort McMurray. If it were necessary, probably one or two of its principal affluents, Red, Tar and Moose, might be ascended for some distance by a steam launch.

8. The Athabasca River traverses the western end of Lake Athabasca, but from its outlet there to its confluence with the Peace, some 20 miles below, it is called Rivière des Roches, after which the united waters are known as the Slave River, to its embouchure in Great Slave Lake. Smith Landing, 100 miles from Fort Chipewyan, is the northern terminus of the "Grahame's" steamboating on Slave River, and she annually begins operations thereon early in June, and has made one or two trips as late as the middle of October. Between said Landing and Fort Smith there is a good waggon road 16 miles in length; the intervening portion of the Slave River, however, is full of rapids and impassable for a steamer. From Fort Smith to Great Slave Lake and parts beyond, the propeller "Wrigley" has been running since 1886. Its principal tributary, Salt River, is of little account as a navigable stream.

9. During the spring and summer freshets, I believe a stern-wheeler would be able to navigate the Liard River by its western branch for a short distance above Fort Liard, and by its eastern, for many miles above Fort Nelson. It has several affluents, more than one of which (Nahany, &c.), may possibly be navigable for some distance. I may here remark that as the Athabasca, Peace, Slave, Liard, Mackenzie and certain other rivers have been recently explored by Dominion Surveyors, I need not therefore give details which their report will doubtless convey in a more comprehensive and reliable form, regarding their depth, velocity, length and general character, etc.

10. The Peace River receives numerous tributaries in its course, the Red, Smoky and Pine being the chief; but none of them are navigable, except, perhaps, by light draught steamers at high water. On the west of the Rocky Mountains, however, the confluent streams (Parsnip and Findlay) which there form the Peace, are said to be thus annually adapted for navigation, the former for some fifty, and the latter for over one hundred miles above the forks. It is also supposed that a passage could be made at the Chûtes, below Vermilion, which would render the Peace River practicable for steamers of even larger size than the "Grahame," from Hudson's Hope to its outlet, a distance of fully 750 miles. The "Grahame" has repeatedly ascended the Peace to the falls, by way of Quatre Fourches River.

11. Except at the rapids in low water, the Beaver River, I should say, was navigable from Lac LaCrosse for a considerable distance above the stream which connects it with Green Lake; but although some of the lakes through which the English or Churchill River flows on its way to Hudson's Bay, are suitable for steam navigation, yet as the river is much obstructed in many parts between, there is really no very lengthy or continuous stretch of good water on the route in question.

12. The propeller "Wrigley" has clearly demonstrated that steam navigation in summer is perfectly feasible for the great distance (1,300 miles) which separates Fort Smith, on Slave River, from Fort McPherson, on Peel's River. The noble Mackenzie River is, on its course from Great Slave Lake to the Arctic Ocean, the recipient of the waters of numerous affluents, some of them of considerable size, viz: the Liard, Bear or Franklin, and the Peel. The Franklin is said to be impracticable of ascent by a steamer to its source in Great Bear Lake; but the Peel's River is supposed to be navigable for a long way to the southward of Fort McPherson; and no doubt several of the

other streams, such as the Trout, Nahany, Gravoir and Rabbitskin, etc., are, more or less, passable by small light draught steamers.

13. Lake Athabasca, except at its west end during low water, is deep and navigable for steamers of a large class. The country on the south shore of the lake is, in many parts, sandy; and while it is for some distance generally level and fairly well covered with pitch and scrub pine, spruce, tamarac, birch and willow, etc., there are some extensive marshy plains. The Wood Carriboo is frequently met with on the south, but rarely on the north side of the lake. The northern shores are very rocky and not well timbered. Iron and other minerals, in all probability, exist in that quarter, and may one day receive due attention. Trout, pike, pickerel, methy and white fish, etc., also abound throughout the lake; but I have heard it stated that since the "Grahame" began to ply in the vicinity of the fisheries of the post and missions near Fort Chipewyan, as well as on Quartre Fourches River, the annual catch of fish has perceptibly diminished.

14. Great Slave Lake is a much larger body of water than the Athabasca, and is now annually traversed by the steamer "Wrigly." The surrounding country, except in the direction of Fond du Lac, is tolerably well timbered, particularly along some of the rivers (Buffalo and Hay, etc.) which disembogue into the southern end thereof. The trout and white fish are somewhat larger and of rather better quality than those of Lake Athabasca. The Inconnu (Salmo Mackenzie) abound in this lake, and also in the Mackenzie, and on the Slave River to the foot of the "rapids of the drowned," one mile above Fort Smith. Its flesh is much inferior to that of the true salmon; but when taken on the Lower Mackenzie and Anderson Rivers, it is firm and rich; but still less palatable than good whitefish. Coal tar, suitable for boat-building purposes, is abundant on the north, and sulphur is far from scarce on the south side, of Great Slave Lake. Other economic minerals may yet be discovered in the vicinity, particularly in the large bays of Fond du Lac.

15. I have never been to Great Bear Lake; but I know that excellent trout, white and other northern fish are to be had in plenty in its waters. The fresh water herring (*Coregonus Lucidus*) also abounds. It is similar to that of the Mackenzie and equally fine. Whilst a resident of Fort Simpson, Mackenzie River District, we received in March, 1867, a very large and splendid trout weighing, I think, 70 lbs., which had shortly before been caught in Bear Lake, east of old Fort Franklin. The lake is very deep and clear, and ice is said to be seldom wholly absent thereon for much more than two months out of the twelve!

16. A thorough exploration of the Mackenzie Basin would probably determine the existence of more than one sheet of water, whose area would fully equal that of Lesser Slave Lake. The Simpson, Petitot and Colville, lying to the north of Great Bear Lake; the Pio-Nono and Taché on the west side thereof; and Lac LaMartre to the north-west of Great Slave Lake, and many others of a lesser size, besides those laid down in maps, all contain trout, white, jack and other fish. During winter, and also at other periods of the season, numbers of Indians find subsistence in these waters, as well as on many of the rivers and streams which, among other fish, also contain lots of *Poisson Bleu* (Back's Grayling) of various sizes—and on a few of the former, the Hudson Bay Company sometimes establish fisheries to supplement the food requirements of their northern trade posts. Scarcely any of those lakes, however, are accessible by steam, owing to the obstructions in the rivers which connect several of them with the great lines of communication with Southern Canada.

17. During the summer of most seasons, seagoing steamers drawing 6 feet of water and upwards would be able to navigate the Mackenzie from above its mouth to Great Slave Lake. It is doubtful, however, if the sandbar shallows of the Delta would admit of the entrance of craft of that draught; and a similar difficulty would meet them at the outlet of Slave River, although once over them, they would probably be able to reach Fort Smith.

18. The Hudson Bay steamers now employed on the Athabasca River are both sternwheelers. The "Grahame," which annually runs between Fort McMurray and the

Smith Landing, Slave River, and on Peace River to the Chûtes, is 131 feet long and 24½ feet wide, with 4 feet depth of hold, and a carrying capacity equal to tons. The "Athabasca," which runs between Grand Rapids and Slave Lake post is feet in length, feet wide, depth of hold, and of tons. The propeller "Wrigley" is feet long, 14 feet wide, 7 feet depth of hold, and tons register. She runs between Fort Smith and the several posts on the Mackenzie River, and to Fort McPherson, Peel's River, and also Fort Rae, on Great Slave Lake.

19. I know nothing from personal observation of the West Coast of Hudson's Bay. I passed through the Straits and Bay in the "Prince of Wales," one of the company's ships, and landed at York Factory on 18th August, 1852. Some of the passengers, however, had previously gone ashore and spent an hour or two on the Barren shores of Hudson Straits and Southampton Island.

20. Under Question 16, I have given a little information regarding the lakes of the Mackenzie Basin; but those lying betwixt it and the West Coast of Hudson's Bay, together with the Coppermine, Back and Great Fish Rivers, &c., are more or less described by Hearne, Franklin, Richardson and Back. On the Rev. Abbé Petitot's map will also be found numerous lakes and rivers, many of which I had seen and partly navigated in summer and walked over in winter, between 1857 and 1866. The course of rivers and the configuration of lakes appearing thereon, which have been based on Indian report, are not, however, as accurately laid down as those observed and delineated by this able and enterprising missionary traveller. As an instance in point, I may state that the river which he has kindly named after me, and traced as falling into Liverpool Bay, is, in my opinion—who have crossed it repeatedly on my way between Fort Anderson and Franklin Bay—no other than the Wilmot Horton of Richardson, which discharges itself into the Arctic Sea on the east side of Cape Bathurst. Richardson states that he found driftwood piled on the shores at the mouth of the Wilmot Horton river in latitude 70 N. longitude 126° W., which seemed to prove that it flowed through a wooded country. Now, as we met but one stream flowing to the Polar Ocean between the Anderson River and Franklin Bay; and, as there are no woods except the few clumps of stunted spruce referred to in *reply 25*—to the North, or for a considerable distance to the South of said crossing, I believe it can be no other than the Wilmot Horton, having its source to the eastward of the eastern branch of the Anderson River. Extracts from the narrative of my first voyage to the Anderson in 1857 will shortly be published, and to them I would beg to refer for further information regarding the country between Fort Good Hope and that river, together with some of its tributaries, &c.

21. I should not feel justified in designating the region under review as *rainy*, although the rainfall during some seasons is certainly greater than in others, and a similar remark will apply to the snow of winter. The general average depth of the latter in the Athabasca, Peace and Mackenzie River districts, varies between one and one-half and sometimes three feet on the level. I have, however, occasionally in voyaging found the snow late in the season in some places below, as well as above the indicated figures.

22. The penetration of frost into the ground varies according to the nature of the soil—the depth of protecting snow in winter, and its exposure to the sun's rays in spring. Some moss covered and other sheltered tracts, however, remain to a great extent permanently frozen at a short depth below the surface. This subject has latterly become a matter of deep interest, and it is on occasion of enquiry like the present, that old fur-traders too late regret the many unused opportunities they have had for acquiring and recording information which often seemed commonplace at the time, but which would now and later prove of much interest to science.

23. I would merely remark under this head that any additional information required would, perhaps, be more satisfactorily elicited *viva voce* than by written queries of a *general* character.

24. This question would be easier answered by pointing out on a map, the portions of the country therein referred to.

25. The belt of timber which at Fort Anderson (established 1861 and abandoned 1866) extends for over thirty miles to the eastward, rapidly narrows and becomes a mere

fringe along the river of that name, and disappears to the northward of the 69th parallel of latitude, is thickly interspersed with sheets of water varying in size from mere ponds to small and fair sized lakes, and insignificant streams. Several dry swampy, mossy and peaty plains were passed before reaching the "Barren Grounds" proper. The country thence to the height of land between the Anderson and the deep gorge-like valley, through which the Wilmot Horton river flows, as well as from the *crossing* at the latter, to the high plateau which forms the western sea bank of Franklin Bay, consists of vast plains or *steppes* of a flat and undulating character, diversified by some small lakes and gently sloping eminences, not dissimilar in appearance to portions of the North-West prairies, over which I have since travelled. In the former, however, the ridges occasionally assume a mound-like hilly character from a distance, while one or two intersecting affluents of the Wilmot Horton, discharge their waters through valleys along which a few stunted spruce, birch and willow appear at intervals. On the banks of one of these, near its outlet at the aforesaid "*Crossing*," we observed a sheltered grove of spruce and willows of larger growth, wherein moose and musk oxen had frequently browsed. We met no more spruce, nor any traces of the former animal to the eastward; and I doubt if many stragglers range much beyond latitude 69° north. The greater part of the "Barren Grounds" is every season covered with short grasses, mosses and small flowering plants, while patches of sedgy and peaty soil occur at longer or-shorter distances, on which, as well as along the smaller rivulets, river and lake banks, Labrador tea, crow and a few other berries, dwarf birch and willows, &c., grow. Large flat spaces also had the early spring honey-combed appearance usually presented by fall turned over ground; there were few signs of vegetation on these, while some sandy and many other spots are virtually sterile. Grasses, willows, berries, Labrador tea and one or two species of sweet-scented flowers were noticed on the shores of the Bay. The high sea bank in the vicinity of Langton Harbour recedes to some distance, and there is consequently a large area of rather sloping ground which seemed better covered than the sandy point across, with the remains of the previous season's vegetation—the new had not yet (end of June) made much progress. Traces of the dark bituminous formation seen on the Lockhart, Anderson and Ross rivers of the '57 Report, no doubt exist along the Wilmot Horton River, and the greater part of Franklin Bay, especially to the north of our camping point. The foregoing "Barrens" are chiefly composed of a peaty, sandy, clayey and gravelly soil; but stones are rare and rock *in situ* (limestone) was encountered but two or three times on the line of march from the woods to the coast. The country on the west side of Anderson River below Fort Anderson, is more marshy in the valley, and so, therefore, more thickly carpeted with grasses, &c., than that of the east side, where the right bank latterly becomes an entirely denuded chain of high sand-gravelly peaked hills, having wide ravines more or less declivitous between. A large tract of marshy flats is said to exist north and south of the Napoleon III channel, as well as in the vicinity of "Esquimalt Lake." I may remark in passing that quite a lot of the northern spruce is partially covered with lichens.

26. Barley and potatoes have been grown as far north as Fort Norman in latitude 65°, and also in Fort Good Hope in 66° 16' north. I believe barley and potatoes have also been raised at old Fort Youcan 66° 30. N. and longitude 145° west; as well as at Fort Rae, latitude 63° N. and longitude 115° west.

27. At Fort Simpson, Mackenzie River, 61° 50' north latitude.

28. The late Mr. William Shaw, of the Hudson's Bay Company, assured me that Indian corn had ripened on several occasions during his charge of Fort Vermilion, Peace River, latitude 58° N.; but it never got beyond the *green eating* stage at Fort Chipewyan in about latitude 59° north.

29. At Fort Simpson, barley sown about the end of May ripens by the 12th and before the end of August annually. Potatoes are usually put down about the same time, and they are taken up before the end of September. A late spring more or less retards the sowing, as does an unfavourable summer, the growing process up north. At Chipewyan crops can be put down about a week or ten days earlier, but are not generally reaped much before those at Simpson.

30. Some springs are early, others late, as a rule a late fall precedes a late spring and *vice versa*, while some have thought they have perceived signs of a *cyclic* character in their experience of the northern seasons.

31. Generally from one to two weeks. Vegetation is undoubtedly more rapid in its progress throughout the Mackenzie Basin than it is in regions further south.

32. Wheat at Chipewyan ripens in about 120 days ; barley, 90 days ; potatoes, early, 110 days ; turnips, gathered after 130 days ; wild strawberries and gooseberries are ripe in July ; wild raspberries are ripe in August.

33. During the month of June, July and August, fine dry and warm weather generally prevails more frequently than the reverse—cold and wet. Some months are occasionally much colder and more rainy than others, in portions of, as well as throughout the entire region.

34. On the Athabasca and Great Slave Lakes, and on the Peace and Mackenzie Rivers, as well as in the valleys of the Liard and Clear Water Rivers, several days of north and north-east gales in June, July and even in August, bring on summer frosts, which injure growing barley, wheat and potatoes ; nor do crops on islands surrounded by running water, always escape injury from frost.

35. Summer frosts are occasionally general, but more frequently local.

36. Settlements are believed to exercise an ameliorating influence on the climate in their neighborhood.

37. Periodical heavy summer rains are not experienced in the far north, though we sometimes have one and two, but rarely three, days of almost constant rain in course of some seasons.

38. September is generally—but not always—a fine weather month, still even at its worst, a few beautiful days occur. October is usually more or less rainy, and long before its close it is cold and snowy, according to the situation. Some fine days, however, are experienced at Chipewyan, on Peace River, and even north of Fort Simpson on the Mackenzie, in the earlier weeks of October.

39. During very severe cold, trees are often heard to crack with a loud report ; but whether the longitudinal fractures sometimes observed in trees while being converted into lumber, had been thus started, instead of being wholly caused by winds, as hitherto supposed, is more than I can say.

40. In the vicinity of most lakes and streams, as well as in the marshy and open wood tracts, the wild grasses grow well up north ; but where the soil is sandy or mossy the growth is very scrubby.

41. The Wild Vetch is met with ; but not abundantly, except on Peace River, in the Athabasca and Mackenzie River Districts. I do not however, clearly remember having seen any in the country between Fort Good Hope and the Anderson River.

42. When the winter stock of hay occasionally runs out, scalded willow is eaten by cattle, but as its continued use makes them dangerously costive, it is not a desirable article of food. In spring they sometimes browse on the buds and catkins of the willow, as well as on lichens, and during summer, they, as well as horses seem to enjoy eating the leaves of willows and other plants.

43. There are large tracts of sand and sandy loam, gravel, clayey and peaty soil, with rich alluvial islands like that on which Fort Simpson is built, interspersed throughout the region referred to, which cannot however, be correctly described from a cursory examination.

44. There is any amount of pasturage, and no doubt immense areas fit for the production of the more hardy grains ; but I would however, remark in this connection that whilst travelling over the Canadian Pacific Railway from Quebec to Winnipeg, the general appearance of many portions of the country along the route, strongly reminded me of singular tracts traversed otherwise by me in sections, through the great region under review.

45. The winter climate of the North and Arctic regions is frequently very rigorous ; but the summers tho' comparatively short, are generally fine and warm, and, as already stated, vegetation progresses at a rate unknown in Southern Latitudes. At Fort Ander-

son 68½° north, the summer of 1861 was, on the whole, remarkably warm and favorable, and also much the finest and driest of the five seasons we spent there. In July 1865 however, the heat on our way back from Franklin Bay was very oppressive, especially the day before we reached the post. I can truly say that I have but rarely experienced such great heat, myself and party were fairly prostrated for several hours, while most of them were unable to respond to the after call to march, and they only rejoined us at our camp late next morning.

46. A few Grasshoppers have been observed most summers for many years in numerous parts of the Athabasca and Mackenzie River; but until the last four or five seasons, they were not known, or probably were not in sufficient numbers, to attack and injure growing crops as I understand they have since done, to a certain extent annually at Providence and Fort Simpson.

47. At Fort Vermilion Peace River, and at Fort Chipewyan Athabasca, the thermometer has, during very severe winters fallen as low as 50°. At Fort Simpson 55°, and at Good Hope, Mackenzie River, 60° and at Fort Anderson, Anderson River, I knew it to range for days between 60° and 65°, and on three occasions to descend to even 70° below zero of Fahrenheit! January and February are usually the coldest months in the far north.

48. Except during the continuance of ice on the water, and after northerly gales in summer, the larger lakes (Athabasca and Great Slave) doubtless exert some influence in warding off summer frosts; but the vegetation in spring on the banks of the larger rivers at least, (Athabasca, Peace, Slave and Mackenzie) is decidedly earlier advanced than is the case along, and in the proximity of the most favored (South Western) shores of the aforesaid lakes. The waters of the Athabasca and Peace Rivers usually break up the ice at the western end of Lake Athabasca, between the first and middle of May; but the main ice seldom disappears before the end of June; and while the same Bay near Fort Chipewyan, as well as Fond du Lac itself, sets fast before or soon after the beginning of November annually, yet the intervening body of water is sometimes open for two or even three weeks later. Great Slave Lake does not freeze up earlier; but it opens later than the Athabasca, the eastern and northern bays in both cases of course excepted. The Liard River at Fort Simpson is generally fast by the end of October, and breaks up by the beginning of May, sometimes a little later, the Mackenzie closes at Simpson between the tenth and the end of November, and the ice thereon gives way and is broken up by the disruption of the Liard River. The upper Mackenzie ice comes down about or soon after the 20th of May. At Fort Good Hope the River freezes up between the end of October and middle of November, and it breaks up between the middle and the 20th May, though the ramparts some ten miles above the Fort are often jammed up and thus retard the upper ice from passing for a week or ten days later. At Fort Anderson, I have known the river opposite to and above the post, set fast on two occasions as early as the tenth of September, and once as late as the tenth of October, whilst the ice usually disappeared before the end of May, though once as late as the second and tenth of June respectively.

49. The prevailing winds at Fort Chipewyan are north-east and south-east, one or two days of the latter or westerly wind, brings on a spell of mild weather, with more or less of a thaw, and, very rarely through, rain. At Fort Simpson, north-west and south-east winds prevail during the winter season; and while the coldest there and elsewhere are those from the north and east a western gale is always followed by a thaw even in mid-winter.

50. Southerly and westerly, or the so-called "Chinook" winds make themselves more or less felt over the greater portion of the Mackenzie Basin. Under thier influence, we, on one occasion, experienced an unprecedented thaw of nearly three days' duration, at Fort Good Hope, in the month of February, 1855. Comparatively fine and warm weather is sometimes experienced most winters south, and even to the north, of the Arctic Circle. But on the other hand, we often have several weeks of protracted cold weather.

51. On my way by York boat from Norway House to Mackenzie River, summer, 1853, I found out by observation *en route* and enquiry after my arrival there, that a number of horned cattle and horses also had been raised, and that fair-sized farms and gardens had been under cultivation for many years at the following Hudson's Bay Stations, viz.: At Isle à la Crosse and Forts Chipewyan, Resolution, Vermilion, Dunvegan, Simpson, Liard, Halkett, Norman and Good Hope. The posts of St. Johns, Red River, McMurray, Smith, Providence, Wrigley and Nelson, had not then been opened; but as soon as they were established, gardens were cultivated and cattle supplied; and both subjects have always—but especially since the provision trade began to fail owing to the migration or scarcity of moose, and the reindeer having also become irregular in frequenting former fall and winter haunts—received as much attention as was possible under the former transport system which necessitated the summer employment of all available servants as boatmen. Stock-raising has, however, been fairly successful at Forts Dunvegan, Liard and Chipewyan; and but for transport requirements, Smith as well as McMurray might do equally well in this line as beef providers.

52. During the summer and autumn, a limited number of horses and horned cattle of a hardy race, would find adequate pasturage in many parts of the Anderson Barren Grounds; but they would all have to be housed for at least six months of the year, and I believe great difficulty would be experienced in securing a sufficiency of provender for any considerable number.

53. *Carriboo.*—There are two species of Reindeer in the Mackenzie Basin—the Wood Carriboo which is a permanent resident of the forest and mountains, and the considerably more numerous but smaller barren ground deer, which averagely spends less than one-half of the year (during winter) in the woods, and the remaining portion, on their way to, stay at and return from Arctic Coast, and in the Barren Grounds. Bands of them, however, frequently remain for weeks on the outer borders of the woods. Early in February, 1859, I saw about a dozen animals on the Barrens to the west of Anderson River, and within 30 miles of Liverpool Bay, while the Esquimaux assured me that they frequently saw traces of, as well as deer all seasons and had killed a few, still closer to the coast. I never observed any earlier than the middle or end of April, in my subsequent winter visits to that quarter. Both varieties are in prime condition in the autumn. After the "rutting" is over the males continue rather lean for several months, but the flesh of the females improves until they shed their young the following spring. They seldom have more than one fawn at a birth. The Carriboo-eating Indians annually capture quite a large number of reindeer, by means of snares placed at openings left on purpose amid miles of fencing made in wooded tracts of country, usually traversed by them on their spring and autumn migrations. A few male stragglers generally remain in the outer forest all summer. The skins of deer which escape attack by the gadfly are of some use, but no great value, while the others are scarcely good enough to convert into babishe or snowshoe netting.

Musk Ox.—The winter pelt of this animal is valuable, but it is not very numerous anywhere. During the colder season it usually keeps along the outer edge of the wooded country; many, however, sometimes penetrate therein for some thirty or forty miles, and a few stragglers for a distance of even one hundred miles. They pass the summer in the "Barrens" and on the coast, and although I have occasionally observed a solitary bull by itself, the only herd of males and females, of various ages, I ever encountered was one consisting of twenty-two animals, which we met about ten miles to the eastward of the Wilmot Horton River on our way back from the coast in July, 1865. But in the autumn of the year, and during the winter, a comparatively large number used to be met with on the borders of the forest-country to the south-east of Fort Anderson, while some thirty or forty adult animals were generally killed by the Indians. As the spring approached, they invariably took their departure for the barren grounds to the northward. The female usually produces one and sometimes two at a birth.

Wood Buffalo.—They are now very rare, and unless they be legally or otherwise protected from indiscriminate slaughter, they will soon become extinct. A few animals

are to be found in parts of the country between Fort McMurray and the Lower Peace River, and from the latter to the Salt Plains below Fort Smith. The woodland skin is similar to, but the inner fur is somewhat finer than of the plain buffalo. Its flesh is also excellent eating. We used to receive the meat fresh, of one or two (sometimes more) animals most winters during my residence at (1870 to 1885) Fort Chipewyan. Occasionally the Indians of Fort McMurray, and more frequently those of Fort Smith, would kill several animals in course of a season. In the spring of, I think 1879, a band of twenty buffalo were run down and slaughtered in deep snow in the vicinity of Birch Mountain, Lower Athabasca River.

Moose.—This important food animal is becoming scarce in tracts where twenty years ago it was very numerous, and for which unfortunate circumstance, over hunting and the resulting consequences, slaughter and migration to other localities are believed to be chiefly responsible. The dressed skin is valuable for making leather moccasins for winter use. The female has one and sometimes two young annually in spring. It was comparatively numerous both above and below Fort Anderson previous to the establishment of the latter, and may possibly have become so again since its abandonment upwards of twenty years ago. It is, however, possible that this easily-scared animal may still be somewhat plentiful in certain sparsely-populated sections of Mackenzie River. At any rate, on my way back back from Anderson River in July, 1860, we came across a veritable preserve of some extent, which lay between the usually hunted grounds of the Loucheux and Hare Indians of Forts McPherson and Good Hope. Traces of Moose and Woodland Carriboo, especially the former, were very numerous, while Black Bears were by no means scarce. Again, for nearly a decade subsequent to 1865, when Fort Nelson (which had been destroyed by the Indians in 1813) was re-established near its former site on the eastern branch of the Liard River, Moose were much more abundant in the adjacent country than they have been ever since.

Elk.—I have never known of any having been seen or shot near the Peace or Hay Rivers, nor indeed to the north of Forrt McMurray; but they are said to be found in the country to the south of that post.

Wild Goat and Sheep.—Both species have been reported as fairly numerous in spurs of, as well as in the Rocky Mountains almost to the coast. The flesh of the latter is the most delicious in the north, and is occasionally brought in by the Nahany Indians in small quantities, chiefly in a dry state, to the posts which they frequent, viz.: Simpson, Norman, Good Hope and La Pierre's House. The hair covering of the goat is whitish and of a longer and coarser texture than that of the sheep whose skin greatly resembles that of the carriboo; and if the skins of both were converted into leather, it would probably nearly equal that of the latter in value. One and sometimes two young are yearly produced by the full-grown female of both species.

54. Old traders are well aware that the annnal catch of the following fur-bearing animals, viz.: Fisher, cross, red and silver Foxes, lynx and Martens, is largely affected by the abundance or scarcity of the rabbit or hare, which generally increase and decrease in numbers every seven years. There are other species, however, as the Black Bear, mink, musquash, otter and wolverine which almost correspondingly become numerous and scarce for a shorter or longer term, and while the former group undoubtedly prey on the rabbit, we must seek, probably in vain, for satisfactory reasons to account for this constant or at least very frequent peculiarity in the history of the latter-mentioned animals. Many Indians assert that martens and lynx (of whom, by the way, not a few also die off, especially when rabbits are scarce) migrate, as well as most of the rabbits which are not snared, &c., by Indians or carried off by disease, and, as they are not uniformly abundant all over the fur-territories, apart from the fact that they suddenly appear in localities where they had previously for a season or so been conspicuous by their absence, there seems to be some good grounds for the supposition. There are other circumstances also, such as an unfavourable season for breeding, a scarcity of the required food, and the destruction by fire of extensive areas of forest, which would of course, more or less, adversely affect the abundance of these and other species of animals in certain localities. A very lingering spring, for instance, would compel bears to

leave their winter "washes" while snow was still on the ground, and thus enable the Indians to track and kill more than would otherwise be possible.

Lynx.— This animal is principally captured by snaring; a few are caught in steel traps, some are shot and quite a number are treed by dogs and secured by shooting. Its flesh is also an important and much relished article of Indian diet.

Arctic Fox.—It is common on the northern coast; but in seasons when it is most numerous, a good many are also caught by Indians in steel and wood fall traps in the bordering wooded sections. When scarce, however, hardly any appear in the latter, and but comparatively few are secured in the former region, where the Esquimaux take them chiefly in dead fall traps composed entirely of ice blocks. The blue is supposed to be a variety very rare and far more valuable than the white fox.

Black, Silver, Cross and Red Foxes.—These animals also periodically increase and diminish in numbers; but the finer varieties are by no means very abundant at any time in the Mackenzie Basin, as a statement of the yearly catch would prove; but as a few remarks in reference to those foxes may possibly be published at an early date, I need not here repeat them.

Fisher.—Sixty degrees north latitude may be safely set down as the northern limit of this, at one time, very valuable fur animal, which is, however, far from numerous in the southern part of the Great Basin; while the receipt of even one skin at the posts of Providence, Nelson, Liard and Simpson, is an event of very rare occurrence indeed. From fifteen to thirty skins are traded annually at Fort Resolution, and these all come from the country to the south of Great Slave Lake.

Wolverine.—A most powerful, cunning and destructive animal, and not easily captured; but a number are fortunately taken in wood fall and steel traps, and a few are also poisoned yearly. He will often break into well-constructed *caches* and therefrom carry away and conceal at a distance all the meat or fish they may contain, and what cannot be thus easily disposed of, and even a portion of the foregoing, they will some. times urinate and otherwise render unfit for human food. They do an immense amount of damage by destroying martens and other species caught in steel and wood fall traps, besides breaking down many hundreds of the latter every hunting season.

Otter.—It is more abundant and generally diffused than the two immediately preceding species; but it is not very numerous in the Mackenzie region. It is usually caught in steel traps, a few are shot in the water, and now and again the Indians run down and club an animal on its way over the snow from one sheet of water to another.

Beaver.—If not at all, or but little disturbed, this interesting and valuable animal, rapidly increases in number. In confirmation of this view, I may mention that several tracts of country in which the beaver had almost disappeared, in consequence of the keen opposition which had for many years existed between the North West and Hudson Bay Companies, previous to their coalition in 1821, afterwards recovered under the nursing policy of protection inaugurated by the reorganized fur trading concern. For the two decades of years which succeeded, each beaver district was annually restricted to the collection of a certain number of this staple pelt, a course which proved of eminent service to all concerned. The Indians, thanks to the resulting natural increase, experienced but little difficulty in securing the required quota of skins; and as their real wants were then but few, they were no losers by the limit imposed upon them, especially as they were strongly encouraged to kill and trap all other fur-bearing animals. It is needless to say that a trade regulated on such wise business principles, led to the best possible results. Unfortunately however, the introduction and general use of the silk hat, gave almost a death blow to the beaver whose average sale price in London for the following two decades, fell nearly three fourths below the rates which had been realized for the previous period! During the decades in question, the Hudson's Bay Company virtually held a monopoly of the trade of the whole of their chartered and licensed territories. The great decline experienced in the value of beaver naturally led the company to discourage its capture, in the hope which proved futile that smaller returns would augment the demand and enhance prices. In the meantime, the Marten fortunately for their interests came into fashion, and soon occupied and retained—but for

little over twenty years, the rank of being the chief staple fur, which had formerly been held by the beaver almost uninterruptedly for nearly two centuries. Under the circumstances, the latter animal, of course, continued to flourish in number; but as competition in the fur trade about this time (1845) appeared at Pembina on the United States frontier, the hunting of all pelt animals in that and neighboring sections received an impetus which has largely expanded and continued to the present time. In all the protected districts however, while the utmost attention was given to the trapping of martens and other furs, the Indians were encouraged to spare the now unprofitable beaver, as much as possible, and its annually catch therefore, appreciably declined: but as the opposition gradually extended its sway east, west and north of Fort Garry, the beaver was closely hunted, wherever found, while it became impossible to continue limiting its pursuit in districts where the animal actually swarmed especially after it began to exhibit a slight tendency to improve in value. Under these combined influences, the total quantity of skins received from the whole of their Territories rapidly increased, so much so indeed, that the Company's London sales of 1859 (107,196 skins) nearly doubled those (55,456) of 1853! With increasing opposition and slightly better prices &c., the sales of the next seven years (1860 to 1866) averaged 119,319 per annum. Thence to the transfer of the country to Canada, the quantities thus disposed of for the years 1867, 1868 and 1869 respectively, amounted to no less than 172,042, 147,290 and 158,-119—making a total of 477,451 and an average of 159,150 skins for the three years in question! For the succeeding eight years (1870–7) however, market rates having somewhat advanced, and the country having been thrown open to all comers, the London sales though still remarkably good, declined to 140,047 beaver per annum. I have no complete statistics of the results of the last eleven years (1878 to 1888 inclusive); but I believe that altho' prices have, on the whole materially improved, the average receipts of beaver per annum will not much exceed one hundred thousand skins, while there is every reason to fear that future decades are much more likely to exhibit a further continuous decrease rather than any augmentation in the general returns of this valuable fur. Judging hastily from these premises a stranger would probably conclude that the Hudson Bay Company was losing ground in Territories—not so however, their share of the furs secured by the natives; is still, as it probably always will be the "Lions," and their officers are as popular to day, as at any period in its history, notwithstanding the fact, that the Indian is now more peculiarly difficult to manage than formerly. Competition is doubtless the life of most branches of business; but it is equally true that if persisted in it will ultimately prove the death or virtual extinction of the fur trade. The settlement of the country also gradually but surely operates as an important factor in restricting the habit of all wild animals, while I may explain that the advent of free traders and their presence on new ground almost invariably has the effect of giving a very strong impulse to the hunting of all fur-bearing animals in the assailed quarter, and in a lesser degree also in neighboring ground—a few years of over and indiscriminate hunting at all seasons soon tells adversely, especially on the poor beaver, which had previously been to a great extent preserved under the conservative and far reaching policy of the old company. Largely increased returns result at first from these extraordinary exertions, and all parties benefit accordingly. After a time however, the scene changes,—for the worse—the beaver gradually, I might say, rapidly diminishes in numbers; and, as a matter of fact, this has has hitherto been the invariable consequence of unrestricted trading operations in every attacked fur district in the Territories. English River, Athabasca and Peace River with other districts, have been almost ruined thus, and Mackenzie river will shortly follow suit. I doubt if the whole aggregate beaver catch of the western, northern, southern and Montreal departments in which the company conduct their trade, will either this or for last year greatly exceed one half of the combined Hudson Bay and Lampson Summary Sale Lists—say for any one of the four years of 1867, 1869, 1871 and 1872.

Marten.—As already mentioned under beaver this fine fur-bearing animal was for many years highly esteemed, and the chief staple skin for export; but over a dozen years ago, the fur seal came promptly to the front as the fashionable winter pelt, and

marten at once sustained a terrible blow from which it has never since been able to recover. In fact every subsequent improvement, and they have been wonderfully few and unimportant, was only a prelude to a still greater decline; until the average prices obtained at the London sales of 1888, proved to be the lowest realized during a record of upwards of two hundred years? It is very numerous in the Athabasca, Mackenzie regions some season, and it preys on rabbits and mice, &c.

Mink.—The fur of this animal sold remarkably well for the period (some fifteen years) during which it was in fashion and good demand. It then readily realized prices at least six fold greater than the obtained average of late years. Although very numerous in certain parts of the northern and other departments, it is by no means equally abundant in the Great Mackenzie Basin. It lives principally on fish.

Ermine.—A generation or so ago, this small pelt was of some value; but for many years it has become unprofitable as an article of export—the prices obtained latterly being about 3 or 4 cents per skin!

Musquash.—Very numerous some seasons in marshy tracts, throughout the Dominion; but as its fur is of comparatively little value, the company have not heretofore strongly encouraged its capture in the far north, where it is in places quite abundant during most years, although in each decade it is remarkably scarce for two or three seasons in succession. A great many musquash are shot; but the bulk of them are speared in their "washes" on small marshy lakes &c.

Black Bear.—This bear is very numerous on Peace River; but is less abundant along the Athabasca, Slave, Liard and Mackenzie Rivers, and is still more though not very rare on the Peel, Anderson and other streams and sections of the Great Basin, while the light brown and Cinnamon varieties thereof are somewhat scarce all over. The black bear usually produces 2 and 3, and occasionally 4 cubs at a birth; but the New Caledonia Indians inform me that they have known a few rare cases where the female has had as many as five! The young almost invariably hybernate with their mother for two winters, after which they have to provide accomodation for themselves. She breeds every third year, while the litter seldom contain more than one female. The Indians also state that the finding of a fœtus in the uterus of the mother even when shot months before the birth period, is almost unknown in such instances she appears to abort them immediately after becoming aware of the approach of danger.

Grizzly Bear.—The grey, whose fur is more or less tipped with silvery white, is supposed to be the northern representative of the true grizzly of California and the southern Rocky Mountains. This bear has frequently two, but very seldom three young ones at a birth, and they also hybernate with their mother for two winters, after which they are repulsed and she associates with a male, and breeds but once in three years.

Barren Ground Bear (Ursus Arctos, of Richardson).—This species is stated to greatly resemble the brown bear of Europe; and although it is not very common, yet it is sometimes met with in the barren grounds of the Anderson and along the shores of Franklin Bay. It is also said to be an inhabitant of the Rocky Mountain range of the Lower Peel and Mackenzie Rivers. We shot a large male in one of the ravines of the coast bank, Franklin Bay, and missed killing 9 or 10 others seen at different times in crossing the "Barrens." One and two cubs are usually borne in early spring, and they are said to continue with the mother until they become full-grown and set up for themselves.

Polar Bear.—This bear is said to be not very numerous along the northern coast; and but few skins have been obtained from the Esquimaux, while it is the least valuable of the several species of bear. Although I observed a few white bears on the ice in Hudson Bay and Straits, I never met a live specimen on my summer trips to Franklin Bay, or on the winter journeys to the mouth of Anderson River. The Esquimaux kill them by shooting, and occasionally by spearing *comme a la bayonette.*

55. I have not got the data for giving the amount of shipments of peltries of the foregoing animals during the last ten years, but I can confidently assert, what is susceptible of proof, namely, that they have been considerably below what outsiders

imagine. This is more especially true of the returns of Peace Rivers and Athabasca Districts, in which, since 1885, opposition has appeared in much greater force than before; nor would their united catch, added to the company's, bring the totals for the three years up to the general average of former outfits. For several years after the advent of opposition on Peace River, when beaver were swarming there, the returns of old Athabasca, which took in the whole of Peace River to Hudson's Hope, rapidly increased, and then—but not now—always exceeded in bulk and value those of the more extensive Mackenzie River Districts.

56. For some years subsequent to 1859 meteorological observations were taken at several of the northern posts, and statements of some were duly transmitted to the Smithsonian Institution at Washington. From the journals kept at the company's stations, weather and other records of interest would doubtless be gleaned, while the published works of General Lefroy and Major Dawson contain very valuable information bearing on the climate of the region under consideration.

57. The best and most generally diffused fish throughout the numerous lakes and rivers of the Mackenzie Basin, is the *Coregonus albus* (whitefish), and it is quite plentiful, especially in the Athabasca, Great Slave and Great Bear Lakes. In weight in these waters it ranges between 2 and 4 lbs., but on some of the lesser and indeed in several of the smallest fish lakes of the far north, a few are met with which attain to 5, 6 and 7 lbs., and upwards, and their flesh is excellent. Trout of a large size (7 to 50 lbs.) abound on the greater; but they are of lesser weight (5 to 25 lbs.) on the smaller lakes. Several speckled trout have been caught on the Lower Anderson River. Jackfish of various sizes are plentiful on most of the lakes—and on Clear Lake, which, with Lac Manmrawee, are but a continuation of the western end of Lake Athabasca, they often weigh as much as 20, 25 and 30 lbs. Carp, doré, loche and suckers are present on all the larger lakes, as well as in most of the smaller sheets of water. Fresh water herring is abundant in Great Bear Lake, and also in the Lower Mackenzie River, and some were obtained by us on the Anderson River. This is also a fish of fine quality and weighs about 2 lbs. The Loucheux and Hare, Indians catch in nets and dry a large quantity in summer for winter use. Some are also thus secured at Fort Norman; while a few are caught as high up as Fort Simpson. The best are, however, taken on the Lower Mackenzie. Back's grayling or *Poisson Bleu* abounds in many of the streams falling into the Anderson and Mackenzie, as well as on many others throughout these regions, where it is frequently met with in various stages of growth, from two ounces to maturity at 2 lbs. The *Inconnu*, as already mentioned, is numerous in the Mackenzie, on Great Slave Lake and on the Slave River to Fort Smith. It is also plentiful in the Anderson, which is known to the Indians as the river of the toothless *(Inconnu)* fish. The largest specimen of this fish I ever saw was taken on Anderson River within 40 miles of its outlet in Liverpool Bay. I should say it would have weighed about 50 or 60 lbs; its flesh was white, firm and oily. There are no true salmon in the Anderson or Mackenzie Rivers, and yet in most of the Arctic streams to the westward of the latter, and to the eastward of the former, they are said to be very abundant.

58. The Esquimaux who used to frequent Fort Anderson succeeded most seasons in killing one but seldom as many as two large sized Whales, which proved of immense value to them as an article of food. They band together and hunt it, in the manner described by Dr. Richardson in his Boat A. S. Expedition. Seals, walruses and water-fowl are also taken by the Esquimaux in the way mentioned in that volume. On my first visit to Franklin Bay on 25th June, 1862, and again about the end of the same month in 1864, we distinctly heard one or two large whales spouting in a lane of open water which appeared amid the ice-covered sea. We found Langton Harbour almost entirely free of ice on each of our summer visits. The daily tides and gales of wind materially help to break up the ice of Langton Harbour and Franklin Bay. The former is more deeply indented to the eastward than a passing boat or vessel would be able to notice. Quite a large number of Seals and a few Walruses were seen basking in the sun on floating as well as on stationary fields of ice. Although a human skull and traces of ancient residences and some weather-beaten rib and other bones of the whale were

observed at several spots on the shores of the Arctic Sea, no Esquimaux were met with except on the last two of our four (1862, '63, '64 and '65) summer bird and egg collecting expeditions from Fort Anderson to Franklin Bay. In the fall of 1863, I requested a party of Liverpool Bay Esquimaux to meet us the following season near Langton Harbour, with a boat (umiak) and two or three canoes (cayaks), in order to aid us in gathering specimens and visiting the opposite point and several small islands in that quarter. Ten men, women and children appeared accordingly in the end of June, 1864. On 1st July, 1865, they again, together with four more families from Cape Bathurst, one of whom I had never previously seen, turned up in the same place and rendered us good service. Both parties informed us that most of them had come over by land from Harrowly to Franklin Bay, and had thence coasted the shores of the latter, at first on ice and latterly by water to the apppointed *rendezvous*.

59. There can be no doubt that large and small Whales, hair seals of several species, walruses, salmon and other fish abound in the seas of the Arctic coast of the Dominion, but as I have had no personal knowledge of the value or mode of operating seal and whaling industries, I can only state what I think on the subject. It seems to me that the experience which would be gained from the establishment of a thoroughly equipped whaling station near the mouth of Mackenzie river would point out to all concerned the best possible measure for the profitable prosecution, and the extension eastwards of the coast fisheries in question. For some time to come, however, the whole, or at least, the bulk of their produce, would have to be transported to market by way of Behring's Straits, as being much cheaper than by the inland route *via* Mackenzie river. Of course, several whale boats and one or two small steamers would form part of the equipment, while all or most of the required staff of *employees* should winter at the station and be occupied in the capture of seal under ice, and otherwise as might be deemed necessary until open water. The services of the Esquimaux might also be more or less utilized in connection with the aforesaid fisheries.

60. Spruce similar to that used in the building of the steamer "Wrigley" can be had on Lower Slave, as well as on the Upper Mackenzie rivers. I opine it is good enough for the construction of seal and whaling craft.

61. Langton Harbour with its one or more land-locked *fiords* at the bottom of (Franklin Bay) strikes me as being an excellent locality for future sealing and whaling operations in Franklin Bay. Reindeer are no doubt fairly numerous during the summer which would enable the party to add largely to their required stock of provisions.

62. When the demand arises, and the time arrives, for utilizing the timber resources of the Mackenzie Basin, no insuperable difficulties will be found to stand in the way of meeting same. Settlements will probably by that time have approached and even advanced within its southern boundaries, and the practical men of the day will, no doubt, avail themselves of the then existing, and, where necessary, create additional facilities for its transport to destination. Spruce is the principal product; but poplar, birch and tamarac will be able to add their quota to the lumber of the future.

63. Chives or wild onions grow in spots along the shingly beaches of the larger rivers, including the Anderson and Wilmot Horton, and when boiled in water, or fried in fat they prove an acceptable addition to one's fare in regions where vegetables are uncultivable. The wild parsnip is also much relished by the Indians. One or two plants are used for dying quills, &c., and there are others probably of an *economic* character to be met with in the plains and forests of the distant north.

64. The northern Indians use the bark of the red willow and the scrapings, after removal of the outer bark, of the poplar, for medicinal applications; and they frequently eat the latter, and smoke, mixed with tobacco, similar scrapings of the former. They also partake of decoctions made from, and masticate parts of, certain roots and plants in times of sickness, all of which I think are mentioned by Dr. Richardson in his already quoted "Boat Voyage."

65. The Labrador tea is, I believe, one of the most widely diffused plants in Canada—it is encountered in the woods and swamps, along river and lake banks, on the barren grounds and near the shores of the Arctic Sea. When Chinese tea was imported

in comparatively small quantities in former years, our northern servants had frequent recourse to the use of the Labrador, as a substitute, and they seemed to enjoy not only the first strong pungent infusion of the leaves but the second, which tasted much milder. I myself never cared for either, but I have often partaken with relish of Tea made from the white flowers of the plant, fresh gathered or dried—a small addition of Souchong improves the latter.

66. For my own part, if the *flowers* of the plant were *properly* prepared and blended with Asiatic tea, I should have no objection to a cup for breakfast every morning, because when I used it thus in former years I always found it to act as an *appetizer.*

67. *Gold.*—Traces of gold have been discovered by passing miners on the Athabasca, Slave and Mackenzie Rivers. On the upper waters of the Liard and Peace however, it has I believe, been frequently found in fair paying quantities.

Silver.—The late Mr. William Shaw told me that old Indians assured him that some had found small nuggets of silver in the vicinity of the mountains southwest of Fort Vermillion, while he himself thought there might be some silver in the Carriboo mountains. Indians have also fancied they saw traces of silver in the Rock mountains, southeast of Fort McMurray. I however, merely repeat what I have heard.

Copper.—Reported to be in abundance on the Coppermine river. Nodules of pyrites of iron and copper are occasionally met with along the river and lake shores in various parts of Athabasca and Mackenzie river districts.

Iron.—I have no doubt that iron even of a superior quality will some day be discovered, probably on the north side of Lake Athabasca, as well as in many other parts of the region under investigation.

Sulphur.—On the upper Anderson; on the south shore of Great Slave Lake; on the Clear Water river, and in many other places, sulphur exists in greater or lesser quantities.

Salt.—It is believed that a mine of first class salt of vast extent is situated between Salt river and Fort Smith. Salty springs have been found on Clear Water river, and also on one of the eastern affluents of the Mackenzie, not very far from Fort Wrigley. Similar springs doubtless exist along the Peace and Athabasca rivers.

Petroleum and Asphaltum.—Incalculable deposits of Asphaltum and Petroleum are believed to cover much ground along both sides of the Athabasca river, and the latter has been found on the upper Peace river, as well as on the north shore of Great Slave Lake, and at or near Lac la Porte, some 80 or 90 miles northeast of Fort Good Hope.

Gypsum. Lots at Peace Point and in the neighborhood of Rapid à Bouille, lower Peace river. I believe it is also found near Fort Norman, Mackenzie river.

Alum.—Traces of Alum have been observed in the face of the bank of the Ross river, one of the affluents of the Upper Anderson river, also on Lockhart river, its principal tributary, and in other parts of the Mackenzie river district.

Precious Stones.—May possibly be present there; but I never came across any. Some fifty years ago however, small quantities of Rock Crystal were exported from the Mackenzie; but the business soon ceased, as it did not pay.

Coal and Lignite.—On the Upper Athabasca and Peace River; on the Lower Mackenzie; on the Onion; Lockhart and Ross affluents of the Anderson; as well as on that river itself, and on the Wilmot Horton, Barren Grounds, strong indications of the existence of Coal and Lignite in unknown quantities have been repeatedly noticed.

Plumbago—Has been found loose in the vicinity of Fond du Lac, Athabasca.

Lead.—I cannot say, I have always however, been a believer in the truth of Sir John Richardson's long published opinion, that if the Hudson Bay Company had devoted as much capital, care and attention in developing the mineral resources of their then territories, as they had bestowed on the fur-trade, the result would have repaid them ten-fold better than the latter ever had, or could possibly accomplish.

68. Abundance of fine white earth, well adapted for out or inside wall washing, as well as red earth, are to be found in the neighborhood of Fort Simpson, Norman, Good Hope, Anderson, and other places in the Mackenzie river district. Blue earth is

met with near Simpson, and Red ditto below Fort McMurray, and on the Wilmot Horton river. Clay suitable for brick-making is believed to exist along the rivers Athabasca, Peace, Slave and Mackenzie, and at many other points. Moulding sand is found on the Athabasca and elsewhere, while good lime-stone abounds in various directions throughout the entire region. All the grindstones required for local use are obtained from beds of sandstone on the Peace, Liard and Mackenzie rivers.

69. There are numerous mineral springs along the larger rivers and elsewhere, some of which are doubtless medicinal. I know of one in particular at the foot of a hill near the Lower Peace River, on the winter road from Fort Chipewyan to Red River, of which I drank a pint in the end of March, 1882, whose flavour strongly reminded me of the celebrated mineral waters of the Strathpeffer Spa, Rosshire, Scotland.

70. I will endeavour to reply to this question by preparing a list of the birds which have been collected by Hudson Bay officers and others, also, which are believed to breed in the Sub-Arctic, as well as in the polar regions of the great Mackenzie Basin.

71. The wild fowl which are considered of the most value during the spring and fall migrations, are the grey and three species of white wavy—and the Canada and Hutchins goose—while the whistling and trumpeter swan-cranes, and the various species of non-eating fish ducks, are also all welcomed as articles of food.

72. Great numbers of geese, wavies and swans &c., stop to feed for some time in the spring and autumn in the marshes and shallow waters of the west end of Lake Athabasca, and also, of its adjoining former extensions, the present lakes Mammassee and Claire, and on the lower Peace River. Very many for the same purpose stay in the marshes near Fort Resolution and Big Island on Great Slave lake, as well as around the Little Lake below Fort Providence, and quite a crowd remain in the vicinity of Fort Good Hope in the spring ; but comparatively few do so in the autumn. At other points along and aside of the regular line of water communication, more or less geese, &c., stop for a short time to feed on their outward and return migrations coastwise.

73. The food varies according to the locality. Berries, seeds of grasses, succulent stems and leaves of aquatic plants, the larvæ of and water insects, small molluscæ, and sometimes the small-fry of fish, constitute the diet of these birds.

74. At Fort Chipewyan, the Canada goose is the first spring-food bird to arrive, and he sometimes does so early in, but very seldom before the middle or 20th of April, and occasionally, even when there is little or no water visible. The arrival of Geese in spring and their departure in fall, however, depends greatly on the season ; but the Canadas generally appear in great numbers by the end of April. The next to follow is usually the medium white wavy *(Chen Hyperboreas)*, they are present in thousands by the begenning of May, and after a brief interval, the larger bird *(Chen Hyperboreas Nivalis)* is on hand in still greater force. About the same time, numbers of grey wavies and Hutchin's geese are observed flying around, or going north in small flocks. The last to arrive is the smallest and least abundant of the white wavies *(Chen Rossii)* and they seldom put in an appearance before the middle or 20th of May ; but once started, they seem to come more quickly than the other species whose period of arrival must continue from two to three weeks. The horned wavy, however, is among the first to get back from the coast. Swans arrive in course of the first and second week in May, they remain but a short time, and when they return in September, their stay is still shorter. Cranes turn up in May, and are sometimes seen going south after the middle of August. Immense numbers of ducks appear in May, and thousands remain to breed, as do also many of the Canada geese. The white wavies which arrive at Fort Chipewyan in spring, in successive flocks of scores and hundreds, after duly resting and fattening up, take their departure in a similar manner, on their way to the breeding grounds near, and beyond the coast, and on the large islands of the Arctic Ocean. As the process is, to a quarter or lesser extent, going on almost daily for about a month, myriads must necessarily thus arrive and depart northwards over the perhaps exceptionally favoured feeding grounds, which are situated in the vicinity of that post and thence to the *Grand Marais* on Lower Peace River. In the autumn they begin to arrive on their return flight going south, about the end of August, and they are generally all gone by the middle of October, but,

fully one week earlier, should the weather happen to become cold and severe. As a matter of course, considerably more birds stay to feed than in spring, while great numbers are observed flying past. In September, when favouring winds blow, they are seen in long converging \/ shaped lines during the day, and are often heard all night going south in large flocks. The grey wavy and the Hutchin's and Canada geese, are likewise, present in respectable force, and the latter is usually the last, with some ducks, to quit Lake Athabasca for a warmer climate. Altho' the brent or black goose breeds in considerable numbers on the coast of Liverpool Bay, yet, I never obtained a specimen of the bird on Lake Athabasca. Farther north the spring arrivals at the before noted chief places, are from one or two days at the nearest to a fortnight later at the furthest from that in this and other respects, central point Fort Chipewyan. Comparatively few geese, swans and ducks were ever noticed at Fort Anderson on their annual migrations to or from the coast.

75. The usual summer and autumn food of these wild fowl after the hatching season is over, is probably much the same as before ; but varied of course, according to the changing locality of the feeding grounds.

76. At Chipewyan and the adjacent country, raspberries, gooseberries, strawberries, low bush cranberries, eyeberries, blueberries, red and black currants and other varieties, are more or less abundant every season. At Fort Simpson the same species of berries are to be found, and in equal abundance. At Good Hope, the blueberry is very plentiful ; but except cranberries, other kinds are rather scarce, while a few of the foregoing are altogether absent. I have never met the service or saskatoon berry, which is so very abundant on the Peace River, particularly in the vicinity of its smoky tributary below Fort Wrigley. It is, however, plentifully met with on the Athabasca and Clear Water rivers in favourable seasons. I do not think the red currant extends much further north on the Mackenzie than the post of Norman, near Bear or Franklin River. At Fort Anderson, the low bush varieties of the cranberry and blueberry were quite abundant. Eastward to the "barrens," the eyeberry, bearberry, yellow, crow and a few other berries, were more or less plentiful.

77. It is certainly the general opinion of all who have been in the country, that the natural pitch of the Athabasca river will prove of immense prospective value.

78. In order to obtain an approximately correct idea of the extent of this deposit, it will be necessary to send competent experts to examine and report accordingly.

I think the best way of taking petroleum from the Athabasca region to the North-West market, would be by the improved steam and rail route referred to in my reply to question third of the series. Should large surplus quantities, however, be discovered several relative questions may now be asked, as they would then probably arise. 1st. "Will the cost of production and transport of this petroleum to older Canada admit of profitable competition with national or foreign sources of supply? 2nd. Would it pay to thus meet the requirements of the Province of British Columbia, either by the proposed route and the Canadian Pacific Railway, or by any other transcontinental line of the future? And lastly, "Would it be practicable by way of Behring's Straits in summer ; and by the other route in winter to compete advantageously with foreign countries in supplying Alaska, British Columbia and other Pacific States and nations with petroleum from the Athabasca, or from the Great Slave Lake and Mackenzie River oilfields of the future?"

80. I have no idea of the approximate cost of taking in machinery and sinking wells in the manner referred to ; but at the same time, it is probable that a judiciously applied expenditure in the proposed direction would lead to satisfactory results.

81. There are Geologists of great experience in the government service who, I presume, would be able to answer this question after a careful exploration of the country.

82. The Dominion census of 1881 will furnish the desired information regarding the number of Indians belonging to the different tribes, and the name of the posts at which they then resorted throughout the Mackenzie Basin. I fear, however, that a similar census taken to-morrow would, for the reasons to be stated presently, exhibit no increase on that of 1881. Influenza and other epidemic diseases, at intervals, carry off

large numbers of the northern Indians, and not a few Esquimaux. In 1865-66 scarlatina, or an aggravated form of measles, appeared among the Indians, which became so contagious that not a single native (Indian or Esquimaux) who came in contact with an affected party escaped attack, and very great numbers of both, especially Indians, perished. The estimate of victims for Athabasca and Peace River was 300, which I feel satisfied is far below the mark, and we know that fully 1,000 Indians and over 150 Esquimaux died in Mackenzie River District. This was by far the most fatal epidemic ever experienced there. It had previously decimated the Crees and Blackfeet of the Saskatchewan prairies, besides committing great ravages in other quarters, as well as in the neighbouring district of English River, at Lac La Biche and on Lesser Slave Lake. I do not, however, know how many perished at these points. I have also been told that about 200 Indians died of measles at Lesser Slave Lake and on Peace River during the winter of 1886-87, while upwards of 100 have since perished by starvation in Athabasca and Mackenzie River. In recent years scrofulous diseases have reduced the Beaver Indians of Peace River to nearly one-half their number some thirty years ago. Syphillis has also destroyed a great number of the Fort Rae and Great Bear Lake Indians, between 1850 and 1875, but they appear to have since quite recovered from the effects of that disease, which had been originally communicated to their women by European seamen; and they have therefore been increasing in numbers for the last two decades. Consumption has likewise claimed many victims at Fond du Lac, Athabasca, and not a few at the other trade posts; and consequently, I believe, that the next census must show a decrease, especially as compared with the population of 1864. In a general way it may be stated that the Indians in question pass the summer and winter in the localities pertaining to the respective tribes, which they find most suitable at the time for obtaining the means of living, as well as for hunting and trapping peltries, &c., in their season.

83. With the view of avoiding too much repetition, I had better classify the Indians of the Athabasca, Peace and Mackenzie River Districts, under two divisions: 1st, moose eaters, or those who live chiefly on the flesh of moose, bears and beaver; and 2nd, Carriboo eaters, whose principal food is the flesh of the barren ground reindeer. To the former class belong all the Fort McMurray Indians, as well as those who live on the south and western shores of Lake Athabasca, the Peace River tribes; many of the Slave River, and all the inhabitants of the Southern Coast of Great Slave Lake; most of the Providence and Simpson Indians; the whole of the Liard River natives; the great bulk of the Indians who reside on the banks of the Mackenzie; together with some of those of Peel's River and the Ramparts; and the Nahannies and *Mauvais Monde* of the mountains. The food supply of the first class is, in addition to the moose, further augmented as follows, viz.: An occasional Woodland deer or buffalo is secured by the McMurray, Lower Peace and Fort Smith Indians, whose bill of fare is largely varied by geese and ducks, and slightly so by swans and grouse. Great numbers of the Indians of Fort Chipewyan, Resolution, Rae, Providence, Simpson, Good Hope, and the other Peace and Mackenzie Posts, more or less, come in for a share of geese and ducks, &c., in their season. Fish also forms a staple, and indeed vitally important item in the food supply of both classes, although most of the Peace River, many of the Liard, a few of Providence, and the Nahanny Indians generally, have hitherto devoted little or no attention to the capture of fish. The last mentioned, however, annually kill a goodly number of wild goat and sheep and some marmots. The cariboo eaters of the second class likewise come in for a fair share of the meat of the musk-ox, beaver, bear, with an occasional wood carriboo, and more or less geese, ducks, ptarmigan, and in certain localities a few marmots. The entire population, however, are largely benefitted during the seasons in which rabbits, lynx and musquash abound. For many years back, especially since moose began to decline and the reindeer have been fluctuating in number, some of the Athabasca, Peace and Upper Mackenzie River Indians have been taking a more general interest than before in the cultivation of the soil, on which they mostly raise potatoes, and some have latterly tried barley and wheat. Both classes, "Moose and Cariboo Eaters," make use of considerable quantities of berries, fresh and

dried, birds' eggs, and birch syrup in their season. The flesh of the musquash is considered a dainty by Indians and Esquimaux. The latter, however, make no syrup; but although they have fewer varieties of berries, they doubtless gather more eggs than the former. The food of the Northern Esquimaux consists of the flesh of the reindeer, seal, river and sea fish, with that of an occasional whale, walrus, polar bear, musk-ox, moose, wolf and wolverine, and marmots, rabbits, ptarmigan and waterfowl in their season. The staple articles of food of the Anderson River Esquimaux are undoubtedly the meat of the reindeer and the seal. From April to September the former animal is rarely absent; and in autumn it is always in greater or lesser abundance. The latter can generally be had during winter; but is most numerous after the ice breaks up in summer. A large number of Esquimaux annually ascend the Anderson, on the ice of course, early in April, to subsist at a point—it may be some 30 or 40 miles up stream—where they had previously secured in early winter, in a strongly constructed *cache* formed of iceblocks, the surplus of their autumn venison hunts. They also spin out the stock by killing a deer now and then as may be necessary until the disruption of the ice enables them to proceed by water to the several localities where they had been accustomed to pass most of the late spring and early summer weeks in fishing, hunting and fowling. In the meantime other parties ascend the river on ice to points below and even beyond the aforesaid *cache*, while those who had wintered at a distance followed later. Immediately after the river broke up, a number of Esquimaux hunters would ascend it with their canoes until they observed reindeer, which at that period of the season consisted of bucks, and were always more frequently discovered on the sloping sides of its eastern banks, and when any one succeeded in killing an animal by gun or bow, he would drag it to the water and send it drifting down stream, having previously inserted an arrow into the floating carcase. Just before reaching the first encampment below, some one on the outlook would take a canoe and examine the arrow, and if found to belong to a hunter thereof, it would be taken ashore, and if otherwise, it would be allowed to descend to the lodge of its owner. A somewhat different course would follow when animals were killed on land close to or below their encampments; but in autumn, when the reindeer are numerous at certain well known river points and passes, on their way to the wooded country, a great many are speared by the Esquimaux while crossing the river, and they are similarly treated and always recognized by some well known marks on the arrows of the successful hunter. While Fort Anderson was kept up, the Esquimaux usually arrived there for purposes of trade in about two or three weeks after the river was open at that place. In seasons when reindeer are very numerous in the autumn, the carriboo-eating Indians spear and otherwise wantonly (that is, for more than they can possibly manage to turn to any useful account) destroy large numbers of them while in the act of crossing small lakes and streams on their annual autumn migrations from the coast. As a rule Indians are very improvident; although a rather frequent rough experience of privation and starvation in recent years has been teaching them to be, and I believe they are now, more careful than they were previously. On the other hand, the Esquimaux are seldom indeed other than a careful, provident and industrious people.

84. The years of comparative plenty are those during which rabbits are in great abundance; moose not scarce; lynx and other periodical fur-bearing animals numerous in the different sections of the country occupied by the "Moose-eaters;" and when the reindeer are plentiful in fall and winter, and the snow sufficiently deep, the "Cariboo-eaters" are also very well circumstanced indeed. On the other hand, it may be readily imagined that a general scarcity or absence of so important a staple as the rabbit, coupled with a like paucity of moose, reindeer and lynx, particularly if the fisheries should fail at somepoints, as they often do, chiefly owing to causes beyond human control, such seasons cannot well be other than years of comparative scarcity, aye, not unfrequently of much privation and even starvation in several localities. The peculiar law of nature which periodically causes the rabbit, &c., to increase, and then to disappear, is really the most important factor in the fore going connection. Previous to 1874, moose were very numerous on the Peace River from Hudson's Hope to its outlet, and also on the lower Athabasca; but they have

sincer apidly diminished in numbers, chiefly owing to overhunting and partly, perhaps, to migration during the remarkably mild winter of 1877–78. In the autumn of 1874 the reindeer also, for the first time in many years, failed to make use of their ancient passes, from the "Barren Grounds" into the wooded country of Fond du Lac, Athabasca, nor have they ever since done so in anything like the great numbers in which they had been previously regularly accustomed to appear. For nearly every winter since 1874, reindeer have been more or less numerous in the vicinity of York Factory, where they had virtually been strangers for over thirty years. During the last two decades, the reindeer have also been very irregular in their annual appearance at all or most of the Carriboo posts of the Mackenzie and Great Slave Lakes. But they are, nevertheless, believed to be still very abundant in the Great Basin. In connection with years of scarcity, it may be added that in course of the last sixty years isolated cases of death by starvation have not been uncommon among the Indians of Athabasca-Mackenzie Region; but, although some instances in which several, and one indeed where very many, individuals perished miserably, are known to have occurred during former winters, it is only of recent years that these very pitiful events have become of very frequent recurrence. On the occasion referred to—the winter of 1841-2—about 100 men, women and children died of sheer starvation in the neighbourhood of Fort Good Hope. The summer and autumn fisheries had failed, while rabbits were exceedingly scarce; and being River Indians they were backward at first and latterly unable to proceed to the outer lands, where deer happened to be at a great distance and not very numerous that season. After the small stock of post provisions was nearly exhausted, the officers and servants were obliged to retreat to Fort Norman, leaving the interpreter in charge and he narrowly escaped dissolution before the "Carriboo eaters" made their appearance six weeks later with a quantity of half-dried venison. An Orkney man and a Highlander who were on their way to Fort McPherson with the usual winter packet from "headquarters," having encamped some 15 miles below Good Hope, at a short distance from an Indian lodge occupied by one very old man and two elderly women—were attacked while asleep and both were killed by the latter. The wretched party afterwards subsisted in plenty on the remains of the unfortunate men. One of the women concerned in this sad affair lived until October, 1865. The Esquimaux, I believe, seldom suffer in the same way, although there is a tradition among them of a large number having starved to death many years ago on the coast to the eastward of Cape Bathurst. One and all of the Northern Indian tribes, however, have contributed their quota of victims; but the Wood Crees and the Chipewayans of Athabasca, especially the former, together with the Beaver tribe of Peace River, seem to have been the most heavily visited of later years. Among the nineteen who, out of a party of twenty-seven Chipewayans died for want of food last winter, were three exceptionally able and formerly very successful hunters (two of whom were half-breeds). The Half-breed Harper, referred to in Butler's "Wild North Land," also met a similar fate in February, 1888, while in company with his Cree Indian wife and relations, on their way to Fort McMurray for a supply of much-needed food.

85. No cause can be assigned for the disease which attacks and kills off thousands of rabbits when they have attained the height of their septennial periodical increase. It affects the head and throat, and is well worthy of medical investigation.

86. There are two species of rabbitt or hare the *Lepus Americanus* and the *Lepus Glacialis*, in the Mackenzie Basin. The latter, however, is scarce, and but very few are ever taken—it is a barren ground animal.

87. I never heard that the polar hare had suffered from the epidemic which plays havoc among his relatives—the rabbits; and while they think that comparatively few, if any, of those of the latter which are attacked survive, the Indians assert their belief that thousands escape contagion.

88. I believe I have already mentioned all the food animals of the Great Basin in former answers. If at all possible, the hunting of beaver out of season should be put an immediate stop to, while every effort should also be made to prevent the Indians from killing reindeer and other food animals that they cannot make use of. And further,

that some effective steps ought to be taken to prevent the comparatively few remaining Woodland buffalo from utter extinction. I would, however, remark that although it is a very easy thing to make laws on the subject, it will prove a matter of great difficulty to enforce them duly in so remote a region. The officers of the Hudson Bay Company are always ready to second the views of the Government; and the resident missionaries are also in a position to render similar service; but I consider that a small police force is absolutely necessary in the foregoing connection.

89. Under proper control and minus spirits, the effect of opening up the Mackenzie Basin to civilization would be somewhat similar to British experience in other portions of the North-West and Canada proper—it would, at the outset at least, benefit some, unaffect many, and demoralize others.

90. I know of no reasons to induce the supposition that the labour of many of the Indians and Esquimaux of the Mackenzie Basin would prove other than advantageous to all concerned. The former are believed to be more amenable to civilization than their prairie countrymen, while the latter are, on the whole, a more intelligent and ingenious people than the neighbouring Indians.

Respectfully submitted,

R. MACFARLANE.

Fort James, Stuart's Lake, B.C., 11th January, 1889.

LIST OF MAMMALS KNOWN AND BELIEVED TO BE NATIVES OF THE GREAT MACKENZIE BASIN.

UNGULATA.

1. *Alce Americanus.* Jardine. Moose.—It is found in the forest country generally as far north as the 69th degree of latitude. Traces were also met with in about longitude 126 west.
2. *Rangifer Caribou.* Linnæus. Woodland Cariboo.—Not numerous in the Athabasca and Mackenzie River Districts, N. W. Territories of Canada. It is a larger animal than the Barren Ground Cariboo.
3. *Rangifer Groelandicus.* Linn. Barren-ground Reindeer.—This valuable food animal is still very numerous at certain seasons throughout the greater part of the northern portion of the Grand Basin.

*4. *Cervus Canadensis.* Erxleben. American Elk. Biche.—Is rarely met with north of latitude 45°.

*5. *Cariacus Virginianus.* Bodd. Virginian Deer.—This deer is said to be a resident in the extreme south-western portion of the map-defined boundaries of the Mackenzie Basin.

*6. *Antilocapra Americanus.* Ord. Antilope. Cabri.—This animal is also to be found on both sides of the Rocky Mountains and within the aforesaid basin, but not in great numbers

*7. *Mazama Montana.* Ord. Rocky Mountain Goat.—Fairly numerous in the Rockies; but none are met with in the mountain spurs on the east side of the Mackenzie River.

*8. *Ovis Montana.* Cuvier. Mountain Sheep. Bighorn.

*9. *Ovis Montana Dalli.* Nelson. Dalls' Mountain Sheep.—This recently determined variety or new species of sheep is undoubtedly that which is met with in the Rocky Mountains to the westward of the Lower Mackenzie River, while the true Bighorn exists in the ranges to the southward.

*10. *Ovibos Moschatus.* Zimmerman. Musk-Ox.—Numerous on the Barren Grounds during the summer; and in winter keeps on the edge of and within the most northern portion of the wooded country.

*11. *Bison Americanus.* Gmelin. Woodland Buffalo. Bison.—Very rare now in the Athabasca District

CARNIVORA.

*12. *Lynx Rufus.* Gmelin. Wild Cat.—It is said to be a native of the south-western section of the territory under investigation.

*13. *Lynx Canadensis.* Geoffroy. Canada Lynx.—As I have already in my "answers" given some information as to this and the other indigenous fur-bearing animals of the Great Basin, I need say no more at present.

*14. *Canis Lupus Occidentalis var. Albus.* Richardson. White Wolf.
var. Griseus. Grey Wolf.
var, Ater. Black Wolf.

*15. *Canis Latrans.* Say. Cayoté.—If it does not cross the North Saskatchewan it is now certainly to be found within the south-western border of the Mackenzie Basin.

*16. *Canis Familiaris var. Borealis.* Desur. Esquimaux Dog.
var. Lagopus. Rich. Hare Indian Dog.

*17. *Vulpes Fulvus.* Fleming. Red Fox.
var, Decussatus. Cross Fox.
var. Argentatus. Silver Fox.
*Black Fox

*18. *Vulpes Velox.* Say. Kit Fox. WAs this animal appears in Dr. Bell's list, I presume it exists within the southern boundaries of the region.

*19. *Vulpes Lagrpus.* Linn. White Fox.
**Var. Fuliginosus.* Blue Fox.—Very rare in British Arctic America, and if it be the same as the Stone Blue Fox so numerous in the Pribylov and other islands of Alaska, it is surely entitled to specific rank.

*20. *Gulo Luscus.* (Linn.) Sabine. Wolverine. Carcajou.—Extends almost if not quite to the shores of the Polar Sea.

*21. *Mustela Pennanti.* Erxl. Fisher.—Very rare indeed, if at all present, beyond latitude 60° north.

*22. *Mustela Americana.* Turton. Marten.

*23. *Putorius Vulgaris.* Linn. Weasel.—Rather scarce in Arctic America.

*24. *Putorius Ermineus,* Linn. Ermine.—Tolerably numerous all over the Basin.

*25. *Putorius Longicauda.* Bonaparte. Long-tailed Weasel.—This species is also believed to live within the defined region.

*26. *Putorius Vison.* Brisson. Mink.

*27. *Mephitis Mephitica,* Shaw. Skunk.—Not hitherto found north of latitude 60° and but very few indeed for a degree or two south.

*28. *Taxidea Americana.* Schrieber. Badger.—Rare even in the southern section of the country under review.

*29. *Lutra Canadensis.* Turton. Land Otter.—Although met with, it is by no means "common very far north" on the Mackenzie.

*30. *Ursus Horribilis.* Ord. Grey or Grizzly Bear.

*31. *Ursus Arctos.* Richardson. Barren ground bear.—Not uncommon in the barren grounds of Anderson and Wilmot Horton Rivers, nor on the shores of Franklin Bay. It is also said to be a resident of the Rocky Mountains of the Lower Mackenzie River, B.A.

*32. *Ursus Americanus.* Pallas. Black Bear.
**var:* Brown and Cinnamon.

33. *Thalassarctos Maritimus.* Linn. Polar Bear.—Frequently encountered by Esquimaux on the ice, as well as on the shores of the Arctic Sea, but never any distance inland in the Continent of America.

PINNIPEDIA.

34. *Odobaenus Rosmarus.* Malmgren. Walrus.—Not scarce in the seas of Northern North America. The Esquimaux annually kill a number.

35. *Phoca Vitulina.* Linn. Harbour or Fresh Water Seal.

36. *Phoca Fœtida.* Fabricius. Ringed Seal.
37. *Phoca Groënlandica.* Fabr. Harp Seal.—While *P. Vitulina* and *Fœtida* are both believed to exist in the seas which bound so large a portion of the Mackenzie Basin, it is doubtful if *P. Groënlandica* extends quite so far north and east.
38. *Erignathus Barbatus.* Fabr. Bearded Seal.
39. *Crystophora Cristata.* Erxleben. Hooded Seal.

RODENTIA.

*40. *Noetoma Cinerea.* Baird. Bushy-tailed Wood Rat.—This species is said to be a native of the country watered by the Upper Peace and Liard Rivers. It is also tolerably numerous throughout the New Caledonia District, Northern British Columbia.
*41. *Hesperomys Leucopus.* Rafinesque. Whitefooted or Deer Mouse.
*42. *Hesperomys Leucopus Sonoriensis.* (LeConte.) *Mus Leucopus* of Richardson. Undoubted specimens of this, as well as the foregoing *H. Leucopus*, were forwarded to the Smithsonian Institution at Washington, from Forts Simpson, Liard and Rae, &c., in the Mackenzie River District.
*43. *Evo onys Rutilus.* Pallas. Long-eared Mouse.—Numerous throughout the Mackenzie River region and on the shores of the Polar Sea.
*44. *Evotomys Rutilus Gapperi.* Vigors. Red-backed Mouse.—An undoubted specimen is recorded as having been received from Fort Churchill, Hudson Bay.
*45. *Arvicola Riparius.* Ord. American Meadow Mouse.—Twenty-nine specimens, not distinguishable from *Arne Riparius*, were received by the Smithsonian Institution from Mackenzie River.
*46. *Arvicola Riparius var. Borealis.* Richardson. Little Northern Meadow Mouse.—Abundant to and on the Arctic coast.
*47. *Arvicola Xanthognathus.* Leach. Chestnut-cheeked Meadow Mouse.—A similar remark will apply here.
48. *Arivicola Xanthognathus var. Richardsoni.* Aud. and Bach. Large Northern Meadow Mouse.—I think this form is the most numerous in the Mackenzie River region.
*49. *Myodes Obensis.* Brants. Tawny Lemming.—Abundant throughout the Arctic regions, and on the shores of the Northern Ocean.
*50. *Cuniculus Torquatus.* Pallas. Hudson Bay Lemming.—More numerous than *M. Obensis* in the same northern regions of Canada.
*51. *Fiber Zibeshicus.* Cuvier. Muskrat or Musquash.
*52. *Zapus Hudsonicus.* Cones. Jumping Mouse.—A few examples have been obtained from Liard River, Peace River and Great Slave Lake.
*53. *Lepus Arcticus.* Leach. Polar Hare.—Not numerous in the Barren Grounds, or on the Arctic coast of the Dominion of Canada.
*54. *Lepus Americanus.* Erxl. Northern varying Hare.
*55. *Erethizon Dorsatus.* Linn. Canada Porcupine.
*56. *Erethizon Dorsatus var. Epixanthus.* Brandt. Yellow-haired Porcupine.—Common on the Peel and Yukon Rivers. *E. Dorsatus* is fairly numerous in the middle and southern sections of the Great Mackenzie Basin.
*57. *Lagomys Princeps.* Rich. Little Chief Hare.—Found in the vicinity of the Rocky Mountains as far north as latitude 60°
*58. *Castor Fiber.* Linn. Beaver.
*59. *Thomomys Talpoides.* Rich. Northern Pocket Gopher.—Interior of west coast of Hudson Bay to the North Saskatchewan. It is also entered in Dr. Bell's list.
*60. *Sciuropterus Volucella Hudsonius.* Pallas. Northern Flying Squirrel.—Extends to the borders of the Arctic circle.
*61. *Sciurus Hudsonius.* Pallas. Red Squirrel.—Abundant throughout the entire wooded region of the Peace, the Athabasca and Mackenzie River districts.
*62. *Tamias Borealis.* Cones. Northern Chipmunk.—Supposed to extend to the Arctic circle.

63. *Tamias Lateralis.* Say. Say's Chipmunk.—Mr. Drummond obtained examples in the Rocky Mountains, latitude 57° north, over sixty years ago. I do not remember ever seeing any specimens.

*64. *Spermophilus Empetra.* Pallas. Parry's Spermophile.—Numerous in the Barren Grounds, and along the banks of all or most of the rivers flowing through the Arctic regions, and on the shores of the Polar Sea.

*65. *Spermophilus Richardsoni.* Sabine. Grey Gopher.—Richardson gives its range as not extending much beyond latitude 55° north, near the Saskatchewan boundary of the Great Mackenzie Basin.

*66. *Spermophilus Tridecemlineatus.* Mitchell. Striped Spermophile.—Common at Carlton House, Saskatchewan, and may therefore extend within the extreme southern boundary of the aforesaid basin.

67. *Spermophilus Franklini.* Sabine. Grey-headed Spermophile—This species was first described from specimens collected at Fort Enterprize in about latitude 64° north.

*68. *Arctomys Monax.* Schreiber. Woodchuck. Ground Hog.—It has not been met with by us in the Arctic regions; but the species is fairly abundant in sections of the wooded country furthur south.

*69. *Arctomys Caligatus.* Eschscholtz. Hoary Marmot.—The same remark is equally applicable to this perhaps more widely distributed Marmot.

INSECTIVORA.

70. *Condylura Cristata.* Linn. Star Nosed Mole.—South-west coast of Hudson Bay to the Rocky Mountains.

*71. *Sorex Forsteri.* Richardson. Foster's Shrew.—Abundant throughout the Arctic regions, to the shores of the Polar Sea.

72. *Sorex Belli.* Dobson. Bell's Shrew.—York Factory, Hudson Bay and westward.

*73. *Sorex Sphagnicola.* Cones. Fort Liard, Mackenzie River District.

CHEIROPTERA.

74. *Scotophilus Noctivagans.* Le Conte. Silvery-haired Bat.—Entered in Dr. Robert Bell's list.

75. *Vespertilio Lacifugus.* Lo Conte. Blunt Nosed Bat. Northward as far as Hudson Bay, and therefore in all probability, to be met with in the south-eastern borders of the aforesaid basin.

NOTE.—The several species of *Cetacea* which indubitably occur in the Hudson Bay and Polar Seas of the Great Mackenzie Basin, are not included in the above list, while it is probable that a few of the native or resident land mamals have also been omitted. Those marked with a star, thus *, are represented in British and American collections made by officers of the Hudson Bay Company. I may add that the foregoing classification is based on Allen and Cones Monographs of North American Rodentia, 1887, and Mr. J B. Tyrrell's Catalogue of Mammalia of Canada, 1889. The eminent American Mammalogist (Dr. C. Hart Merriam) has made a few corrections in the list, and would have made more, especially in reference to *Arvicola Riparius*, &c., some of the determinations of which he cannot endorse, but for the fact "that the present status of nomenclature of North American mammals is so badly mixed up, that it would be out of place in a list of this kind, to attempt any radical reform."

R. MACFARLANE

CUMBERLAND HOUSE, SASKATCHEWAN, 11th Jan., 1891.

LIST OF BIRDS KNOWN AND BELIEVED TO BREED WITHIN THE MAP-DEFINED BOUNDARIES OF THE "GREAT MACKENZIE BASIN."

WATER BIRDS.

*2. *Colymbus Holbœlli.* (Reinhardt.) Holbœll's Grebe.
*3. *Colymbus Anritus.* Linnæus. Horned Grebe.
*6. *Podilymbus Podiceps.* (Linn.) Pied-billed Grebe.
*7. *Urinator Imber.* (Gunn.) Loon.
8. *Urinator Adamsii.* (Gray.) Yellow-billed Loon.
*9. *Urinator Articus.* (Linn.) Black throated Loon.
*10. *Urinator Pacificus.* (Lawr.) Pacific Loon.
*11. *Urinator Lumme.* (Gunn.) Red throated Loon.
35. *Megalestris Skua.* (Brünn.) Skua.
*36. *Stercorarius Pomarinus.* (Temm.) Pomarine Jaëger.
*37. *Stercorarius Parasiticus.* (Linn.) Parasitic Jaëger.
*38. *Stercorarius Longicaudus.* Vieill. Long tailed Jaëger.
39. *Gavia Alba.* (Gunn.) Ivory Gull.
40. *Rissa Tridactyla.* (Linn.) Kittiwake.
*42. *Larus Glaucus.* (Brünn.) Glaucous Gull.
*43. *Larus Leucopterus.* Faber. Iceland Gull.
44. *Larus Glaucescens.* Naum. Glaucous-winged Gull.
*51a. *Larus Argentatus Smithsonianus.* Cones. American Herring Gull.
*53. *Larus Californicus.* Lawrence. California Gull.
*54. *Larus Delawarensis.* Ord. Ring-billed Gull.
*55. *Larus Brachyrhynchus.* Rich. Short-billed Gull.
59. *Larus Franklinii.* Sw. and Rich. Franklin's Gull.
*60. *Larus Philadelphia.* (Ord.) Bonaparte's Gull.
*62. *Xema Sabinii.* (Sabine.) Sabine's Gull.
64. *Sterna Tschegrava.* Lepech. Caspian Tern.
*71. *Sterna Paradisæa.* Brünn. Arctic Tern.
*77. *Hydrochelidon Nigra Surinamensis.* (Gmelin.) Black Tern.
*125. *Pelecanus Erythrorhynchos.* Gmelin. American White Pelican.
*129. *Merganser Americanus.* (Cassin.) American Merganser.
*130. *Merganser Serrator.* (Linn.) Red breasted Merganser.
131. *Lophodytes Cucullatus.* (Linn.) Hooded Merganser.
*132. *Anas Boschas.* Linn. Mallard.
*133. *Anas Obscura.* Gmel. Black Duck.
*135. *Anas Strepera.* Linn. Gadwall.
*137. *Anas Americana.* Gmel. Baldpate.
*139. *Anas Carolinensis.* Gmel. Green-winged Teal.
*140. *Anas Discors* (Linn.) Blue-winged Teal.
*142. *Spatula Clypeata.* (Linn.) Shoveller.
*143. *Dafila Acuta.* (Linn.) Pintail.
*144. *Aix Sponsa.* (Linn.) Wood Duck.
*146. *Aythya Americana.* (Eyt.) Red-head.
*147. *Aythya Vallisneria.* (Wilson.) Canvas Back.
*148. *Aythya Marila Nearctica.* Stejn. American Scaup Duck.
*149. *Aythya Affinis.* (Eyt.) Lesser Scaup Duck.
*150. *Aytha Collaris.* (Donovan.) Ring-necked Duck.
*151. *Glaucionetta Clangula Americana.* (Bonap.) American Golden Eye.
*152. *Glaucionetta Islandica.* (Gmel.) Barrow's Golden Eye.
*153. *Charitonetta Albeola.* (Linn.) Buffle-head.
*154. *Clangula Hyemalis.* (Linn.) Old Squaw.
*155. *Histrionicus Histrionicus.* (Linn.) Harlequin Duck.
*161. *Somateria V. Nigra.* Gray. Pacific Eider.

*162. *Somateria Spectabilis.* (Linn.) King Eider.
*163. *Oidemia Americana.* Sw. and Rich. American Scoter.
*164. *Oidemia Fusca.* (Linn.) Velvet Scoter.
*165. *Oidemia Deglandi.* Bonap. White-winged Scoter.
*166. *Oidemia Perspicillata.* (Linn.) Surf Scoter.
*167. *Erismatura Rubida.* (Wilson.) Ruddy Duck.
*169. *Chen Hyperborea.* (Pallas.) Lesser Snow Goose.
170. *Chen Rossi.* (Baird.) Ross's Goose.
*171*a*. *Anser Albifrons Gambeli.* (Hartlaub.) American White-fronted Goose.
*172. *Branta Canadensis.* (Linn.) Canada Goose.
*172*a*. *Branta Canadensis Hutchinsii.* (Sw. and Rich.) Hutchins's Goose.
*174. *Branta Nigricans.* (Lawr.) Black Brant.
*180. *Olor Columbianus.* (Ord.) Whistling Swan.
*181. *Olor Buccinator.* (Rich.) Trumpeter Swan.
*190. *Botaurus Lentiginosus.* (Montag.) American Bittern.
*204. *Grus Americana.* (Linn.) Whooping Crane.
*205. *Grus Canadensis.* (Linn.) Little Brown Crane.
*221. *Fulica Americana.* Gmel. American Coot.
*222. *Crymophilus Fulicarius.* (Linn.) Red Phalarope.
*223. *Phalaropus Lobatus.* (Linn.) Northern Phalarope.
*230. *Gallinago Delicator.* (Ord.) Wilson's Snipe.
*232. *Macrorhampus Scolopaceus.* (Say.) Long-billed Dowitcher.
*233. *Micropalama Himantopus.* (Bonaporte.) Stilt Sandpiper.
*239. *Tringa Maculata.* Vieill. Pectoral Sandpiper.
*240. *Tringa Fusicollis.* Vieill. White-rumped Sandpiper.
*241. *Tringa Bairdii.* (Cones.) Baird's Sandpiper.
*242. *Tringa Minntilla.* Vieill. Least Sandpiper.
243*a*. *Tringa Alpina Pacifica.* (Cones.) Red-backed Sandpiper.
*246. *Ereunetes Pusillus.* (Linn.) Semipalmated Sandpiper.
*248. *Calidris Arenaria.* (Linn.) Sanderling.
*249. *Limosa Fedoa.* (Linn.) Marbled Godwit.
*251. *Limosa Hæmastica.* (Linn.) Hudsonian Godwit.
*254. *Totanus Melanoleucus.* (Gmelin.) Greater Yellow Legs.
*255. *Totanus Flavipes.* (Gmel.) Yellow Legs.
*258. *Symphemia Semipalmata.* (Gmel.) Willet.
*261. *Bartramia Longicauda.* (Bechst.) Bartramian Sandpiper.
*261. *Tryngites Subruficollis* (Vieill.) Buff-breasted Sandpiper.
*263. *Actitis Macularia.* (Linn.) Spotted Sandpiper.
*265. *Numenius Hudsonicus.* Latham. Hudsonian Curlew.
*266. *Numenius Borealis.* (Forst.) Esquimaux Curlew.
*270. *Charadrius Squatarola.* (Linnæus.) Black-bellied Plover.
*272. *Charadrius Dominicus.* Müll. American Golden Plover.
*274. *Aegialitis Semipalmata.* Bonaparte. Semi-palmated Plover.
*283. *Arenaria Interpres.* (Linn.) Turnstone.

LAND BIRDS.

297*b*. *Dendragapus Obscurus Richardsonii.* (Sabine.) Richardson's Grouse.
*298. *Dendragapus Canadensis.* (Linn.) Canada Grouse.
299. *Dendragapus Franklinii.* (Dougl.) Franklin's Grouse.
*300*b*. *Bonasa Umbellus Umbelloides.* (Dougl.) Grey Ruffled Grouse.
*301. *Lagopus Lagopus.* (Linn.) Willow Ptarmigan.
*302. *Lagopus Rupestris.* (Gmel.) Rock Ptarmigan.
304. *Lagopus Leucurus.* Swainson. White-tailed Ptarmigan.
*308. *Pediocætes Phasianellus.* (Linn.) Sharp-tailed Grouse.
309. *Pediocætes Phasianellus Columbianus.* (Ord.) Columbian Sharp-tailed Grouse.

*315. *Ectopistes Migratorius.* (Linn.) Passenger Pigeon.
*331. *Circus Hudsonius.* (Linn.) Marsh Hawk.
*332. *Accipiter Velox* (Wilson.) Sharp-shinned Hawk.
*334. *Accipiter Atricapillus.* (Wilson.) American Goshawk.
337. *Buteo Borealis.* (Gmel.) Red-tailed Hawk.
*342. *Buteo Swainsoni.* Bonap. Swainson's Hawk.
*347*a*. *Archibuteo Lagopus-Sanctijohannis.* (Gmel.) American Rough-legged Hawk.
348. *Archibuteo Ferrugineus.* (Licht.) Ferruginous Rough-legged Hawk.
*349. *Aquila Chrysaëtos.* (Linn.) Golden Eagle.
*352. *Haliætus Leucocephalus.* (Linn.) Bald Eagle.
*354. *Falco Rusticollis Gyr-Falco.* (Linn.) Gyr-Falcon.
*356. *Falco Peregrinus Anatum.* (Bonap.) Duck Hawk.
356*a*. *Falco Peregrinus Pealei.* Ridgway. Peale's Falcon.
*357. *Falco Columbarius.* Linn. Pigeon Hawk.
*358. *Falco Richardsonii.* Ridgway. Richardson's Merlin.
*360. *Falco Sparverius.* Linn. American Sparrow Hawk.
*364. *Pandion Haliaëtus Carolinensis.* (Gmel.) American Osprey.
*366. *Asio Wilsonianus.* (Less.) American Long-eared Owl.
*367. *Asio Accipitrinus.* (Pall.) Short-eared Owl.
*370. *Scotiaptex Cinerea.* (Gmel.) Great Grey Owl.
*371. *Nyctala Tengmalmi Richardsoni.* (Bonap.) Richardson's Owl.
*375*b*. *Rubo Virginianus Arcticus.* (Swainson.) Arctic Horned Owl.
*376. *Nyctea Nyctea.* (Linn.) Snowy Owl.
*377*a*. *Surnia Ulula Caparock.* (Müll.) American Hawk Owl.
*390. *Ceryle Alcyon.* (Linn.) Belted King Fisher.
*393*a*. *Dryobates Villosus Leucomelas.* (Bodd.) Northern Hairy Woodpecker.
*394. *Dryobates Pubescens.* (Linn.) Downy Woodpecker.
*400. *Picoides Arcticus.* (Swains.) Arctic Three-toed Woodpecker.
*401. *Picoides Americanus.* (Brehm.) American Three-toed Woodpecker.
*401*a*. *Picoides Americanus Alascensis.* (Nelson.) Alaskan Three-toed Woodpecker.
401*b*. *Picoides Americanus Dorsalis.* (Baird.) Alpine Three-toed Woodpecker.
*402. *Sphyrapicus Varius.* (Linn.) Yellow-bellied Sapsucker.
*405. *Ceophlœus Pileatus.* (Linn.) Pileated Woodpecker.
*412. *Colaptes Auratus.* (Linn.) Flicker.
*420. *Chordeiles Virginianus.* (Gmel.) Night Hawk.
457. *Sayornis Saya.* (Bonap.) Say's Phœbe.
459. *Contopus Borealis.* (Swains.) Olive-sided Flycatcher,
466. *Empidonax Pusillus.* (Swains.) Little Flycatcher.
*467. *Empidonax Minimus.* (Baird.) Least Flycatcher.
*468. *Empidonax Hammondi.* (Xantus.) Hammond's Flycatcher.
*474. *Otocoris Alpestris.* (Linn.) Horned Lark.
474*a*. *Otocoris Alpestris Leucolœma.* (Cones.) Pallid Horned Lark.
475. *Pica Pica Hudsonica.* (Sabine.) American Magpie.
477. *Cyanocitta Cristata.* (Linn.) Blue Jay.
*484. *Perisoreus Canadensis.* (Linn.) Canada Jay.
*484*b*. *Perisoreus Canadensis Fumifrons.* Ridgway. Alaskan Jay.
*486*a*. *Corvus Corax Principalis.* Ridgway. Northern Raven.
*488. *Corvus Americanus.* Audubon. American Crow.
*497. *Xanthocephalus Xanthocephalus.* (Bonap.) Yellow-headed Blackbird.
*498. *Agelaius Phœniceus.* (Linn.) Red-winged Blackbird.
*509. *Scolecophagus Carolinus.* (Müll.) Rusty Blackbird.
514. *Cocothraustes Vespertina.* (Cooper.) Evening Grosbeak.
*515. *Pinicola Enucleator.* (Linn.) Pine Grosbeak.
521. *Loxia Curvirostra Minor.* (Brehm.) American Crossbill.
522. *Loxia Leucoptera.* Gmel. White-winged Crossbill.
*527*a*. *Acanthis Hornemanni Exilipes.* (Cones.) Hoary Red Poll.

*528. *Acanthis Linaria.* (Linn.) Red Poll.
529. *Spinus Tristis.* (Linn.) American Goldfinch.
533. *Spinus Pinus.* (Wils.) Pine Siskin.
*534. *Plectrophenax Nivalis.* (Linn.) Snowflake.
*536. *Calcarius Lapponicus.* (Linn.) Lapland Longspur.
*537. *Calcarius Pictus.* (Swains.) Smith's Longspur.
*540. *Poocœtes Gramineus.* (Gmel.) Vesper Sparrow.
*542*a*. *Ammodramus Sandwichensis Savanna.* (Wils.) Savanna Sparrow.
*542*b*. *Ammodramus Sandwichensis Alaudinus.* (Bonap.) Western Savanna Sparrow.
*554. *Zonotrichia Leucophrys.* (Forst.) White-crowned Sparrow.
*555. *Zonotrichia Intermedia.* Ridgw. Intermediate Sparrow.
*558. *Zonotrichia Albicollis.* (Gmel.) White-throated Sparrow.
*559. *Spizella Monticola.* (Gmel.) Tree Sparrow.
*559*a*. *Spizella Monticola Ochracea.* Brewster. Western Tree Sparrow.
*567. *Junco Hyemalis.* (Linn.) Slate color'd Junco.
*567*a*. *Junco Hyemalis Oregonus.* (Townsend.) Oregon Junco.
*581. *Melospiza Fasciata.* (Gmel.) Song Sparrow.
*583. *Melospiza Lincolni.* (Aud.) Lincoln's Sparrow.
*585. *Passerella Iliaca.* (Merr.) Fox Sparrow.
588. *Pipilo Maculatus Arcticus.* (Swainson.) Arctic Towhee.
595. *Habia Ludoviciana.* (Linn.) Rose-breasted Grosbeak.
*611. *Progne Subis.* (Linn.) Purple Martin.
*612. *Petrochelidon Lunifrons.* (Say.) Cliff Swallow.
*613. *Chelidon Erythrogaster.* (Bodd.) Barn Swallow.
*614. *Tachycineta Bicolor.* (Vieill.) Tree Swallow.
*616. *Clivicola Riparia.* (Linn.) Bank Swallow.
*618. *Ampelis Garrulus.* (Linn.) Bohemian Waxwing.
*619. *Ampelis Cedrorum.* (Vieill.) Cedar Waxwing.
*621. *Lanius Borealis.* Vieill. Northern Sheike.
*624. *Vireo Olivaceus.* (Linn.) Red Eyed Vireo.
*560. *Spizella Socialis.* (Wils.) Chipping Sparrow.
*561. *Spizella Pallida.* (Swains.) Clay-color'd Sparrow.
*627. *Vireo Gilvus.* (Vieill.) Warbling Vireo.
*646. *Helminthophila Celata.* (Say.) Orange-crowned Warbler.
*647. *Helminthophila Peregrina.* (Wilson.) Tennessee Warbler.
*652. *Dendroica Aestiva.* (Gmel.) Yellow Warbler.
*655. *Dendroica Coronata.* (Linn.) Myrtle Warbler.
*656. *Dendroica Anduboni.* (Towns.) Audubon's Warbler.
*657. *Dendroica Maculosa.* (Gmel.) Magnolia Warbler.
*660. *Dendroica Castanea.* (Wils.) Bay-breasted Warbler.
*661. *Dendroica Striata.* (Forst.) Black-poll Warbler.
*672. *Dendroica Calmarum.* (Gmel.) Palm Warbler.
*675. *Seiurus Noveboracensis.* (Gmel.) Water Thrush.
*685. *Sylvania Pusilla.* (Wilson.) Wilson's Warbler.
*687. *Setophaga Ruticilla.* (Linn.) American Redstart.
*697. *Anthus Pensilvanicus.* (Lath.) American Pipit.
700. *Anthus Spragueü.* (And.) Sprague's Pipit.
701. *Cinclus Mexicanus.* Swains. American Dipper.
*725. *Cistothorus Palustris.* (Wilson.) Long-billed Marsh Wren.
728. *Sitta Canadensis.* (Linn.) Red-breasted Nuthatch.
735*a*. *Parus Atricapillus Septentrionalis.* (Harris.) Long-tailed Chickadee.
*739. *Parus Cinctus Obtectus.* (Cab.) Siberian Chickadee.
*740. *Parus Hudsonicus.* Forster. Hudsonian Chickadee.
*749. *Regulus Calendula.* (Linn.) Ruby-crowned Kinglet.
757. *Turdus Aliciæ.* Baird. Gray-cheeked Thrush.
*758*a*. *Turdus Ustulatus Swainsonu.* (Cabanis.)

*761. *Merula Migratoria.* (Linn.) American Robin.
763. *Hesperocichla Nœvia.* (Gmelin.) Varied Thrush.
*768. *Sialia Arctica.* (Swains.) Mountain Bluebird.

Note.—Although I may have admitted several species of birds into the foregoing list, which had been collected and observed on the eastern, southern and western frontiers of the immense region under investigation, yet I have no doubt that examples of all, or nearly all of these, as well as of most of those entered in the sub-joined list, annually cross the line during the season, and for the purpose of reproduction. And it is also my belief that future explorations will determine the presence therein, even at such periods, of not a few specimens of other birds which are now supposed to breed *outside* of the limits in question. It is, moreover, probable that fuller information would enable me to make some additions to the number of species, thus* marked in both lists, whose eggs have been obtained through the exertions of Hudson Bay officials. I should have previously stated that the recently revised and abridged check list of North American birds, according to the canons of Nomenclature of the American Ornithologists' Union, has been closely followed in the preceding and succeeding classifications.

R. MacFARLANE.

ADDITIONAL LIST OF BIRDS SUPPOSED TO BREED IN THE AFORESAID MACKENZIE BASIN.

WATER BIRDS.

60*1.* *Larus Minutus.* Pallas. Little Gull.
61. *Rhodostethia Rosea.* (MacGil.) Ross's Gull.
* 69. *Sterna Forsterii.* Nutt. Forster's Tern.
* 70. *Sterna Hirundo.* Linn. Common Tern.
*160. *Somateria Dresseri.* Sharpe. American Eider.
*169*a*. *Chen Hyperborea Nivalis.* (Forster.) Greater Snow Goose.
169*1.* *Chen Cœrulescens.* (Linn.) Blue Goose.
172*b*. *Branta Canadensis Occidentalis.* (Baird.) White-checked Goose.
173. *Branta Bernicla.* (Linn.) Brant.
194. *Ardla Herodias.* Linn. Great Blue Heron.
212. *Rallus Virginianus.* Linn. Virginia Rail.
225. *Recurvirostra Americana.* Gmelin. American Avocet.
*231. *Macrorhampus Griseus.* (Gmel.) Gowitcher.
234. *Tringa Canutus.* Linn. Knot.
235. *Tringa Maritima.* Brünn. Purple Sandpiper.
247. *Ereunetes Occidentalis.* Lawr. Western Sandpiper.
256. *Totanus Solitarius.* (Wils.) Solitary Sandpiper.
259. *Hetaractitis Incanas.* (Gmel.) Wandering Tatler.
*264. *Numenius Longirostris.* Wilson. Long-billed Carlew.
275. *Aegialitis Hiaticula.* (Linn.) Ring Plover.

LAND BIRDS.

300. *Bonasa Umbellus.* (Linn.) Ruffled Grouse.
333. *Accipiter Cooperi.* (Bonap.) Cooper's Hawk.
375. *Buteo Virginianus Sub-Arcticus.* (Hoy.) Western Horned Owl.
420*a*. *Chordeiles Virginianus Henryi.* (Cassin.) Western Night Hawk.
*428. *Trochilus Colubris.* Linn. Ruby-throated Humming Bird.
462. *Contopus Richardsoni.* (Swains.) Western Wood Pewee.

*486. *Corvus Corax Sinuatus.* (Wagl.) American Raven.
507. *Icterus Galbula.* (Linn.) Baltimore Oriole.
510. *Scolecophagus Cyanocephalus.* (Wagler.) Brewers' Black Bird.
538. *Calcarius Ornatus.* (Towns.) Chesnut-collared Longspur.
*556. *Zonokichia Gambeli.* (Nutt.) Gambels' Sparrow.
584. *Melospiza Georgiana.* (Lath.) Swamp Sparrow.
636. *Minotilta Varia.* (Linn.) Black and White Warbler.
645. *Helminthophila Ruficapilla.* (Wils.) Nashville Warbler.
674. *Seiurus Anrocapillus.* (Linn.) Oven Bird.

R. MacFARLANE.

Cumberland House, Saskatchewan, 11th January, 1891.