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Appendix No. 1, No. 2, No. 3 & No. 5 were not printed.

APPENDIX

TO THE

TWENTY-FIRST VOLUME

OF THE

JOURNALS

OF THE

HOUSE OF COMMONS

DOMINION OF CANADA.

From the 13th April, 1887, to the 23rd June, 1887,
BOTH DAYS INCLUSIVE.

BEING THE FIRST SESSION OF THE SIXTH PARLIAMENT OF CANADA.

SESSION 1887.

VOLUME XXI.

APPENDIX.

LIST OF APPENDICES, 1887.

No. 1.—First Report of the Select Standing Committee on Privileges and Elections *Not printed.*

No. 2.—Second Report of the Select Standing Committee on Privileges and Elections. *Not printed.*

No. 3.—First Report of the Select Standing Committee on Public Accounts. *Not printed.*

No. 4.—Report of the Select Standing Committee on Agriculture and Colonisation.

No. 5.—Report of the Special Committee appointed to revise the rules respecting Private Bills. *Not printed.*

REPORT

OF THE

SELECT STANDING COMMITTEE

ON

AGRICULTURE AND COLONISATION

OF THE

HOUSE OF COMMONS.

FIRST SESSION, SIXTH PARLIAMENT.

Printed by Order of Parliament.

OTTAWA:
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1887.

TABLE OF CONTENTS.

REPORT.

The Select Standing Committee on Agriculture and Colonisation respectfully submit their first and final report:

The Committee examined Prof. Saunders, the Director of the Central Experimental Farm Station, already established in the vicinity of Ottawa, and of the stations to be established in the Maritime Provinces, Manitoba, the North-West Territories, and British Columbia, under the provisions of the Act passed last Session; and from his evidence (submitted herewith) it will be found that considerable progress has already been made at the Central Farm, about 100 acres having been seeded this season, principally with wheat, barley and oats.

A quantity of wheat has been imported from Northern Russia (grown in a latitude about 600 miles north of Ottawa), part of which has been sown on the Farm, and the balance distributed, in small quantities to persons who applied for it throughout the different Provinces, with a view of testing its adaptability to our climate and soil. A large number of fruit and forest trees have also been planted, and from the evidence adduced, your Committee are of the opinion that good results are likely to flow from the publication of the reports of the proposed agricultural and horticultural experiments.

The Committee next examined Mr. John Lowe, Secretary of the Department of Agriculture, on the subject of the immigration operations carried out under the direction of that Department. It was found, from Mr. Lowe's evidence, that there was a decline in the number of immigrants who reported their intention of becoming settlers in Canada in 1886, as compared with those in 1885, the figures in the former year being 69,152, and in the latter 79,169; the total number of immigrant arrivals, including the passengers who used the Canadian route to proceed to destinations in the Western States, was 122,581 in 1886, as against 105,096 in the previous year.

The immigrants arriving were reported to be of a good class, there having been found very few unsuitable persons, and none, according to the evidence adduced, were reported as being unable to obtain employment.

The whole number of mechanics registered at Quebec was only 1,100 out of a total of 10,411 of all trades and occupations, of immigrants, as registered at that port, and the number at Halifax was only 202, out of 3,801.

These are the only two ports at which such registration takes place, but they may be held to be an index of the whole; the policy of the Department has been not to encourage immigration of that class.

The so-called assisted passage appears to have been given to comparatively few persons during the year, the total number who profited by it being 3,480 adults and 2,320 children. They consisted of agricultural labourers and their families, and female domestic servants; the larger portion of the 3,840 adults were women, but the figures supplied did not give the exact proportions of the sexes.

The Minister of Agriculture, at one of the meetings of the Committee, stated that it was his intention, after the close of the present season, to limit the assisted passages to persons going to Manitoba and the North-West Territories, discontinuing it so far as it relates to the old Provinces of the Dominion.

Mr. Lowe stated that there was increased activity in the arrival of Scandinavians and Germans, who had settled in colonies in Manitoba and the North-West; the reports received from such colonies having been favourable.

The question as to whether the population reported by the census taken in 1885 and 1886 in the North West and the Province of Manitoba, supported the figures of

immigration from 1881 to 1886 inclusive, was made a subject of enquiry by the Committee, and it was ascertained that the population in 1886 in the Province of Manitoba and the three districts of Assiniboia, Saskatchewan and Alberta, compared with that of the same circumscriptions in 1881, showed an increase numerically of 76,491, or a ratio of 87·14 per cent. in five years. Taking the whole of the Territories and the Province of Manitoba, the numerical increase in the same time would be 78,258. But the immigrants reported to have gone in, according to the figures furnished by Mr. Lowe to the Committee, between the dates of the taking of the census in the years named, were 146,547, which, if we take the figures of the whole territory, would show an apparent loss to be accounted for of 67,999. It may be stated, however, that more than half of the immigrants to Manitoba and the North-West were from year to year given as migrants from the older Provinces, a fact which, taken in relation to the whole Dominion, would not show a loss of immigration from abroad, although a very great one in so far as Manitoba and the North-West are concerned.

Mr. Lowe accounts for this by the return of large numbers of persons who were engaged in building the Canadian Pacific Railway, and also of many of them from the older Provinces who were attracted by the excitement known as the "boom" in the first three of the years in question.

The probability is that settlement in the North-West will proceed on a more secure basis in the future.

The total expenses of the service of immigration during the calendar year 1886, was stated to be $301,704.97, as against $310,271 for the previous year.

The expenditure for all Canadian agencies was $65,675.07. The whole expenditure for the London office including the cost of all establishments for immigration in Europe, was $61,225.10, the remainder of the general expenditure being $173,804.71. The actual net amount expended for assisted passages during the year was given at $19,355.91. To this should be added a sum of $9,666.46 for commissions paid in connection with the item of assisted passages, this figure really standing as a payment to persons who were engaged in distributing the publications of the Department, and booking passengers.

Mr. James Fletcher, the honorary Entomologist of the Department of Agriculture, was examined by the Committee with reference to the best modes of counteracting the ravages of insect pests.

Much valuable information was communicated by Mr. Fletcher, and the Committee are of opinion that his evidence should be circulated as widely as possible, for the use of farmers, and horticulturists, and others.

The whole of the evidence taken before the Committee is submitted herewith as part of this report.

All which is respectfully submitted,

P. WHITE,
Chairman.

COMMITTEE ROOM No. 6,
HOUSE OF COMMONS, 17th June, 1887.

MR. SAUNDERS' EVIDENCE.

OTTAWA, 18th May, 1887.

The Committee on Agriculture and Colonization met, Mr. White (Renfrew) in the Chair.

Prof. SAUNDERS, Director Government Experimental Farm, was called and examined.

By Mr. Mallory:

Q. Will you state what varieties of seed wheat you have procured for distribution amongst the farmers? A. When the question of introducing new varieties of cereals was discussed it was thought to be most important to endeavour to obtain grain from

some very far northern territory. I therefore entered into correspondence with a gentleman at Riga, in Russia, which is about 600 miles north of this latitude, and he engaged to procure for me a quantity of wheat from the Government of the territory which is north of Riga. This is the wheat that we have been distributing. We got about 6,000 pounds of it. It is a very fine sample of hard spring wheat. It will grade No. 1 hard, according to the opinion of several experts to whom I have submitted it. We tested it in the seed-testing house and it showed a vitality of 98 per cent., which indicates that it has a vigorous constitution, and, having been ripened in a latitude 600 miles north of this, and where the season has fewer summer days, it ought to succeed well here and in the North-West. I expected to have more difficulty than I experienced in obtaining this seed, and fearing that it might not arrive in time, entered into correspondence with a grain dealer in London, and through him ordered another consignment from as far north in Russia as it was possible to obtain it. He did not send me particulars as to place of growth of this wheat, so that I only distributed a very small quantity of it. The Russian wheat, of which I show you a sample, is the variety that was principally sent out. We have distributed something over 1,000 bags, of 3 lbs. each, of that wheat to various parts of the Dominion. Every Province has received a certain portion of it; the largest part, however, has gone to Manitoba and the North-West Territories, because it was for those localities that the wheat was principally designed. Besides that, 1,200 lbs. sent to Governor Dewdney to be distributed amongst the Indian agencies, so as to have it tested all through the Territories, and in districts where the settlement is so sparse that it would be difficult to find settlers who would undertake the work.

Mr. MALLORY—I have taken the trouble to send samples of this wheat to some of my constituents, and I have a letter from one of them in regard to it. He is a gentleman who cannot be accused of having any political bias against the Government, because he was one of my most active opponents. The letter is accompanied by a quantity of foul seeds which was taken from a 3 lb. bag of the wheat. The letter is as follows:—

"WARKWORTH, PERCEY, 5th May, 1887.

"DEAR SIR,—I am certainly obliged to you for your kindness to have, or caused to have, sent to me the two samples of wheat, which I have sown by the side of fifteen plots that were sent to me from the Guelph College. But I enclose you the filthy seeds of the worst kind that I took out of the Russian variety. It is surely a mistake of the Agricultural Department to send out such seed. I trust that you will be kind enough to let them know about it, for such seed surely should not be sent out.

"Yours truly,

"THOS. B. CARLAW.

"P.S.—What I send you was all taken out of three pounds of wheat.

"T.B.C..

"A. E. MALLORY, Esq.,
"House of Commons,
"Ottawa."

A. On the arrival of the first lot of grain it was submitted to several experts and was pronounced by them as a very fine sample. But I did not have the opportunity to examine it critically at that time. As soon, however, as I found that there was a few weed seeds in it, I had every particle of the grain hand-picked before it was sent out. To look through the wheat casually there appeared to be only a foul seed here and there, but on a careful hand-picking the result was more than I anticipated. There was such a rush for the grain at first that we were obliged to send it out as rapidly as possible, and a few seeds may have escaped the pickers, although they were instructed to be very careful. Most of the varieties of grain that were received from the London market had more foreign seeds than this Russian variety. Prof. Brown, of Guelph, writes me that he has had the same experience. I am testing

those weed seeds, and I find that the larger seed is a species of vetch. It would be an objectionable seed in the wheat, for the reason that it is not easy to separate it, being about the same size as wheat. But the quantity of weed seed which was sent with this letter as having been taken from a 3 lb. bag is far more than exists generally throughout the lot. I should judge that this would represent the cleanings of about twenty bags.

Mr. MALLORY—Of course I do not know anything more about the circumstance than is stated in this letter, but I think a great deal of care should be exercised in distributing seed, to see that no foul seed goes out with it. The gentleman from whom I received this sample is probably one of the best farmers in the Province of Ontario, and he takes an especial interest in testing new varieties of grain.

Prof. SAUNDERS—I would not like to throw any discredit on this evidence, but I think there are seeds here which are not in the Russian wheat I have spoken of. There is a yellow seed here which I am positive is not in that wheat. I think he must have got some foul seeds from some other samples.

By Mr. Sproule:

Q. Did you test the vitality of this wheat before you sent it out? A. Yes; its vitality was 98 per cent.

Q. What would be the fair average percentage of vitality of ordinary wheat? A. From 70 per cent. up to that point, and occasionally even as high as 100 per cent. It is a matter of great regret to me that any foul seeds should have gone out with this wheat. I was prevented from noticing it at the time by severe illness, but as soon as I was made aware of it, I set men to pick it over, and it was all made as clean as this sample on the table.

Mr. LIVINGSTON—I can easily see how a mistake of this kind could have occurred. I am in the habit of importing seed myself from Rotterdam, which is generally clean seed, but we found, this spring, one bag, which, from some cause or another, was mixed with all kinds of seeds. The conclusion we came to was that that bag must have got open in the vessel, and the other seeds got in with it. I think that before any imported seed is sent out, it should be carefully inspected.

By Mr. Sproule:

Q. Have you any knowledge of the time of sowing and the maturing of this kind of wheat? A. The only knowledge I have is that published in a paper written by a Russian scientist who has investigated the periods of ripening of wheat in the northern and southern parts of Russia. It was published in St. Petersburg. He says that wheat will ripen in the northern provinces of Russia from ten to fourteen days earlier than the same variety will in the southern; but that I have not any means of verifying. He is a man of high standing and has, I believe, been employed for this purpose by the Russian Government or some scientific society.

By Mr. Innes:

Q. Did you get your samples from the southern or northern sections? A. From Riga. A small sample was received from Odessa, in the Crimea, as well. I got a second sample from London; it came from the London grain market but was grown in one of the northern Provinces of Russia. In selecting grain in Russia a great deal depends upon the means of inter-communication at the place of selection. If you get your sample from some point where there are a number of railways centreing, and into which wheat comes from the north and the south, unless you employ a man to make a special selection it is uncertain whether your sample comes from the north or the south of the shipping point.

By Mr. Sproule:

Q. Did you get samples of other varieties of grain? A. No other grain in quantities large enough for general distribution, except wheat from Winnipeg—samples of Red Fyfe, which was sent out as far as it would go in the Provinces of Quebec, Ontario and the Maritime Provinces, and the remainder is being tested on the Experimental Farm here. That was distributed with a view of testing the desirability of change of seed. It is important to ascertain what effect will be produced by obtaining

wheat from distant points in the North-West and sowing it in these districts nearer home.

Q. I understand you sent a circular along with each parcel of wheat instructing the party to sow it in a separate patch and report to the Department? A. Yes; asking each person to report the date of sowing and the date of ripening, also the character of the soil and the yield that was obtained from the three pounds sent. They were also requested to return a small sample to the Experimental Farm, so that we might see the different samples from all parts of the Dominion. I have had a great many letters from farmers who have received these samples of grain—most of them having been sent out by the direction of members of the House—and in most cases they express great gratification at receiving them; and they say that if this wheat will ripen a week earlier than other varieties it will be a great boon to them.

Q. I may say that I had a great many applications for other grain, barley especially, and farmers in my section think there is nothing that will do so much good. In wheat what is wanted is a variety that will ripen and a change of seed? A. That is one of the things that it is proposed to test on the Experimental Farm. We have sown about ten or fifteen varieties of barley and we have some thirty varieties that will go in to-morrow in small quantities. These have been obtained from all parts of the world, and it is proposed to compare them one with the other and with the varieties we have as to yield and period of ripening, with the object of ascertaining whether they are worthy of more extensive cultivation. When that is determined larger quantities can be got sufficient for distribution if it is desired.

By Mr. Innes:

Q. Have you your Experimental Farm in full operation? A. We have a large area of land sown, also some forty plots one-fourth of an acre each, and some 1-4 smaller plots, that we shall begin to put in to-morrow. You must understand that this Experimental Farm was at first in a very rough state, and we could not begin work on it until the 2nd of May; but we think we shall be in good time for the grain to ripen if it is sown this week.

Q. Would Mr. Saunders give the Committee a short account of what has been done so far and what it is expected to do this season? A. I cannot give you the exact acreage under crop, but I think it is over 100 acres. Most of that land had to be cleared of stone, partially levelled and ploughed before seeding, and now, having got through all the land that was in a reasonably good state, the ploughing and working up of the rougher portions has been commenced with a view to bringing these into cultivation as soon as possible. The grain has been put in the 100 acres I referred to, and I am of opinion that there are fifteen or twenty acres of the Russian wheat referred to sown. It was sown just as it came, so we shall have an opportunity of seeing whether any evil results from the few weed seeds it contains. In addition to the Russian wheat named we have sown patches of White Russian wheat obtained from Manitoba and also Red Fyfe wheat from the same Province, and samples of wheat from the Indian Reserves at Crooked Lake and Assiniboia, and also from the Red Deer River country which is about sixty miles north of Calgary; and small samples from the Peace River District. In this collection there are a great many interesting things indeed, and I hope a great many of the gentlemen present will be able to see the farm before leaving, so that they may form their own ideas of the work being done.

By Mr. Mallory:

Q. Will you be kind enough to say how you have treated the soil, and what proportion of manure did you use? A. The soil was manured with stable manure this spring. We had possession of one portion last fall and ploughed about twenty acres; but we did not get full possession until this spring. Most of that portion put under crop has been manured and well ploughed and harrowed. Some of the land was under cultivation last year by the tenants who occupied the farms, but I cannot say how much, and there are other portions which had not been cultivated until this spring. I think, however the grain will do well. The farm is not in such a state of preparation as we hope to have it in another year. We know that the public are

impatient for results, and we are doing our best to meet the wishes of the farming community.

By Mr. Livingston:

Q. Have you used any fertilizer? A. No; none but stable manure, because I did not think the land was in such a condition as would enable one to obtain satisfactory and accurate results.

By Mr. Mara:

Q. You spoke about farmers needing a change of seed; do you mean the farmers of Ontario or the North-West? A. In both Ontario and the North-West, also in Quebec.

By Mr. McMillan (Huron):

Q. Have you sown any other wheat on the farm from Ontario, to show what difference there is between our own and the imported? A. No, sir; we have not had enough land available this year and, therefore, have not sown any Ontario wheat; but we have the neighbouring fields alongside of us which will give sufficient opportunities for comparison.

Q. I should have thought that a very important thing to do. I know, as a farmer, whenever I get a fresh variety of grain I wish to see it growing alongside an Ontario variety. A. We thought it was better to sow other varieties, and watch and report upon them this year, as our land fit for the purpose was limited, and get our experience from our neighbours in regard to Ontario wheat, rather than to devote any considerable portion of our available area to that purpose.

By Mr. Mallory:

Q. Is the land prepared the same for these wheats as for the Ontario varieties by your neighbours? A. Mr. Booth is one of our next neighbours, and half of one of the fields which we have planted with Russian wheat is on the boundary line of the farm. It was occupied last year with a root crop. He has sown the other half of this field with spring wheat grown in Ontario. I may say that the farm, which comprises some 465 acres, was in the hands of some half a dozen different people, three of whom being tenants, hence the land is not in uniform condition. We hope, however, to get it in a reasonable state of uniformity this year before beginning a series of permanent experiments in grain culture and the growing of grasses.

By Mr. Sproule:

Q. You think that the Government from this farm might be able to distribute larger quantities of seed grain after it has been tested? A. That is what we had hoped; that from this 15 or 20 acres of Russian wheat we would have a great deal more to send out, if it was desired to do so. It is the wish of the Minister of Agriculture that we should test all these varieties of grain and raise a sufficient quantity on the farm for distribution in such a way as may be thought advisable hereafter.

By Mr. Innes:

Q. Distributed gratuitously? A. That will depend upon the Minister, and is a question for him to determine from year to year.

By Mr. Livingston:

Q. Of the gratuitous distribution of this year, I was not aware of it until a week ago last Saturday, and at that date it was impossible to give it a satisfactory test in my district. This fact ought to have been made known sooner and in time? A. In obtaining the Russian wheat referred to, it was intended primarily to meet a long felt want in the North-West Territories and Manitoba, where their wheat is frozen often. I wrote to each of the members in those districts, asking them to send me the names of a few farmers whom they thought would be able to test this variety of grain, as to its adaptability and earliness. We have responded promptly to every request as far as the stock would permit. There was not much to be gained in sending out samples of this wheat in Ontario and Quebec, except in the northern portions of those Provinces.

By Mr. Sproule:

Q. Have you tested other seeds, such as grasses? A. About thirty or forty varieties of grass seeds have been obtained from Northern Germany; but the land is not in a fit state to test them and may not be until another season.

By Mr. Davin:

Q. Have you obtained any information as to the growth of wheat in those parts of Russia devoid of trees, as our plains in the North-West? A. That part where this wheat comes from is mostly plains, but it is near wooded plains. The northern part of Russia is much more wooded than the central. That part as you go west and north from Riga is an immense plain, so I am told by those who have travelled over the country—very similar to our Canadian North-West. That is the steppe country.

Q. Is it within your information that this wheat ripens successfully there? A. It has been obtained from that district.

By Mr. Chisholm:

Q. In sending out these seeds I do not know what you may expect unless you have first tested them on the farm, so as to ascertain whether any noxious weeds are among them. Now, some of these seeds are very small, and in my opinion before they were sent out for distribution among the farmers, they ought to have been tried on the Experimental Farm, and the weeds being discovered, some remedy for them might have been found? A. I do not think there is any danger of sending out any more foreign seeds, for as soon as my attention was called to it, I remedied the difficulty.

By Mr. Wilson (Lennox):

Q. When I was out at the Experimental Farm a little while ago there were three persons going through the wheat and picking all foreign matter out? A. Yes, we adopted that plan.

By Mr. Sproule:

Q. You have a house prepared, or rather fitted up for the purpose of testing the sprouting quality of seeds? A. Yes, we are prepared to test anything that is sent in, as to its vitality and germinating power.

By Mr. McMillan (Huron):

Q. We found about two years ago we had one of the most promising crops of spring wheat that we had ever seen. I had 18 acres myself, and yet when that grain was harvested not a single bit of it was fit to take to the mill, although it turned out 17 bushels to the acre. One or two varieties were not, however, so much affected. I think it is of great importance that this wheat should be tested alongside of our own native wheat in order that we might know if any of these varieties would be affected in a similar manner? A. I only received instructions to import this Russian wheat, and to procure it in season; it had to be ordered last autumn, before we had a farm to sow it on. I had no instructions to order a large consignment of any other variety, but the Minister desired to have the wheat from northern Russia tested as thoroughly as possible. Wheat is one of those artificial products which has been perfected by man's genius, by selection and cross fertilizing, and it is constantly degenerating. If we would maintain the fertility of our wheat crop we must introduce new varieties and make selections from them of the most promising and endeavour to disseminate them. If farmers confine themselves to one or two varieties of wheat and continue to grow these from year to year without change of seed, and that is the way many farmers do, the average of wheat production in Canada will go down. I believe in Ontario the yield was, some years ago, from 20 to 22 bushels per acre on an average, and now it is down to 11, and there is not in my opinion sufficient reason to account for this in the deterioration of the soil. I think the soil has been fairly kept up within that period and a vast amount of virgin soil has been brought into grain raising by Ontario farmers.

By Mr. Mallory:

Q. I think new lands bring 22 bushels yet to the acre? A. Nevertheless 11 bushels is about the average. I saw last summer Sir John Lawes' experiments in wheat culture. I saw his 42nd crop of wheat on the same plot of ground without any manure having been used during the whole period, and it convinced me that deterioration of the soil does not occur as rapidly as we suppose. Although it will necessarily take place if you continue to grow the same crop without change;

I am satisfied that a large portion of the decrease is due to the lack of proper care in effecting changes of seed and introducing new varieties as the old ones run out. We all know that this happens in potatoes. Where are the old varieties that our fathers cultivated years ago? I do not know of one variety of forty years ago that is in general cultivation now. We should introduce new varieties from time to time, and that will be one of the objects of the Experimental Farm, and it may be of use to exchange seeds from one distant part of the Dominion to another.

By Mr. Trow:

Q. Will continual cropping have a tendency to deteriorate the soil? A. It will where cereals are grown for several years in succession. Rotation of crops is the proper thing to do.

Q. Does not certain grain take up certain ingredients out of a soil that another does not, and a change would produce better crops? I understand you to say that one individual has cropped land for forty years—is it not the same grain? A. Yes, the same grain, Sir John Lawe was the gentleman I referred to. He has been carrying on a set of experiments for 42 years on plots of about one-fifth of an acre each, feeding them with different manures and planting the same variety of grain year after year. In one plot he applied no manure, and while the wheat I saw was small in stature, he has had an average of 9 or 10 bushels to an acre for the last few years on the unmanured plot. The action of frost on the soil causes disintegration of the component parts and liberates plant food, which adds to the fertility of the soil to a greater extent than is generally supposed.

By Mr. Mallory:

Q. I should be sorry indeed if the impression should go out from this Committee that the mere change of seed would accomplish what we are aiming at. All of us who have anything to do with the clearing of new land, know perfectly well that with the seed we have, the ordinary wheat we sow in the Province of Ontario, a yield of from 25 to 30 bushels per acre is obtainable. We also know that old farms which have produced grain for some years do not give more than from 11 to 15 bushels per acre. There is of course the difference of season—one season is more favourable than another. We know, therefore, from actual experiments and our own experience, that new land gives large crops and the same land when it grows older will not raise anything like the same quantity of grain? A. I hope the gentlemen present will not misunderstand my statements. I merely said I believed that one of the most important elements was change of seed. I believe we want to keep up the fertility of the soil if a good succession of crops is to be obtained, but I also think that the importance of change of seed should not be lost sight of, as there is no doubt that the same variety of grain cultivated from year to year in the same locality will deterioriate.

By Mr. Trow:

Q. Are you experimenting with this Russian grain on the farm? A. Yes.

By Mr. Hesson:

Q. I think the Professor ought to give us some information respecting what it is intended to do with fruit trees? A. I shall be happy to do so.

By Mr. Baker:

Q. Before leaving this grain question I would like to ask if samples were sent to Okanagon, Kamloops and other districts of British Columbia, and also to Vancouver Island? A. I know that samples have gone to some of those districts. I could readily find out by reference to the books of the farm.

By Mr. Trow:

Q. Some twenty-five years ago the Canada Company brought out from Russia a large quantity of Russian grain. I remember that I purchased about $100 worth myself, and gave it to several parties. It proved, however, a total failure. In reality it turned to chess.

By Mr. Robertson (King's, P.E.I.):

Q. In reference to what Professor Saunders has said about the deterioration of wheat I wish to say I agree with him thoroughly. In Prince Edward Island, where I come from, we used to grow very good crops and were sowing the same variety

from year to year, and with diminishing crops; but during the last few years we have been importing seed from Ontario, and we find we can grow as good crops as in the years gone by. The first year we do not get the best crop, but the second year we do get splendid crops and after that it begins to deteriorate. We must change our seed every four or five years. That shows to my mind most conclusively that you must have a change of seed to secure good crops for any continuous length of time.

By Mr. Semple:

Q. Have you tried to do anything with reference to new varieties of oats? It is as important in my part of Ontario as wheat in some districts? A. We have obtained oats from different parts of Canada; some from the Maritime Provinces; some from Manitoba; some from the North-West Territories, and besides those we have obtained forty varieties from Germany. In this collection there are some from all parts of Europe, also from China, New Zealand, and Australia, besides a special number of varieties from Norway and Sweden, but these were got only in small quantities; not for distribution; we could not get enough for that purpose. These forty varieties will be tested and reported on at the end of the year, and it is hoped that among them will be found some varieties of sufficient promise to induce their importation in larger quantities. It will be easy to get a large quantity of that particular variety, but this subject this year must be one largely of experiment.

By Mr. Robertson (King's, P.E.I.):

Q. How many experimental farms have we in the Dominion? A. Only one; the Central Farm near Ottawa, is the only one established yet.

By Mr. Davin:

Q. What is the size of the staff? A. The staff is not all appointed yet. There will be a larger staff at the Central Farm than at the outlying stations, for the reason that the scientific problems connected with agriculture will be undertaken there. The analyses of fertilizers will be carried on at the central station, but not at the branches. In the same way the diseases in plants will be investigated; rot, mildew, rust, &c., will be experimented upon there.

By Mr. Innes:

Q. What will the scientific staff consist of? A. It will consist of a chemist, and I believe it is the intention to combine the entomological and botanical department in one for the present, but sooner or later they will have to be separated.

By Mr. Davin:

Q. I want to get at what will be the staff at the Central Farm and then what will be the staff at the Experimental Farms in Manitoba and the North-West Territories? A. On page ninety-eight of the special report made by me to the Minister of Agriculture on Experimental Farms, there is contained the recommendation made to the Government at the time. The Act establishing the farms was based partly on these recommendations and at page ninety-nine beginning with the words "Central station" I think Mr. Davin will find all the information he seeks. I may however say in brief that if the recommendations made there are fully carried out the staff at the Central Farm will consist of a director, a superintendent of horticulture, a superintendent of agriculture, a chemist, and a botanist and entomologist. That would make five heads of departments.

Q. For the Central Experimental Farm? A. Yes; in the outlying stations a superintendent of agriculture and a superintendent of horticulture is all that will be needed. One will take charge of the farm, the other attend to forestry and fruit.

Q. What staff will they employ? A. That will depend on the work there is to do. The men they would employ will be ordinary labourers; and the number would depend on the quantity of work to be done.

Q. I would like to get an idea as to how the farm will be run; what area will be cultivated in the outlying stations? A. It is impossible to answer a question like that for the reason that the requirements in each case may be so different. In the North-West Territories the branch farm will be located where tree culture will form an important part of the experiments. It might be determined to devote a large

area to the cultivation of trees, or it might be deemed more advantageous to devote the larger portion to stock raising and testing the various breeds of cattle.

By Mr. Innes:

Q. You cannot determine the size of these farms? A. No; as the farms have not been located and nothing has been determined. The Act provides that the farms in the Maritime Provinces and British Columbia are not to exceed 300 acres each and those in Manitoba and the North-West are not to occupy more than a section of land in each case, which limits them to 640 acres.

By Mr. Trow;

Q. Are you doing much on the Central Farm? A. Yes; I shall be very glad if any of the members of the Committee will come out and see what is being done.

By Mr. Davin:

Q. I desire to ask the Professor whether the object of these outlying stations will be to see how best stock can be raised, or trees or wheat cultivated; is it the intention to find out whether in the outlying stations cattle can best be raised or whether grain growing is better? A. It is desired to advance the interests of agriculture all over the country. The wants of each district will be considered and whatever in the opinion of the Minister will best advance the interests of agriculture in any particular Province will be undertaken.

The Committee then adjourned.

OTTAWA, THURSDAY, 2nd June, 1887.

The Committee met, Mr. WHITE (Renfrew) in the Chair.

Professor SAUNDERS recalled.

By the Chairman:

Q. I think, Mr. Saunders, some complaint was made at the last meeting of the Committee respecting the foul nature of the wheat distributed from the Experimental Farm. The Committee will be glad to hear anything you have to say on the subject? A. I desire to explain to the Committee, that I found on referring to the book in which the record is kept of every sample sent out, that there were six bags, containing three pounds each, sent out from a second consignment of Russian wheat which came from the London corn market, before it was discovered there were foul seeds in them. Only six bags went out in that manner out of nearly 1,100 which were distributed, all the rest was cleaned by sifting and hand picking. This wheat is small; not so plump as the first lot received from Riga. I found the weed seeds Dr. Mallory brought, identical with those in this second consignment of Russian wheat. So that I must admit having sent out 18 pounds of wheat, in all, with a certain small proportion of weed seeds in it. Three of these six bags were sent to different parts of Ontario and the other three went to the other Provinces. Two of the bags we know to have been hand picked before sowing and probably the others were. I imagine the injury to the country would not be as much as would accrue from a neglected fence corner on a badly managed farm. None of these seeds are winged seeds that would be distributed by the air; they are seeds that would drop on the ground and be easily eradicated.

Q. Here is one of the seeds; do you know what the nature of it is? A. It looks like a polygonum seed of the buckwheat family. All the other wheat sent has been hand picked very carefully. Very gratifying reports have been received from Manitoba of the appearance of the Russian wheats sent out from five or six different sources this last week. Farmers say it is exceedingly promising and shows a vigour much greater than Red Fyfe, or any other variety they have had in cultivation.

By Mr. Ste. Marie:

Q. I received some of the wheat for distribution and on looking at the sacks found some foul seeds in it. I had not time to pick it, but I have written to the men to whom I sent it to be careful and pick it? A. It has all been hand picked, and I do

not see how anything more than an occasional seed can have escaped the vigilance of the pickers.

Q. I was at the last meeting of the committee and heard what was said about foul seeds. I accordingly looked into the sacks. A. How many seeds did you find in the sacks?

Q. I did not count them, but the wheat was pretty dirty. A. We have had two men at work almost constantly cleaning the wheat; after sifting it is all picked over on a white cloth so that the men can easily see every foreign seed. It has all been hand picked since the early part of the season.

By Mr. Trow:

Q. What part of Russia was that wheat obtained from? A. The first consignment was obtained from north of Riga.

Q. What latitude is that? A. It is about 600 miles north of Ottawa. I have not yet learned the exact locality from which the second lot came, but expect to do so shortly. It was from one of the northern provinces of Russia and was purchased on the London market.

By Mr. Ste. Marie:

Q. This wheat (referring to the samples shown to the Committee) is far better than what I got. I got ten sacks altogether and it is very likely that some of it had not been picked? A. Every particle of the wheat has been picked during the last five or six weeks.

By Mr. Watson:

Q. Have you had this wheat tested by experts as to its quality? A. I have submitted it to two experts, who are of opinion that it would grade "No. 1 Hard." One of these gentlemen was a miller and the other a farmer in the North-West Territories. I have not submitted the second lot to experts as we did not expect to send it out.

Q. The sample I saw seemed to be a soft kind of wheat. The Agricultural Society of Portage la Prairie obtained from Ontario a sample of Azof wheat which gave good results as a whole, but it is not as hard as the Red Fyfe, but it was harder than the other samples of Russian which I have seen. The sample of Russian wheat appeared to be a wheat that would not grade more than "No. 3 Northern" according to the way wheat is graded in Manitoba? A. About 100 grains were cut in my presence and they showed that transparency which experts look for in "No. 1 Hard;" there was less than 15 per cent. of soft seed in it. Did you examine it in that way Mr. Watson?

Mr. WATSON—Yes. None of the grains appear to be as hard as the Red Fyfe, nor to have in them the hard amber appearance.

By Mr. Livingston:

Q. Have you kept a record of the different lots sent out, so that you will be able to ascertain where they do best? A. Yes, it is by keeping a record that I have been able to trace the six bags which were not cleaned. This system has been strictly followed except in some later instances where members of the House of Commons have asked for samples to be sent to them and have not forwarded the names of the farmers to whom they proposed to send it. In such cases the records contain only the names of the gentlemen to whom they were sent.

By Mr. Trow:

Q. What is the weight of this wheat? A. That I have not ascertained.

N.B.—Mr. Saunders subsequently reported to the Chairman that the Russian wheat of the first importation weighed 64½ pounds to the bushel; that of the second, 63 pounds.

Q. It does not appear to be over 54 or 55 pounds to the bushel? A. That I can ascertain and report to the Committee afterwards.

The CHAIRMAN—I think when Mr. Saunders was here the other day some gentlemen wished to ask him questions respecting fruit growing.

By Mr. Hesson:

Q. Yes, I would like to ask Mr. Saunders what he is doing in that direction. I think he was going to give us some idea of what the farm was doing both as to fruit and also as to shrubs and trees? A. We have obtained about 600 varieties of fruit trees, over 200 of which are hardy Russian sorts, the very hardiest to be found. Some of these have been imported direct and some obtained from nurseries and from other experimental stations in the United States which have imported from Russia, especially those in Iowa and the Territories adjacent to our North-West. In that way we have secured all the varieties obtainable of Russian apples, as well as some pears, plums and cherries, with the view of propagating them here so as to still further test them, besides which all the standard varieties of apples, pears, plums and cherries, which are likely to succeed here, have been secured. In the smaller fruits we have a vineyard planted with some 130 varieties of grapes and in raspberries, strawberries, currants and gooseberries we have almost every variety that could be obtained. I suppose we have about 200 in all of the different varieties of small fruits, but I cannot yet give the exact number.

By Mr. Trow:

Q. Is your investigation with regard to these northern fruits intended more for their cultivation in Manitoba and the North-West? A. Yes, Sir; the intention was n bringing them here to propagate them for the other stations.

Q. From your observations in Manitoba do you think you will get a fruit that will do well there? A. I do, Sir. Some of the varieties of fruits which we have obtained are from the Province of Kasan, where I am told the thermometer goes down occasionally to 50° below zero, and has gone as low as 55°. Manitoba can scarcely beat that. If these fruits stand that temperature I am sure they will endure any temperature to which they will be subjected in the North-West.

Q. Do you think it is the hard frost that kills the fruit in Manitoba? A. I think that has a great deal to do with it. I would hardly like to express a positive opinion without more experience, but I believe it to be so. I have seen many trees killed, to the snow line.

Mr. WATSON—In my observation I believe it is the sun in the spring which kills the fruit trees. Before the frost gets out of the ground the sap gets into the tree and the sun scorches the tree. Almost all the trees found withered it is the south side of the tree that the bark is blackened. It appears to me that the sun in the spring time is the cause of the whole trouble.

By Mr. Trow:

Q. Are there any nurseries in Manitoba? A. I cannot say. There are some in Minnesota; one or two not far from Minneapolis.

Q. Are there any in the north part of the State? A. Not that I know of. Some of the varieties of fruit trees on the Experimental Farm have been obtained from the neighbourhood of Minneapolis from one or two growers near Minnetonga Lake. In reply to Mr. Watson I may say that trees are often injured by the sun, but it is doubtful if this is the sole cause of the withering of the tree. There is a certain amount of sap left in the tree which will generally discolour on the south side where the sun strikes it, but it is a matter well worth experimenting upon whether such injury could not be prevented by placing a board or some kind of covering on the south side; that is one of the things which will be tested at the Manitoba station.

By Mr. McNeill:

Q. Is there any intention to propagate hardy quick growing forest trees? A. I have just submitted to the Chairman a list of the varieties which has been received. They are all planted now and growing on the Experimental Farm, and the intention is to propagate from them the hardiest varieties. We are also sowing a large number of tree seeds which have been obtained from the older countries of Europe with the view of raising young trees here and distributing them to the other stations, and also to other localities in the Dominion. I have a list here of more than 500 varieties

By the Chairman:

Q. Where did these trees come from? A. Many of the young trees have been brought from France. The seeds are obtained from various parts of the world, but the young trees were got from France, because this department of business is carried on there most extensively.

By Mr. Trow:

Q. What kind of trees are they? A. Chiefly young forest trees.

By Mr. Watson:

Q. Have you tested any of the native trees so as to compare them with these foreign trees? A. I have obtained tree seeds as far as I have been able to get them. From Manitoba has been got the Manitoba maple, one of the elms, and one of the pines from somewhere in the neighbourhood of Oak Lake and the mountains in that district. I am promised a number of varieties more for next year and shall be able to do more as soon as the branch farm is established there.

By Mr. Mallory:

Q. In what way was the land prepared for the planting of these trees? A. The land where the trees have been planted chiefly was in potatoes last year; it was ploughed and cultivated.

Q. Were any particular precautions taken in planting? A. No, I do not think so. Care was taken to plant the trees with the root downwards. We have had to do much of our planting with inexperienced men, and occasionally you would find one with the root uppermost. Fully nine-tenths of those planted are growing; they were planted with all the care we could give them.

By Mr. Hesson:

Q. I do not think a fair test will be at all possible until you get your farm established in the North-West. We have no difficulty in Ontario, except perhaps north of Renfrew, and the Central Farm can afford but a very poor test as to the possibilities of these trees. I suppose you are really procuring them with the view of sending them to the North-West and making the real test there? A. Yes.

By Mr. Mallory:

Q. For experiments in the North-West, bringing seeds to Ontario and getting them acclimatized here, seems to me hardly the best way to tell just exactly what we are going to do in the North-West Territories. It appears to me, that anything we desire to be of use to the North-West Territories or Manitoba, it would be better to take them up there at once, instead of acclimatizing them here where the winters are so different, and the tendency would be to weaken them? A. Dr. Mallory is no doubt correct in what he says, but at present we have no farm in Manitoba, and no means of testing them until the farm is established. In the meantime it was thought better to introduce them and endeavour to harden here a number of varieties that might be used in the other stations, in British Columbia and the Eastern Provinces, as well as Manitoba and the North-West Territories. It will be a useful experiment to have varieties which have been hardened in this climate tested as to their powers of endurance. At the same time, the line indicated by Dr. Mallory will be one of the first things to be pursued as soon as the farm is established in the North-West.

Mr. WATSON—If they can stand the climate in Ottawa there is no fear about them in Manitoba.

By Mr. Trow:

Q. I presume seeding took place in many places in Manitoba probably three weeks earlier than on the Central Farm? A. Yes, Sir. From reports received seeding began there as early as the first week in April and we did not begin operations here until the 2nd of May; the frost was not then quite out of the ground.

Q. There is a large variety of trees and shrubs that could be grown here which would naturally grow there? A. I should think so.

Q. With regard to fruit trees a matter of vital importance to us up west is in regard to the plum. A few years ago we had no difficulty in raising plums, now we find it impossible. Some little information might do us good as to what should be done with regard to what is called black knot. Is there anything to prevent it? A.

Black knot is a fungus disease and like the rust in wheat or oats there are certain seasons in which it prevails to an alarming extent. There has been no remedy discovered except cutting off the affected branches and burning them. It is a low fungoid form of growth and there is no likelihood of our discovering a remedy that will entirely prevent it. Some seasons in western Ontario we escape it almost entirely while in other seasons fruit growers suffered greatly from it. Generally speaking the affected branches of the plum tree can be removed, and if removed in the spring time before the germs from which the fungus is propagated mature (they generally mature in June or July,) the evil can be kept under, but if it is allowed to go on for a year or more the difficulty is very greatly increased owing to the multitude of spores which are in the air. They settle on the trees, strike into the wood and propagate there. When you have affected trees all about you it is very difficult to prevent your trees from attack.

Q. I have tried to prevent it by lopping off the branches but it seems to me that the whole trees in the community are affected? A. Probably your neighbours' trees may be affected more than your own. There is a law in Ontario by which people are compelled to cut off this black knot and destroy it. If that were more generally enforced I think the black knot could probably be kept under.

By Mr. Mallory:

Q. Do I understand you to say that the spores will float in the air and attach itself to the trees in that way? A. Yes, Sir, the spores are carried by the wind, and we know there are certain seasons when the spores germinate less readily than at other seasons. When the weather is less favourable they fail to accomplish the same amount of injury. It is largely due to seasonable conditions and over such there is no control.

By Mr. Hesson:

Q. Have you tested the remedy said to have been discovered by Mr. Harrison, a coloured man? I think he brought it before the Fruit Growers' Association on one occasion, and he was willing to give his information to the Association for a certain consideration; he did not like to give it away for nothing? A. I was present at that meeting, and I looked upon it as I look upon a good many suggestions of that character, as a species of quackery. I knew the history of the fungus and I do not see that any remedy applied to any one tree is going to prevent it attacking any other tree. I do not suppose that the coloured man knew half as much on the subject as two-thirds of those present did, and his proposition to reveal his secret for money was not entertained as we had no money for such purposes.

By Mr. McNeill:

Q. You say that the black knot originates in fungus growth? A. Yes; the life history of this fungus has been worked out thoroughly—every stage from the development of the spores to the maturity of the black knot itself. The information has all been published; it has two or three different forms at different stages of growth. But I suppose the Committee does not want me to go into the scientific aspect of this subject any further.

The Committee then adjourned.

MR. LOWE'S EVIDENCE.

STATISTICS OF IMMIGRATION—REFERRING TO DOMINION GENERALLY—IMMIGRATION AND MIGRATION TO NORTH-WEST AS TESTED CENSUS RETURNS.

OTTAWA, Tuesday, 7th June, 1887.

The Committee met, MR. WHITE (Renfrew) in the Chair.

MR. LOWE, Secretary of the Department and Acting Deputy Minister of Agriculture, called and examined.

By the Chairman:

Q. Will you be kind enough to tell the Committee the total number of immigrants arriving in Canada during 1886, distinguishing passengers from settlers? A.

The total number of immigrants arriving from all sources during the year 1886 was 122,581, of whom 22,782 came by way of the St. Lawrence, 51,473 by the Suspension Bridge, 6,100 by inland ports, 11,124 by Maritime Province ports, and 5,825 in British Columbia; 25,277 entered at Customs with settlers' goods free of duty. Of that number 69,152 were immigrants to Canada, the remainder being passengers by our route for the Western States.

Q. How do these total numbers compare with those of previous years, and at what ports did they enter? A. The settlers show a decline as compared with the four previous years, the figures being 69,152 as against 79,169 in 1885, 103,824 in 1884, 133,624 in 1883 and 112,458 in 1882. The settlers in 1886 who entered at the port of Quebec numbered 16,764, at the Suspension Bridge, 5,594, the greater part of the 51,473 entered at the Suspension Bridge being passengers for the Western States.

Q. What do you say is the number of settlers who came in by the Suspension Bridge? A. 5,594. At Halifax, N.S., the number was 5,361; at St. John, N.B, 1,710; at Montreal, from the ports of Boston and New York, also Portland, Maine, 2,454; Manitoba and the North-West, that is from beyond the sea, not taking in those from the old Provinces, 3,554, and British Columbia, 5,825. The return with Customs entries of settlers' goods was no less than 25,277, and these figures are an exact registration. The total number of settlers with effects reported in Manitoba and the North-West Territories during the year 1886 was 11,599.

Q. You say the total number with Customs entries of settlers' goods is how many? A. 25,277.

Q. How does that compare with previous years? A. It shows a decline. In 1885 the figures were 32,301, in 1884, 35,191, in 1883, 34,987 and in 1882, 30,554.

Q. What is the character of the immigration of 1886, and did those who came seeking for employment find it readily? A. It was on the whole very good and all immigrants who came to our immigration stations found employment. The proportion of the unsuitable was very small indeed; in fact the percentage of the whole would be insignificant, but it must be borne in mind in all large immigrations there will always be a certain proportion of the unsuitable; it simply cannot be avoided.

Q. What is the nature of the foreign immigration from the continent of Europe and what relation has such immigration to special colonies in Manitoba and the North-West? A. The foreign immigration during the year was of a colonizing character. For the most part it consisted of Germans, Scandinavians and Hungarians, and each of these nationalities have now established several settlements in Manitoba and the North-West Territories, which, on the whole, are highly flourishing and give promise of increase. It is a point which we have sought to attain in our immigration arrangements.

Q. Were any measures taken to influence or regulate the kinds of immigration as respects classes either of artizans or labourers? A. Instructions were sent by order of the Minister to the High Commissioner, to repress as far as possible, the classes of artizans and mechanics, and to induce simply agriculturists, tenant farmers or agricultural labourers. That information was very widely diffused, with the result that very few mechanics came. At Quebec we have an absolute registration and I find that there were there registered as mechanics 1,110 out of a registration of trades and callings of adults of 10,411. I think that that 1,110 would have come in obedience to calls from their trades and callings. At Halifax, where there is also a registration, the result is the same; there were only 200 mechanics out of nearly 4,000 adult trades and occupations registered.

Q. How about tenant farmers, Mr. Lowe; have you any encouraging information to give the Committee respecting the immigration of that class? A. I think we may hope for a very considerable immigration of tenant farmers here. Agricultural operations seem to be very much disturbed in the United Kingdom; the prospects, therefore, are favourable to immigration, but on the other hand, the accounts which have gone from Canada and have been published in the English papers have been conflicting; some of them have not been favourable.

Q. You gave the Committee in previous years statements of the numbers of immigrants and also of migrants from other Provinces who entered the Province of Manitoba and the North-West Territories. Do you still stand by those statements, or have the censuses which have been taken in the North-West and Manitoba led you in any way to modify your statements respecting the number of immigrants between the decennial census of 1881 and that taken in Manitoba last year? A. That, of course, Mr. Chairman, is a very wide question and covers very wide ground. As relates to the first part of it, that is as to the statements which I gave to the Committee during the several years from 1881 to 1886, with regard to the immigration into Manitoba and the North-West Territories, that, I have no doubt, they were substantially correct. Possibly they require to be modified to the extent that a very much larger number have subsequently left, but for causes which can be very clearly stated, and which have nothing in relation to them that is in the slightest degree doubtful. There yet remains, however, a very large residue of immigration, and also a very large percentage, a percentage which is very large indeed when compared, say with the State of Minnesota and some neighbouring States. To make my statement clear I had better recapitulate the figures, and it is also interesting to note the years in which there were large immigrations and those in which there were small. I gave the Committee a total of figures during the years mentioned of 166,403, of whom 22,001 entered in 1881, 58,751 in 1882, when the boom was at its height and culminated, and in 1883 42,772, when the boom to some extent had collapsed, but not in time to check the inward movement. In 1884 the number was 24,040, in 1885 7,240, and in 1886, 11,599. I should, however, point out that the census in 1881 was taken in April; therefore, according to our office figures, about 13,200 would have gone in previous to the census being taken, and these should be eliminated; and in 1886 the census was taken in August, for which we should eliminate about 7,072 of those who went in that year, making between the census years a total number of immigrants entered of 146,257. I should also point out that more than half of those immigrants were migrants from Old Canada. The total number from foreign countries altogether was 96,702, which would be the number for which we should have to account for (if we make any question of loss of population) very much smaller than they would be, including the migrants as well. Well, we find the combined total population of Manitoba and the North-West Territories in 1881 was 118,706, and the total immigration to be accounted for, as I gave it, was 146,257. If we then take the combined total population of Manitoba and the North-West in 1886 we find there has been a numerical increase of 78,258, which being subtracted from the immigration shows a discrepancy or loss of 67,999. But I think that a comparison would be best made by taking the circumscriptions of territory to which the census refers, and I find that there has been a confusion by mistaking the words of the census which included a very much larger extent of territory than was taken in the census of 1885. In the census of 1885 the three provisional districts of Assiniboia, Alberta and Saskatchewan were simply taken, and they gave a population of 23,344 whites, 4,848 half-breeds and 20,170 Indians, in all 48,362. That was against the population of 25,515 in these three districts, Alberta, Assiniboia and the Saskatchewan, in 1881. The outside districts are not included in the census of 1886, but they were taken in the census of 1881, and have been erroneously included, making an error in the gross figures of 30,931, these two figures combined making 56,446. The error consists in taking in the coasts of Labrador, the Peace River District and the District of Keewatin, which had no relation whatever to the three districts of which the census was taken in 1885.

By Mr. McNeill:

Q. What difference in the figures do you say that that makes? A. It makes an error of 30,931, an error of more than two to one of the population.

Q. You say there are nearly 31,000 erroneously included. Are those figures correct, Mr. Lowe? A. I take the census of 1881. That census gave the population of the North-West Territories at the figure which has been quoted, 56,445, but the census districts or circumscriptions from the letter G to M in the census volume

comprise Alberta, Saskatchewan and Assiniboia, of which a census was taken in 1885, with 25,515 population; while the letters N to Z comprise York Factory, Oxford House, Norway House and Cumberland, in the district of Keewatin; the Peace River district and the Labrador coast, which had a population of 30,931—or in all 56,446.

By Mr. Trow:

Q. That would consist of the Hudson Bay Company's employees? A. The Hudson Bay Company's employees and Indians. It was the population supposed to be in the whole of the Territories in 1881, and not that of the three provisional districts.

By the Chairman:

Q. Would not the easiest way be to take the population as shown in the three districts in 1881 and at the present time? A. Yes; it is better to take the figures of the actual circumscription in question, as the error has arisen from mistaking them. They are, however, plainly stated in the census.

Q. Will you give the Committee the figures of the population in Alberta, Assiniboia and Saskatchewan in 1881? A. The figures in those districts in 1881 were 25,515, as you will find in the census returns.

By Mr. Paterson (Brant):

Q. Indians, do you mean? A. That includes Indians also. The Indians were 20,115, and the half-breeds, which were not separated from the whites in 1881 (the correct designation being whites and half-breeds) were 5,400 in that portion of the territory.

By Mr. Trow:

Q. So there were no whites? A. Oh, yes, there were some whites, but their number was very small. The fewer whites then the better for the immigration returns since.

By Mr. Fisher:

Q. How do you separate the whites and the half-breeds? A. They cannot be separated in that year, and I should fancy those put down as whites in the three districts were mostly half-breeds classified in the census as whites.

By Mr. Trow:

Q. By my calculation you would only have 550 whites in those districts in 1881? A. The whites and half-breeds numbered 5,400, and I have no doubt the greater portion of these were half-breeds, but that will appear more clearly when we come to the separation of the population by the census of 1885, because the Indian and half-breed population in the North-West Territory is very nearly stationary. It has been for the most part a hunting population and not very largely addicted to agriculture. I come now to the census of those same circumscriptions in 1885 in the three provisional districts of Assiniboia, Alberta and Saskatchewan when there were 23,344 whites, 4,848 half-breeds, and 20,170 Indians. The Indians as shown by the census scarcely indicated any increase over the population of the same in 1881, and the half-breeds 4,848 being only about 1,000 over the same population there as against the figures of 1881.

Q. The total of that date would be 48,362? A. Yes; that is the figure. I think myself, looking at these figures, that there were about 1,000 whites in those districts at the time as against 4,440 half-breeds; I mean European whites.

By Mr. Burdett;

Q. Can you tell me how many are supposed to have gone in and settled? A. I have already given a detailed account of the number of those who have gone in and we have the losses to account for.

Q. How many are supposed to have left of those who went in there, deducting Indians, half-breeds and Hudson Bay employees? A. The increase on the combined population in 1881 as compared with 1886, that is taking the whole territory together with Labrador, Peace River and the District of Keewatin and the Mackenzie River District, is 78,258, against, as has been variously stated, 44,000 and 34,000; an error having clearly arisen from mistaking the circumscriptions of the census in 1885, as compared with the figures in the census volume of 1881.

Q You say the figures would be between 44,000 and 78,000? A. I state the increase of the popu ation of the combined territories is 78,258.

By Mr. Fisher:

Q. The actual increase? A. Yes, the actual increase as appears by comparison of the whole; but for the purpose of our immediate enquiry it would be more correct to take the actual circumscriptions with which we are dealing; that is the population in the Districts of Alberta, Assiniboia and Saskatchewan in 1881, and the population of the same in 1886.

By. Mr Burdett:

Q. I want to know how many immigrants went in that time? A. I will answer that, but to finish my statement in regard to these circumscriptions, the numerical increase as between the census of 1881 and 1886 is 76,481, or a very large, I may say an enormous percentage in five years of 87.14 per cent. In reply to the other question, the immigrants between the census periods was 146,257.

By Mr. Innes:

Q. In 1881 you give us the population as 25,515, and in 1885 as 48,362. How do you make this increase? A. That was for the three districts only. But to state the increase of Manitoba Province as well, as established by the census of 1885, and bringing the figures of the Territories down to 1886, I have added an estimate of the increase of population in the Territories, on a ratio of the Manitoba census of 1885.

Q. That is only an estimate? A. Yes; of one year for the three districts, the actual censuses of which were 48,362 in 1886, and 25,515 in 1881.

By Mr. Mallory:

Q. Then the increase is about 22,000? A. Yes; a little over in the three districts.

By Mr. Burdett:

Q. How many immigrants have gone into that country? A. If we consider the fact that the Indian and half-breed population is nearly stationary, and I answer that question by the light of the increases as shown by the censuses, the increase would show an immigration of 78,258.

By Mr. Mallory:

Q. Do you keep a record of those going in? A. As far as we can; I have always stated the figures are approximate.

By Mr. Burdett:

Q. What is the official report of those stated to have gone in? A. The official reports of the immigrants and migrants from the old Provinces between the census periods is 146,257.

By Mr. Fisher:

Q. Have you in your reports every year issued a statement of the number of immigrant settlers in the North-West? A. Yes; the figures being those I have read. They have reference to the immigrants entering Manitoba and the North-West.

Q. Will you give us the statement of the number of immigrants that are reported to have entered Manitoba and the Territories? A. The total number of immigrants entering Manitoba and the North-West Territories, between 1881 and 1886, inclusive, was 166,403, but eliminating those before the census of 1881 in that year, and those after the census of 1886 in that year, so as to give the figures between the censuses, I make 146,257.

By Mr. Kirk:

Q. Did this include those who went from the older Provinces? A. Yes; and as I have stated much more than half of the whole went from the older Provinces.

By Mr. Fisher:

Q. Is that merely an estimate, or is it from recorded figures? A. That is from the recorded figures yearly published in the Immigration Returns.

Q. You have not a statement of all who entered before taking the census in 1881, or after the census was taken in 1886? A. Yes, I gave all the figures; but there is the question of 13,200 which I stated I estimated entered before the census of 1881, from looking at the figures during that boom period.

Q. You have 13,200 for that class, but I think you said 6,000 was allowed for those who entered after August 1886—those figures are estimates? A. Yes; that is 6,900 or 7,072.

Q. That comes to 20,000? A. Yes, in round numbers; or as I put the figures, 20,159.

Q. You wish to subtract that from 166,403? A. Yes.

Q. Why? A. In order to get the actual figures of immigration and of migration between the two census periods.

Q. And thus your figure is 152,463? A. I made one estimate which would give that figure.

Q. Your figures scarcely total up properly? A. I made two sets of estimate as to the number to be eliminated to get the exact figures between the census periods.

Q. Are your figures correct? A. I think 146,257 may be taken as the correct figures, but there is the element of estimate I have stated. Any difference of this kind is not of a nature to affect the argument. We cannot come to any nearer point than that.

By Mr. Mallory:

Q. We are not here for argument? A. You may take the fact that the total immigration from abroad including migration from the older Provinces as recorded is 166,403, and that between the census periods 146,257 as nearly as can be stated.

By Mr. Fisher:

Q. But you say that 20,000 of those were between the census periods? A. Not between, but outside the census periods.

Q. Give us a statement of the number of people who were in Manitoba and the North-West at the dates of the two censuses? A. I can repeat those figures—I have them here. In the Province of Manitoba, according to the census of 1881, there were 59,187 whites and half-breeds. (The whites and half-breeds were not separated), and there were 6,767 Indians, making a total for the census of Manitoba in 1881 of 65,954. That is the census of Manitoba as published in 1881; but from these figures it is necessary to make a deduction for all subsequent comparisons as in the part of Manitoba which was awarded to Ontario there were enumerated in that 65,954, a total of 3,604 souls, of whom 1,538 were whites and half-breeds and 2,156 were Indians.

By Mr. Trow:

Q. Are you not astray in your figures. You say that there were 25,515 persons in the Territories, and 59,187 were whites in Manitoba and 6,767 were Indians? A. My last answer had reference to the Province of Manitoba, by the census of 1881.

By Mr. Fisher:

Q. Be kind enough to give us the population in the three Territories and Manitoba in 1886? A. The census of Manitoba in 1885 was 108,640, of whom 95,080 were whites, 7,985 were half-breeds and 5,575 were Indians.

By the Chairman:

Q. The Indians were reduced in number? A. They may move about, but they are a nearly stationary population as respects natural increase. The census of the Territories in 1885 gave a population of 48,362, of whom 23,344 were whites, 4,848 were half-breeds and 20,170 were Indians. But we have to deal with the year 1886.

By Mr. Fisher:

Q. You have no statement of the year 1886? A. We have the census of 1886 in Manitoba.

By Mr. Mallory:

Q. The figures for 1886 are simply an estimate? A. Not simply that. We have a census of the three districts of the Territories in question in 1885, and only one year is estimated at the ratio of the census of Manitoba for five years which is 75 per cent. for the whole of that period. I think that is rather under than over the mark in view of the known policy and practice of settling immigrants along the line of the westerly portion of the Canadian Pacific Railway.

Q. You have given, you say, the figures of your Department, of those who have actually gone in? A. Yes, and also those of the census.

Q. Have you the figures of, or has the Department any knowledge of the number who actually went in since the taking of the census? A. The census of Manitoba was taken in August, 1886. The figures of those who went in for 1886 was 11,599.

By Mr. Fisher:

Q. You are counting those? A. No, not all.

By Mr. Baker:

Q. You say the increase in Manitoba for the five years was 75 per cent.? A. Yes, for the five years, and that would make 15 per cent. for one year for the purpose of the estimate I made.

By Mr. Fisher:

Q. What figure do you make that 15 per cent.? A. 7,254.

Q. You wish to add that to the number of people in the Territories? A. Yes, to get at the population in 1886.

By Mr. Burdett:

Q. How many of those 11,594 immigrants of last year went into the Territories and how many into Manitoba? A. I have no means of knowing with precision, but I have stated reasons why I believe the greater part of them went west on the line of the Canadian Pacific Railway.

By Mr. Fisher:

Q. Then not allowing for any natural increase there are 69,922 less than there should be? A. Yes, about that, nearly 70,000. With respect to natural increase there are a great many fanciful statements made. It is simply absurd, as has been done, to talk about two per cent. per annum as the natural increase of population such as that of the North-West.

Q. We understand that the natural increase would not be as large as in the older countries, as in the North-West there are a great many more men than women? A. Yes, the disproportion of women to men in the North-West is very considerable, and it must also be considered that Indians and half-breeds made the bulk of the population in 1881. And as respects the population which has since gone in, it must be considered that it has consisted largely of explorers, railway navvies and single men, many of them speculators; the whole of whom would not give much natural increase.

By Mr. Burdett:

Q. Have you counted the navvies in 1886? A. In 1886 they had for the most part left, but they were originally counted as immigrants. It may be fairly estimated that the whole of this class, within the period mentioned, numbered 40,000.

Q. How do you account for the loss of more than half your immigrants and all the natural increase and giving you the full benefit of your approximate estimate of 1886? A. I have already explained that I do not think there is any natural increase to account for, and certainly none that would offset removals to other parts of the Dominion. Of the numbers of immigrants also, which were given, it must not be forgotten that much more than half of the whole were migrants from the old Provinces, who if they did not stay in the North-West, would not be lost to the Dominion.

Q. Surely the population could not have left the country in such numbers without you being able to give some reason for it? A. I certainly have very definite reasons in reference to it. In the first place, the population began to go down with the collapse of the boom. That culminated in the year 1882 and it caused a feverish immigration. According to our returns, there was a perfect rush of immigrants to Manitoba and the North-West during the year 1882, the immigrants showing the unprecedented figures of 58,751. They consisted of persons who went in for all kinds of purposes—for purposes of speculation, and for the purpose of building up communities and cities which it was supposed would arise during that time of excitement.

By Mr. Innes:

Q. You did not take all of them as settlers? A. Not all of those who went in, but the number given was 58,751 out of the 70,532 who went in.

By Mr. Trow:

Q. In taking those statistics, you are governed in great measure by your agents. Did they not also give you the returns for Manitoba during that year? A. Yes; we give figures furnished by the agents—the net figures after deductions. The total was 70,532, making 11,781, who simply went as visitors. The years of the greatest activity in railway building in the North-West were from 1881 to 1884, and we counted the people who went in for the purpose of railway building as immigrants, as I explained before to this Committee. There were special parties of 10,000 each. After 1884 the railway had got into the mountains, and large numbers of persons followed its construction into British Columbia. Therefore, when you come to take the disappointment in speculation on account of the collapse of the boom of 1882, and the return of those navvies, who either went away, or went through to the mountains to build the railway in British Columbia, there is sufficient to account for the loss. It must also be borne in mind that in 1883 there came the first year of the early frosts. It was very discouraging for many settlers, and there was a good deal of wheat frozen. The same thing happened in the following year—the two years came together. But it is to be observed that during those two years there were still large quantities of wheat which ripened, and all wheat that was put in immediately after the winter went away, in the very early spring, did ripen well; while that which was sown by the settlers all the way on during the month of May and into the beginning of June, was caught. I think there is a question here of the very greatest importance in relation, not only to the settling of the country, but, also, to the growing of wheat in the North-West. I feel perfectly sure, from facts within my own knowledge, and from the statements made by Mr. Watson, a member of the House, that there was not necessarily any wheat frozen during those two years, and that if wheat is put in at the proper time, or had been put in at the proper time, during those two years, none of it would have been frozen, as was proved by the actual fact that large quantities were not frozen.

Q. Do you think there is any error on the part of your agents—that they colour the reports in order to show a large business, and that the discrepancy may be accounted for in this way, in a large measure? A. I do not think so, and for one reason, that the figures given are not large for the known very active movement of population in the years named.

By Mr. McNeill:

Q. You said that some of those people who were entered as navvies had gone through to British Columbia? A. I said that numbers of them had gone on with the railway work as it extended into British Columbia. I myself went into British Columbia over the mountains, on a Canadian Pacific Railway train, when the road was building in 1884, and I saw there thousands of people who had gone in, following the construction of the road westward.

By Mr. Innes:

Q. Do you think there would be as many as 40,000 of those people? A. I do not think that less than 40,000 men could have been employed in those six years. I reported to this Committee a single party of 10,000 at one time.

By Mr. Trow:

Q They have left you altogether? A. That I cannot tell, but I have no doubt that very large numbers of them have done so.

By Mr. McNeill.

Q. Have you any reason to believe that other immigrants, besides navvies, immigrated into British Columbia? A. I was also going to say to complete my answer, that I have no doubt that a very considerable number of English immigrants who went in, sons of gentlemen farmers and sons of gentlemen, were not of a class best adopted to succeed very well as pioneers. Then the two years of early frosts were very discouraging to many of these. They had put in their wheat crops late, and many of them were caught by the frost. I remember, in going through over the plains to the Columbia River in November, 1884, which was the point to which the

railway was then constructed—that, I saw many acres of wheat standing on the plains uncut, which implied errors in farming and loss.

By Mr. Baker:

Q. But did they actually go into British Columbia, or did they go back to Great Britain? A. I have no doubt that numbers of the immigrants went into British Columbia with the construction of the railway. I am inclined to think, from the best information I can gather, that it will be found there has been a very considerable accession to the population of British Columbia in the five years.

By Mr. Fisher:

Q. I understand you as attributing this discrepancy to the boom, and to the fact that a great number of people went into Manitoba at the time of the boom, who, afterwards, when the boom collapsed, left? A. Yes, that I gave as one of the causes, and I think most of those were from the older Provinces. Out of all those who went in, 114,613 were from the old Provinces of Canada, and 96,702 were from abroad. or more than half were Canadians. I think this fact is important to bear in mind in considering this question in relation to the whole Dominion. There is no proof from these figures of any actual loss of immigrants.

Q. You say that all those went in in what years? A. From 1881 to 1886, inclusive. The yearly accounts published showed that 114,613 who went in were from the old Provinces against 96,702 from abroad.

Q. That is more than half Canadians? A. Yes.

Q. Then I understand another reason you give is, that a large number of these immigrants were navvies, who went to work on the railway, and that after the railway was constructed, they left? A. Yes.

Q. I would like to draw your attention to the fact that when this statement was made to the Committee it was pointed out that these navvies were only transient immigrants, but it was then claimed that these navvies, on finishing their railway work, would settle in the country. This prediction seems not to have been fulfilled? A. So far as the prophecy is concerned, we may have expected that more would stay in the country, but the circumstances were unfavourable; and so far as the accuracy of the then definition was concerned, I think it was correct. They were properly styled immigrants, and would have been so styled in the immigration returns of any country. There are immigration and emigration.

Q. As a matter of fact, the great majority of those people who went in at that time, in consequence of the boom, must have been merely speculators? A. Yes; and of people who expected to find a state of things which did not continue—people of all kinds, who went in under great excitement. But you will allow me to recall a fact, within my own experience, in connection with this subject. I will show that this is only history repeating itself from the western United States. I happened to be one of a party, in 1866, composed of members of the then Legislature of old Canada and members of the press, who were invited to visit the great State of Illinois, after the collapse of a boom similar to that of Manitoba, when a question arose as to whether that State was really settleable, if I may so speak. I went with a report in my hand of Mr. Caird, the eminent English agricultural writer, who had been sent out by the great English railway interests to report whether or not that State was really then suitable for successful settlement, and whether their money was entirely lost or not, and I remember most distinctly that Mr. Caird did report in his book that investors, especially in Illinois Central stock, might look for very good returns for their investments in the future, for the reason that the lands were valuable and cultivable. My visit convinced me of the truth of this, and that from the view of many homesteads which had been then abandoned in Illinois, in the same way that some have been in Manitoba and the North-West. The object of the invitation was to show that notwithstanding the discouragements of the time, the land was good.

By Mr. Burdett:

Q. I understand you to say that the navvies and boomers who went in there were not enumerated as immigrants? A. Oh, yes they were.

Q. Then you deliberately enumerated them as navvies? A. I stated to this Committee that they were navvies, and classed as immigrants.

By Mr. McMillan (Huron):

Q. Do you not think that a certain number who left the country went into the Territory of Dakota? A. I have no doubt that some have done so. I cannot tell how many.

By Mr. Trow:

Q. Have you reason to believe that your agents duplicated the numbers? Could not a man have been counted half a dozen times during the season? A. I do not think so. But, in continuation of the answer to the question as to whether or not numbers have not left Canadian territory to go to the United States, I answer that by saying that while I have no doubt that some did so, this question may also be looked at by the light of the ratio of increase. If we take the adjoining State of Minnesota, with its large immigration, the figures of the United States census give a numerical increase for that State between the years 1870 and 1880 of 341,000, or 77 per cent. That is almost the precise percentage of increase for the Province of Manitoba for the five years, the increase in Manitoba being nearly two to one greater. The State of Minnesota is a prosperous western State, with a large area of lands now being opened up, and when we take the combined populations of California, Dakota, Kansas, Minnesota and Illinois, these States, according to the census, show an increase between those decennial periods of over a million, or only 53 per cent. in the ten years. The increase in Manitoba and the North-West has been not very far from three to one, as compared with the population of all those prosperous States.

By Mr. Paterson (Brant):

Q. I think it is the strangest argument to make use of before business men—this argument of the ratio of increase. We will suppose that in 1881 there were 1,000 white people in the North-West Territories. Since that 3,000 people have gone in. That would show an increase of 300 per cent. It sounds very large, but there were only 3,000 additional settlers secured. But we will take another State, with a population of 300 000. That State has an increase 100,000 in the same time, but it can only show a percentage of increase of 33⅓. What we want to know is, how many souls have gone in—what the increase of population is? If you have only 10 people in a place, and you receive an accession of 100, the ratio of increase is 1,000 per cent. on a numerical increase of only 100. This return of 166,032, which is reported to us as the number of *bonâ fide* settlers who went into Manitoba and the North-West Territories from 1881 to 1886 is, after taking into calculation, as I understand it, the number who went out. Year after year, as they have gone out, they have been deducted from the gross figure, and the 166,000 remain as those who stayed in the country. It won't do at this time of day to talk about the navvies and say that you cannot consider them as lost. The old members here will remember that at the time when we were expending half a million a year for immigration, we were pointed to this great immigration, and when we alluded to the fact that they were only navvies we were met with the statement, "Oh no, they are actual settlers," and the Department took all the glory for these fictitious figures, for fictitious they must have been, if nothing worse. But now, forsooth, when the census comes in, and we declare that those figures are fraudulent, they say, "Oh, well, you must not include these in the increase; they were only navvies." Let us continue this in the same line as we did before. We spent the money in 1882, and we took the glory of all this immigration; we are not going now to quietly wipe that all out. We will continue in the same line, and treat these as so many settlers who have actually gone in. Now, taking Mr. Lowe's own view of the case, there is a sum of 59,000 people who actually went in there who have gone out. We have lost these, and all the natural increase besides. As I understand it, these 166,032 souls that are reported by the Department of Agriculture as having settled in Manitoba and the North-West, are found after deducting the outgoing ones. There is still reported those 166,032 as the balance remaining after a certain number had left?

A. I answer the question that in relation to the unfairness of making the ratios of increase, that I have not given the ratios of increase in the earlier stages of population, when they would have shown something like 500 per cent. But I think that in relation to the settled Province of Manitoba, where the figures of population range between 100,000 and 60,000, that the ratio of increase of a settled community of this extent—75 per cent. in five years—is at least, not only fair to state, but it proves a very extraordinary increase. As respects the natural increase in those western portions of the country being estimated at 2 per cent. per annum, I would say that this is absurd. The population of the Province of Victoria (Australia) with its immigration only increased 15·38 in nine and a quarter years, and the population of the great State of New York only 15·09 in the last decenniad, and 12.09 in the preceding period with the large immigration which it received. In so far as the North-West is concerned, its large aboriginal population is nearly stationary; that of the whole Dominion in 1871 was 102,000, and in 1881 it was only 108,000. That is an increase of 6,000 on 100,000 during the ten years. I have already explained with regard to Manitoba and the North West, that the largest part of all of those who went in were single men, and white males in the Territories as well as in Manitoba, have been far in excess of the females. The number of families following agricultural pursuits in that whole country has been very small indeed. Then the numbers given in the returns as having left the country to make the balance of 166,403, were never in any manner treated as immigrants, but only as passengers; and it has also been shown in every yearly report that much more than half of the 166,403 were migrants from the older portions, and there is no evidence whatever to justify the statement that they have been lost to Canada.

Q. The point I want to get at is, if I am correct in understanding these 166,0 2 as being the net settlers there, after deducting what went out? A. After deducting those understood to be simply passengers, yes, as referring to the reports in each year. But the reference in this contention is to those who went in between the two censuses namely, 146,257.

By Mr. M·Neill:

Q. In the first place, I understood you that when these navvies were counted, it was understood that they were navvies? A. Yes, distinctly. There was one special party respecting which we had a discussion; that was a party of 10,000 that went in at one time. I stated that they were counted as immigrants

Q. I want you to be good enough to tell me if you have any idea how navvies were includable in the bulk sum of the original figures you gave; not in the 166,000, but in the original figures? A. They were a portion of those figures.

Q. Have you any idea how many went in at all? A. My understanding has been that as many as 40,000.

Q. It is very important to ascertain as to the accuracy or inaccuracy of the figures. Now, if there are 40,000 navvies to be subtracted from the 70,000 who went westward, that leaves only 30,000 to be accounted for. I want to understand from what figure it is that this 70,000 has to be subtracted? A. It is to be subtracted from the figures of 146,257.

By Mr. Fisher:

Q. And Mr. Lowe's immigration estimate gives 146,000? A. Yes, a little more, as I before explained.

By Mr. Burdett:

Q. Upon what ground can you calculate that 40,000 navvies went into the North-West? A. From my understanding of the figures of immigration in the Department.

By the Chairman:

Q. I understand Mr. Lowe to account for the discrepancy between the alleged immigration from 1881 to 1886 inclusive, and the returns as shown by the census of 1885–86 in the Territories and Manitoba, partly from the emigration from that country of railway navvies who were employed on the construction of the road, to

the extent of about 40,000, and partly by the fact that there were two or three years of unusual frost? A. Yes, and by those who left after the collapse of the boom. Those who went in with very excited imaginations afterwards left.

By Mr. McNeill:

Q. Did I understand you to say that with regard to those frosts, the damage to the grain might have been avoided in those years? A. Yes, my statement was that in those two years in which the damage from frosts took place, the crops which were put in early escaped, and a good quality of No. 1 Hard grain was obtained. I can state one fact within my own knowledge. In one of those years a farmer from Ontario put in a very considerable portion of his crop before the winter had fairly left, and some very severe frosty weather came after he put it in. But he had the grain from that crop in the elevator in August, long before the early frost came. He put in another part of his crop in the self same manner, on the same ground, only later in the season, and the crop all went to nothing.

By Mr. Paterson (Brant):

Q. Have you any reason to think that the railway monopoly up there had anything to do with retarding settlement? A. That is a question on which I would hardly like to express an opinion.

By Mr. Mallory:

Q. Have any reports been made to your Department regarding this matter? A. We are quite aware that there has been a very considerable amount of adverse feeling on the subject.

By Mr. Trow:

Q. Do you think that the refusal of the Government to grant the second homestead privilege was a bar to successful settlement in that country? What I mean to infer is this: that during the boom hundreds of old settlers sold out, to my knowledge, and the Government having refused them the second homestead privilege, they crossed the line to take homesteads in Dakota and Minnesota? A. That is true, to some extent. I have heard of cases of disappointment in consequence of that refusal.

By Mr. Mallory:

Q. Was the dissatisfaction in regard to those two particular matters very considerable, or was it small? A. I cannot tell the extent of it, though I should fancy that with regard to the homesteads there was some feeling and some anger shown.

By Mr. Watson:

Q. Do you think there was any complaint with regard to the change by the Government of the area of homesteads from 160 acres to 80 acres? A. I have not heard any very special complaints with regard to that. On the contrary, some English immigrationists think it would be advisable to have smaller homesteads.

By Mr. Mallory:

Q. From whom—from the settlers? From those who would take up land? A. I have no special information on that point.

By Mr. Watson:

Q. But I am talking about general information. Do you think it affected the settlement of the country? A. When people do not get what they want there is generally disappointment, and that does not promote settlement.

By Mr. Mallory:

Q. Is it a fact that they would rather have 160 acres than 80? A. Of course, many would. But we have no definite information on that head.

Q. But have you any general complaints? A. I hesitate somewhat to embody complaints in the terms general. We have no formal complaints.

By Mr. McNeill:

Q. There has been a good deal of talk about those who have left the territory; has there been any immigration from any of the United States into the North-West? A. There has no doubt been a very considerable immigration from the United States into the North-West, and that is proved by the returns at the Custom house. Extent of

population has much to do with the question of numbers attracted. We have more United States citizens per thousand of population in Canada, than there are Canadians per thousand of population in the United States.

By Mr. Mallory:

Q. According to the returns, 11,599 people went into the North-West during the year 1886? A. Yes.

Q. What proportion of these are foreign, and what are Canadians? A. There were 5,812 from Europe; 6,177 from the old Provinces of Canada, and 3,544 from the United States.

Q. Then, have you any figures showing how many went out during 1886? A. Our returns show that 3,944 of the figures I have given were passengers, leaving the net result of 11,599, as I have stated.

By Mr. Innes:

Q. Were these actual settlers? A. They were reported to the Department as such.

Q. They were supposed to be actual settlers? A. Yes.

By Mr. Mallory:

Q. Are those figures based upon calculation, or upon the returns as given by the immigration agents? A. Those who went in are based on a record of count, those who went out as passengers were estimated. We have always given these figures as approximate.

By Mr. Fisher:

Q. Are not they given you by the Custom house officers? A. Not these figures. We have returns from the Custom houses.

Q. In what way do you get your immigration returns except from your agents? A. We get the immigration returns from the agents—the reports at Quebec, and Halifax, from registration; the others from count.

Q. But in the North-West? A. From the agents' reports.

Q. The numbers of those going in and those going out are got for you by the same people? A. Yes.

Q. And the one is as likely to be as accurate as the other? A. Yes, but the former are more certain than the latter. I repeat that I have uniformly stated these figures are approximate.

By Mr. Innes:

Q. This registration of people going out is made at Winnipeg, and at what other points? A. The count is made at Emerson, Port Arthur, and at Gretna.

By Mr. Baker:

Q. You spoke once of the immigration into the western Provinces, and again you qualify it by saying Manitoba and the North-West Territories. Now do those figures speak for the immigration into the whole of the western Provinces, including British Columbia? A. Yes, and now more so than before, Manitoba being the gate.

Q. It includes British Columbia? A. Yes, but not the immigration into British Columbia from beyond the sea.

Q. But that which went in that direction, by that particular stream? A. Yes.

Q. Of that net number, 11,599, how many may we fairly assume went by that particular method into British Columbia in 1886? A. I have no means of making an approximate estimate on that point. But many were included.

By Mr. McNeill:

Q. How do you arrive at the conclusion that men coming over from the United States into our territory are coming as immigrants? A. It is ascertained by the agents. I do not think, I repeat, the information can be ascertained with more than approximate accuracy. The immigration agents at Port Arthur, Gretna, Emerson, and also at Winnipeg are in constant contact with those people, and they make daily records of such as they understand to be immigrants, and the returns are based upon that.

Q. How many, do you say, have come in from the United States in 1886? A. 3,554, but I cannot say how many of those may have been included in the 3,944 who

are alleged to have gone out. So that I have no means of finding the net immigration as regards nationalities.

By Mr. Burdett:

Q. I would like to have information as to how many of white people there were in Manitoba and the North-West in 1881, and how many white people there were when the census was taken in 1886, and how many immigrants, according to the records of the Department, went in between those two dates? A. I have already explained those figures in my previous answers. I stated, that in the census of 1881 the whites and half-breeds were taken together, while in the census of 1886 they were separated, that is, there was an exact separated enumeration in 1886. In the Province of Manitoba in 1881 there were 59,187 whites and half-breeds and 6,767 Indians, makig a total of 65,954, while in the Territories there were whites and half-breeds in the three provisional districts in 1881, by the census, 5,440 whites and half-breeds and 20,115 Indians, making a total of 25,515 persons.

By Mr. Fisher:

Q. Now give us 1885 and 1886? A. In 1886 in Manitoba there were 95,080 whites, 7,935 Half-Breeds and 5,575 Indians, making a total of 108,640, but if a comparison is to be made between these two sets of figures, you must eliminate 3,694 enumerated in that portion of the territory in Manitoba afterwards awarded to Ontario, and which was enumerated in the census of 1881.

Q. Now give us the Territories? A. The total population of the three provisional districts in 1885 was 48,362, comprised of 23,344 whites, 4,848 half-breeds and 20,170 Indians.

Q. You add to that 15 per cent.? A. Yes, to get the population in 1886; that is the ratio per annum for the five years in Manitoba.

By Mr. Mallory:

Q. How many of those 11,599 immigrants who went into Manitoba last year remained in that Province? A. I have no figures, but from my knowledge of the nature of the settlement I think the great bulk of them went along the railway westward.

Q. Have you obtained the number of homesteads granted? A. That is not in our Department. It can be obtained from the Department of the Interior.

Q. You cannot tell how many have gone into British Columbia? A. No; not of that number from the North-West.

By Mr. Davin:

Q. Do you think it would have had a beneficial effect to have allowed the family of the settler to do the work on the homestead while the settler worked elsewhere? A. That refers to a matter of policy in another Department, and I do not like to express an opinion; but as a general question there can be no doubt that in the proportion you give facilities you will have call, but perhaps not with the same degree as respects satisfactory settlers; it is a question of policy.

By Mr. Baker:

Q. In arriving at the total of the population of the Provinces, I notice in Manitoba and the Territories you include the Indian population. Did you do so in British Columbia? A. It is always included in the census, but it is nearly a stationary population.

By Mr. McNeill:

Q. Did I understand you to say that a considerable number of those who have disappeared from Manitoba and the North-West Territories have gone to British Columbia? A. Yes, and into other adjoining territories and Provinces.

By Mr. Baker:

Q. Have you any means of knowing whether the Indian population in British Columbia is on the increase or decrease? A. I have no information which would enable me to answer you with precision, and I could merely give you an opinion. I think the Indians of the Province of British Columbia are generally well off and well to do, and you may look for a natural increase under such conditions. This fact appears to be true with regard to Indians and to all hunting populations, that in

proportion to the supply of food over a series of years, you have an increase or decrease in the population more or less great. I should also say that these conditions may be very greatly affected by the breaking out of endemic diseases.

Q. The reason I ask was because it has been said that the Indian population of British Columbia has been decreasing? A. I cannot speak definitely on that matter.

By Mr. Fisher:

Q. In your statement about the white population in 1886, I understood you to say that there are 3,694 in Ontario now who were enumerated in Manitoba in the census of 1881? A. Yes.

Q. It ought then to be subtracted from the number in Manitoba in 1881? A. Yes.

By Mr. Burdett:

Q. What does the Department show was the immigration into Manitoba between the taking of the two censuses? A. I have given that very fully—it is about 146,257.

By the Chairman:

Q. There is one more question which will complete the series of questions on that branch of the subject; it is, have you any information respecting the prospects of immigration to Manitoba and the North-West? A. I think we may fairly expect a large immigration into Manitoba and the North-West Territories provided no checks arise. The information which has been received respecting immigation into Manitoba and the North-West Territories shows that not only in the United Kingdom but on the Continent of Europe there has been a very large distribution of information which is leading to much enquiry and correspondence, and it is the fact of these inquiries and this correspondence which leads me to believe that if there is no check in the immediate future we may expect a very large immigration.

By Mr. Innes:

Q. How has it been so far this season? A. It has been very good.

By Mr. Watson:

Q. What do you mean by a check? A. Anything. Trouble or bad reports going out, political or other.

Q. I do not think that the prospects were ever brighter in that country than they are to day? A. I think, for instance, that the very bad and exaggerated accounts of the rebellion in the Old Country had a depressing effect, and the year 1885 was one of the worst years that could have been selected for taking the census by those who desired to find a large population.

By Mr. Baker:

Q. Your statement is that prospects are good for immigration into the North-West? A. Yes, based on the enquiries that have been made through the agents of the Department.

Q. Do you in that expectation include British Columbia? A. Yes. And so far as information from the Deprtament is concerned I think we have issued more publications respecting British Columbia than any other Province.

The Committee then adjourned.

MR. LOWE'S EVIDENCE.

(Continued.)

THE COST OF IMMIGRATION AND MEANS TAKEN TO PROMOTE IT—PUBLICATIONS—ASSISTED PASSAGES, &C.

OTTAWA, 14th June, 1887.

Committee met at 10.30 a.m. Mr. WHITE (Renfrew) in the Chair.

Mr. JOHN LOWE, Acting Deputy Minister of Agriculture, was recalled.

By the Chairman:

Q. When Mr. Lowe was present at the last meeting of the Committee we had got pretty well through with his examination respecting immigation; but there is another branch of the subject, and that is with relation to the cost of

this service. I desire, therefore, to ask this question: Can you state the total cost of immigration during the year 1886, also during the fiscal year, and how does this compare with previous years? A. The total cost of immigration for all services during the calendar year, 1886, was $301,704. For the fiscal year the amount was $257,354. As compared with the previous calendar year the amount was $310,271, and for the fiscal year it was $423,860. I may observe that although these figures are apparently different, they are yet composed of the same items, the apparent difference arising from larger amounts being paid in one-half of the calendar year than the other.

Q. What are the principal heads of expenditure during the year? A. There were expended for Canadian agencies, that is, for supporting all establishments in Canada, the sum of $65,675. The total cost of the London office was $61,225. This is for the calendar year. The general expenditure for printing, transportation and all the other expenses for immigration, was $173,804, making the total which I have just given.

Q. Do the agents in the United Kingdom render any other services besides simply promoting immigration to Canada? A. Yes; the agents in the United Kingdom are instructed to act as commercial agents, and they do generally the same kind of service for the country that the consular service of the United States does, and the consular agents for other countries do. Some of the services which have been rendered by the immigration agents in their capacity as commercial agents, have been very valuable. I may mention one fact, which I have also given to the Committee in previous years, that is, that the cattle trade, not only between Canada and the United Kingdom, but that also of the United States, was first set in motion by the Liverpool agent of the Department.

Q. What was the *per capita* cost of immigrants in 1886, and how does it compare with previous years? A. The *per capita* cost in the year 1886, that is, in the calendar year, was $4.36 as against $3.92 for the previous year.

Q. What amount and what proportion of the vote was expended for assisted passages? A. The total amount expended for assisted passages during the calendar year was $29,002, of which about one third of that may be stated to have been for commissions. That is a sort of salary which is paid to people who work for the Department. The net amount paid during the calendar year for assisted passages was $19,355 only. If we take, however, the Auditor General's report, I find, for the fiscal year, that the figures are still smaller, that is, the total amount paid for this service during the year, according to the Auditor General's report, was $15,438, of which the proportion I have stated before is for commissions, that is, $5,146, leaving only a net amount of $10,292 for the assisted passages simply.

By Mr. Trow:

Q. Who were those who received this commission? A. They are the agents of the steamship companies.

By Mr. Mallory:

Q. The agents of the companies? A. Yes; and for that they distribute our literature, and generally make known the facts which we desire to publish.

By the Chairman:

Q. Could you inform the Committee what number of immigration pamphlets or publications have been distributed during the year? A. I have a list here, the total of which is, for the calendar year, 3,561,555; that is for all publications.

By Mr. Trow:

Q. That is, those in Canada and Europe? A. Yes; including those which are printed in England and Europe. The number of pamphlets altogether printed in England was 263,000.

By the Chairman:

Q. Can you inform the Committee what relation the exertions of the Department of Agriculture, in that particular, bear with those of other countries, or interests which invite immigration for settlement of lands, that is, in comparison with what other countries do to promote immigration, or what railway companies do having

lands to sell, and which, I understand, have agents in Great Britain? A. If we compare the position of Canada, in relation to that expenditure, with the Australian colonies, it will be found that the expenditure of the Australian colonies is immensely more than ours; and I may also observe that a comparison of the effects of immigration and emigration from those colonies is very much more easily defined than with us, for the reason that they are bounded by a sea line, instead of by a long line of open frontier of 3,000 miles. The total expenditure of all the Australian colonies for immigration during the year 1883, from the official returns, amounted to $2,446,346. Of that amount the colony of Queensland expended $1,201,526. In the year 1884 the amounts expended by all the colonies were somewhat less; but the figures are still very large. The total amount for the colonies is $1,409,303. The diminution appears principally in the colony of Queensland, as instead of spending $1,200,000 they spent but $356,000 during that year. For results, the total number of immigrants, from 1879 to 1884, inclusive, was 1,117,403, while they had an emigration of 750,000, which does not follow that these were the same persons. It shows the fact of an outgo of a very considerable figure, approaching the figure of the incomers.

By Mr. Trow:

Q. Where did the outgo from Australia go to? A. That I cannot state. They went out of the colonies to somewhere beyond the sea.

By Mr. Fisher:

Q. Is that for the whole of Australia? A. Yes; that is by the sea line.

Q. Did they go from Victoria to New South Wales? A. I think not. Any of them inside of the sea line would be considered as being there, and would have appeared in the New South Wales figures which are included.

By Mr. Trow:

Q. Have you any idea what they paid for passenger warrants to Australia? A. Yes; I have the figures here. In 1884, Queensland paid $135.53 per head; South Australia paid $111.75; Western Australia, $38 and Tasmania, $51. That consideration as respects large expenditures for immigration service by other countries would not be complete unless the amount spent by the United States in its consular service were also stated. I find that the amount of salaries paid to consuls by the United States is $444,600, while the expense of the whole consular service is considerably over a million and a quarter. The amount paid at Castle Garden ranges from $150,000 to $200,000 per annum.

Q. Is that for quarantine? A. No; it is the place where immigrants are received and the principal immigration gate of the continent. It may be stated that in addition to the expense of the consular system, which is very largely an immigration agency, the State of New York, from 1880 to 1885, paid for the expenses of Castle Garden no less a sum than $1,129,252. If to that is added—and that is part of the question asked me by the Chairman—the very large expenditure of the land and railway companies, which have received enormous grants of the United States territory, it would appear that the efforts or expenses which are being paid by the Dominion of Canada for the service of immigration are very small indeed.

By Mr. Innes:

Q. Does the Federal Government at Washington pay any of the expenses? A. It pays the expenses of the consular service, the amount of which is over $1,250,000, which would correspond with our High Commissioner's office and the offices in the United Kingdom and Europe. But in addition to that the United States has alienated an enormous extent of its domain. The proceeds of that are very freely used for this kind of propagandism. It may, therefore, be said that, if not directly, indirectly the United States Federal Government pays enormous sums for the promotion of immigration to the United States.

Q. Does the Federal Government pay the expenses of Castle Garden? A. I believe a question has been raised between the commissioners and the Federal Government. I believe the State of New York have represented to the Federal Government that it is a great injustice to have the expenses of Castle Garden fall upon that State, as it receives but a small portion of the immigrants arriving.

By Mr. Fisher :

Q. Does the Federal Government pay anything towards the passage of immigrants? A. I think not. I think there are often advances made to immigrants at Castle Garden which are afterwards repaid. There are no appropriations made by the Federal Government for that service.

Q. Would that be for forwarding immigrants into the interior? A. Yes; principally for forwarding them into the interior. In some instances, I understand, that small sums of money are advanced by friends. In fact the greater part of the immigration into the United States is on passages which have been prepaid by friends who have gone before.

By Mr. Mallory :

Q. The Government have nothing to do with it? A. Not in a direct way.

By Mr. McNeill :

Q. Did the United States ever give assisted passages? A. Not directly that I am aware of, the same as ours. Assisted passages is rather a misnomer. It is merely a differential rate. In fact the steamship companies, now in the conference on this side of the line, have, as far as inland transport is concerned, a differential rate to certain points. As I have already explained to the Committee, the amount of so-called assisted passages which is paid by the Dominion Government is very insignificant and forms really only an inconsiderable portion of the vote, the amount for the fiscal year having been $10,000, and in the calendar year $19,000.

By Mr. Trow :

Q. Does the Federal Government of the United States publish any pamphlets? A. It is done by railway companies. The Government of the United States, however, did a few years ago publish a pamphlet, a sort of guide book to the immigrant which was very largely circulated. I have not seen any recent ones, so that I cannot answer that question with positiveness.

By Mr. Sproule :

Q. Have you any knowledge of the number of American lines engaged in this? A. In fact every one of those companies which have received grants of land from the United States Government has made a most active propagandism, and that of one large one, the Northern Pacific, would be two to one in expensiveness as compared with the Canadian Government.

By Mr. Mallory :

Q. Have you any figures to show us definitely what it is? A. I have not the figures of their last reports but I had their figures and submitted them to the Committee on a previous occasion. The amount of expenditure set down to the land service was half a million dollars.

By Mr. Fisher :

Q. How does it compare with the work done by the Canadian Pacific Railway Company? A. The Canadian Pacific Railway Company is now making most active exertions and I fancy the expenditure of that company in that respect—I mean in propagandism—for promoting immigration would much exceed that of the Canadian Government.

Q. Have you any data to go upon; has the Canadian Pacific Railway Company furnished you with any estimate or statement of what they spent in that way? A. They have not furnished any figures. I may say, however, in continuation of my answer that I did obtain figures from some of the transportation companies engaged in that service which they were willing to give me for the information of the Department but not for publication. Their figures for printing very much exceeded ours—in fact by nearly two to one.

Q. Do you mean the Canadian transportation companies? A. Yes.

Q. The steamship companies? A. Yes, Sir.

By Mr. Trow:

Q. Where were they printed? A. Principally, I think, in England.

Q. Were they issued in sheet or pamphlet form? A. In both.

Q. Where were they chiefly circulated? A. In the United Kingdom and very largely over the whole of Europe.

By Mr. Mallory:

Q. Can you give us any information as to the number of immigrants brought in by the Canadian Pacific Railway Company exclusive of these brought in by the Canadian Government? A. In answer to that question I have to say that it is almost impossible to give those figures, but I can mention a point which has a strong bearing upon it. The Canadian Pacific Railway Company from the port of disembarkation gives exceedingly cheap tickets to the interior of Canada—to Winnipeg and points along its line. The rate from Quebec is $12 to Winnipeg but there is no variation in the ordinary rate for other classes of travellers except when the railway companies happen to be "cutting."

By Mr. Trow;

Q. After the immigrants arrive in Winnipeg what other steps are taken to facilitate their settlement? A. The Canadian Government in addition to its immigration office has also a land guide office worked between the Department of the Interior and the Department of Agriculture. The Pacific Railway, too, has a regular immigration office there, well kept and well appointed, in which they do effective service; and now the Government of the Province of Manitoba has also opened an office at Winnipeg, a sort of guide and distribution office, which is also, I believe, doing very good service.

By Mr. Wilson (Elgin):

Q. Have you examined any of the Canadian Pacific Railway Company's pamphlets, so as to speak definitely as to their nature? A. Oh, yes. We have in the Department copies of all their pamphlets, some of which I have looked over. They are, generally, well done.

By Mr. Trow:

Q. Do you ever find the advantages of Minnesota set forth in their pamphlets? A. No, I have not seen that.

Q. I thought, possibly, they might call attention to that? A. I think not; with their large land grant, they would naturally desire to put settlers upon their own lands.

By Mr. Livingston:

Q. I do not know that I have understood you rightly. You class the expenses of the United States consular agents in Canada, under the head of immigration; what have their consular agents in Canada to do with immigration? A. What I meant to say was their consular agents in Canada will facilitate, as far as they can, settlement in the United States.

By Mr. Mallory:

Q. Have you any direct evidence of that? A. Of course I do not say that the United States consuls are direct emigration agents; nor did my remarks specially refer to the United States consular agents in Canada; very far from that, but efforts are made by the representatives of the United States by the diffusion of publications and by very active agency, to promote emigration to the United States.

By Mr. Livingston:

Q. By the consular agents? A. The consular agent's office would be the head office, or point, to which all agencies would go for information, and for making it a sort of base of operations.

Q. I do not understand that to be the case at all, I understand their business to be of a different nature altogether. You go to the consul's office to get an entry for your goods, and I have yet to learn that the office is used for emigration purposes? A. The position I consider to be this: The consular agent is also a commercial agent, and the consular agents of the United States everywhere make known the resources of their country, and that is one of the most effective ways, I take it, for promoting emigration. It is of those indirect efforts that I speak.

Mr. LIVINGSTON—You were speaking of the amount of money spent on those agencies. Those agencies, as a rule, take in more money than is paid out for them; in other words, the Government derives an income from them.

Hon. Mr. CARLING—The American consular agents in Canada cost some $50,000 or $60,000 a year. Some of them are paid by salary and some by fee. From my own experience, the American consular agents in Canada are active emigration agents, trying to show the great advantages of their country, in order to induce settlers to go there. In every city and good sized town in Canada we have active, intelligent American consular agents. These gentlemen are also agents for the land companies and railway companies, and they are continually in the midst of our moving population, trying to convince people of the great advantages which the United States possess over Canada.

Mr. LOWE—The simple point, I may answer, is, that the consular agent, wherever he is found, will find it his business to set forth the greatness and glories of the United States. They do it in their annual reports, which are published, and of which we have copies in the Department, and I simply meant to say that in that way they were rendering an important emigration service to the States.

By Mr. Mallory:

Q. You have told us what the expenses of the consular agents of the United States are; can you tell us what the income of those agencies is? A. No.

By Mr. Wilson (Elgin):

Q. Will Mr. Lowe give us some reliable definite information as to those consular agents being emigration agents? A. I have endeavoured to explain that I did not in any way desire it to appear that I had stated or supposed that these gentlemen acted directly as emigration agents.

Mr. WILSON (Elgin)—Yes, but the Minister stated definitely that such was the case, and that in every locality these men acted as emigration agents.

Hon. Mr. CARLING—It is impossible to give definite information to Mr. Wilson. I know in the city of London, where I live, we have a most active man as a consular agent. He is not at his office most of the time, but leaves a clerk in charge. If any public meeting is going on he is there listening to everything that is said with regard to our country. My information is that these gentlemen are most active in trying to induce people to settle in the United States. If we sent a Canadian to Chicago, Milwaukee or Detroit, he would naturally feel anxious and desirous to do everything he could to boom his own country and show the advantages of Canada over the United States. The American consular agents are active politicians and intelligent men, and you never hear them say anything but what is of very great benefit to the different States. If they are acting as I say they are, and are moving about among our people, they are doing it in a quiet way. They are not holding public meetings to show our people the advantages of their country, but these fifty men in Canada at the present time, a majority of whom are Americans by birth, are most active and influential emigration agents for the United States in taking our people away from Canada. We are trying, as far as we can, to checkmate them and to show that we have as good, if not a better country, than they have in the States, and let them understand that the advantages we have to offer are much better than they can get in the United States.

Mr. WILSON (Elgin)—As far as the opportunity has been presented to me, and I think I had an opportunity of ascertaining, these consular agents do not take the course credited to them by the Minister, and, on the contrary, are constantly writing up the advantages and extensiveness of the Dominion of Canada.

Hon. Mr. CARLING.—I do not wish to take up the time of the Committee, but I do say that the American consular agents sent over here, although they may not appear on the public streets and public markets preaching up emigration to the United States, will naturally give information to all parties who may want to get it about the class of people in their particular locality, and the class of people which might be induced to go to the States. It is natural that they should do so, and from the information which I have received as Minister of the Department of Agriculture and Colonisation, I believe these gentlemen are in constant correspondence with people in the United States who are anxious to induce Canadians to leave Canada and settle on the other side of the line. From my information I am satisfied that those gentle-

men, although not taking an active part, for our people would not submit to that, these officers of the American Government do everything they can to point out the advantages of the United States, and give information to our people in the interests of American railways and land companies. I have information lately from a gentleman residing in the town of Chatham, who I have reason to believe is a truthful man, to the effect that a large number of people had been induced to leave the counties of Kent, Essex, and some of the more eastern counties, to go to the United States, believing that the information given by those agents from the United States, who I have no doubt in turn were informed by the consular agent, was correct. I have reason to believe further, that a large number of people have left the County of Middlesex, and I daresay they have gone from other parts of Canada in the same way. I am told even that from the city of Ottawa a large number of people have gone to the United States. Information had been supplied them that the advantages which the United States possessed were greater than those of our great North-West. I had that from the head of the railway department of the Grand Trunk, I forget the gentleman's name, and he told me that he had sent a number of families to the Western States to become settlers there. We have an active American consul here, a shrewd, intelligent man. He knows how to manage the business of his country; he knows whom to correspond with, and the agents of the railway companies in the States coming here know where to go, how to act, and how to procure men and induce them to go to the United States. I feel satisfied that these gentlemen are doing effective work for the United States and consequently immense damage to Canada.

By Mr. McNeill:

Q. I desire to ask Mr. Lowe whether settlers coming out here send money home to bring their friends out? A. Very frequently.

Hon. Mr. CARLING—I think the advantages of Canada have been clearly shown by the press, and by the literature that has been spread abroad throughout the whole of Europe. Nevertheless, we have American railway agents and American land agents acting on information which I believe was supplied them by the consular agents in Canada, continually working amongst us, and even at the very door of Parliament, pointing out to the people here the great advantages which they say the Western States have over our own North-West. I daresay they have pointed out this in glowing colours, but I fancy that when people act upon their representations they do not find them as they expected, and that after all the country they have left is better than the one they have gone to.

Mr. MCNEILL—I suppose these American agents in Canada always directly affirm that their's is a good country; they never say "we are told it is a good country?"

Hon. Mr. CARLING—I do not think the consular agents would say Canada is a better country than the Western States; I do not think that you would expect our agents in Great Britain would affirm that the States are better than Canada, but I do say that these land agents and railway agents have their ramifications all over the Dominion, and they are gradually taking our people away by inducements that are held out to them. That information given to these people, I am satisfied, is obtained from the American consular agents.

By Mr. Watson:

Q. What number of prepaid passages have been reported during the past year; passages prepaid by settlers residing in Canada? A. I have no means of telling how many prepaid passage tickets were sent by settlers to England to bring their friends out, but I have no doubt it is relatively very large.

The CHAIRMAN—In my own county a very large number of immigrants have sent money to their friends who have prepaid their passages. These, I may say, are principally from Germany, but a good percentage of them have their passages prepaid from the British Islands. During the last year in my own county as many as fifty immigrants came out on prepaid passage tickets supplied them by friends living in the county through my own medium.

Hon. Mr. CARLING—The question of assisted immigration has been very much misunderstood and very much exaggerated in the country. The total number of persons assisted last year, men, women and children, was not, I believe, over 5,000 altogether; I mean those who came to Canada and were assisted by the Canadian Government. The rate of assistance is only ten shillings each. We do not pay their passages, what we do is to make an arrangement with the steamship companies to reduce their passage £1. The Government pays one-half and the company pays the other half. No better precaution could be taken than is taken by the Government to prevent imposition. We have assisted no one except agricultural labourers and female domestic servants, and before they get a reduced ticket they have to go before a magistrate or clergyman and make a declaration that they are agricultural labourers or female domestic servants as the case may be, and it is only by making that declaration before a magistrate and signing the documents that they can get a reduced passage.

Mr. TYRWHITT—And that their destination is Canada?

Hon. Mr. CARLING—Yes.

Mr. MALLORY—But that they do not intend to remain in Canada.

Hon. Mr. CARLING—That they do intend to settle in Canada. I do not think we could take any greater precaution to prevent fraud, and as I said the total number who obtained assisted passages last year did not amount to more than 5,000 all told. Am I not right, Mr. Lowe?

Mr. LOWE—Yes.

Hon. Mr. CARLING—With regard to assisted immigration, it has been stated that a large portion of the money spent annually by the Department has gone towards assisting immigrants to come to this country. Those gentlemen who make this statement seem to overlook entirely that we have to maintain a number of agencies in all parts of Canada. We have, further, the establishment in London under the High Commissioner; we have an agent in Bristol, one in Glasgow, Dublin, Belfast, and Liverpool. We have also an agent in Paris, and we have had others in different parts of Europe; besides these we have sent men from the North-West to do everything they could to induce emigrants to come from Iceland and other points, and these men have had to be paid for their services. Then we have spent a large amount in literature, pointing out the advantages which Canada possesses over the United States. I think that has been a judicious expenditure, an expenditure by which information has been given to intending emigrants, not only in the United Kingdom but in different parts of Europe, and despite all this expense we are not spending as much money to-day as we did formerly. We reduced the appropriation by $100,000, and this year there is a still further reduction of $50,000, which may be accounted for by the fact that we are not printing so extensively as we did two or three years ago. Still we are keeping up a good supply of literature, which we think is of advantage by showing emigrants the resources of the country to which we desire them to come. The amount paid towards assisted passages is a small one, but it is hardly one which could be stopped at once. I may say, however, that after this season it is not the intention of the Government to assist immigrants coming to the older Provinces. If any assistance is granted at all, it will be given to agricultural labourers and female domestic servants settling in Manitoba and the North-West Territories.

By the Chairman:

Q. I would ask Mr. Lowe to explain to the Committee what he really intended to say in regard to the American consular agents in Canada? A. My statement was not that the United States consular agents in Canada were direct emigration agents. I had not even in my mind's eye the consular agents in Canada, but I was referring to the agents stationed in different parts of Europe, for instance in the Scandinavian kingdoms and Germany where we had great difficulty in reaching the people. My statement was that these consular agents everywhere make known and extol in the very highest degree the resources and the advantages of the United States, and that the information so given conduces in the highest degree to promote

emigration to the States. In that sense I said they were incidentally emigration agents; I said nothing more than that, and I did not even refer to or think of the consular agents in Canada.

By Mr. McNeill:

Q. Do settlers often send money to assist in paying the passages of their relatives out to Canada and the United States? A. I think that the greater number of all the immigrants who come to this continent are so assisted.

Q. And I presume as there are so many more residents in the United States that for that reason the United States has a great advantage over us? A. As a matter of course.

By Mr. Mallory:

Q. You say the greater number that come to this continent are so assisted? A. I think so.

By Mr. Trow:

Q. Could you describe the pamphlets? You have given the numbers. A. I have a list of them here. It is a little long.

By Mr. Tyrwhitt:

Q. Would it not be possible to get a more perfect record of the circumstances of immigrants, as to whether their passages were prepaid or not, if the steamship companies were applied to? A. That information is measurably obtained. The amount of money sent through such banks as are willing to make a return is collected by the Board of Trade in England. I have not the figures by me, but we have them in the Department. They run into millions of dollars.

By Mr. Fisher:

Q. I would like to ask Mr. Lowe a question. The number who are supposed to have come into the country last year is given as 69,000, and of these 43,000 were those omitting the Customs entries, while 25,277 are those who were entered at the Customs. I suppose the Department takes pains to see that these two numbers do not cross, but that the customs entry is entirely separate? A. Yes. There are only 9,000 making Customs entry who are not Canadians.

Q. Of these Customs entries I see that 16,153 are Canadians?

By Mr. McNeill:

Q. What point in the Province of Quebec did these come in at, marked as coming in through that Province? A. The largest proportion came in at Sherbrooke.

Q. I suppose these are nearly all French Canadians? A. I think a greater part of them were.

By Mr. Fisher:

Q. And the object is to enable them to bring back their effects when returning from the United States. As a matter of fact this is a very fallacious system. It is an unfortunate fact that these French Canadians are in the habit of passing backward and forward to a very great extent. There is not a day passes where I live, but I see from fifty to a hundred persons going over, and an equal number coming back. They are not immigrants. They go over and work for six months and then return? A. I think the view given by Mr. Fisher would not be well founded in so far as relates to a greater part of these returns; but I wish to observe this, that we do not keep a record of the emigration from this country, but only of the immigration, and if the net immigration is to be found out it is only after ascertaining the emigration. I have no doubt that there is a large emigration from Canada into the United States, that has never been concealed by the Department.

By Mr. McNeill:

Q. Would not the sum supplied from the United States for this purpose amount to a very much larger sum than that sent home for this purpose from Canada? A. That would follow as a matter of fact from the larger population.

Q. If we desire to secure a fair share, would it, in your opinion, be necessary to supplement this comparatively small sum sent home from Canada for assisted passages, by some other sum from some source or other? A. I have no doubt that the assisted passage which we have offered in the past has been exceedingly influen-

tial in bringing to our shores large numbers of agricultural labourers and their families whose wages are very little, and who unless they were in some way assisted could not have come, and it has been valuable in the past in that sense.

Q. I suppose a strict scrutiny is kept to see that paupers do not come? A. Paupers are not assisted; in fact, means are taken to prevent them from coming.

By the Chairman:

Q. Have you reason to believe that the publications of the Department have been judiciously distributed for the objects they were intended to promote? A. Yes; and I am satisfied the supply is never equal to the demand for them.

By a Member:

A. It is an actual registration taken down name by name.

Q. The immigration said to have gone into the North-West in previous years was always after making deductions of those who went out? Could not that be done at all points? A. The only means of doing that would be by adopting the means which I followed at Port Huron a few years ago when the question of an exodus at that point was raised. A record of the ins and outs would show the net immigration into the country. Unless we keep a record at every avenue of travel we should not be able to show the net immigration. These figures which the Department give do not pretend to be the net immigration.

By the Chairman:

Q. Have you any reports of the amount of values brought to the country by immigrants? A. In addition to the value which they create as producers after arrival, it was actually ascertained that the value brought into the country during the year was $3,413,576.

By Mr. Mallory:

Q. Have you any means of knowing what the value of the effects of immigrants was of those who went out? A. I may say that we have no means of obtaining that figure; but I have no doubt that there is a corresponding figure of emigration. It is impossible to deny that.

Q. Is it not a fact that the information as to emigration might be collected at the same time as the other figures? Could not the same officers do it? A. It would require an additional set of officers. The duties of our agents are such as would prevent them from doing more than taking a record of the count of the numbers of immigrants coming in.

Q. These officers have to be at the ports of entry? A. I do not believe that the immigration agents could do it.

By Mr. Campbell (Kent):

Q. As I understand it, those going out of the country are not obliged to report to anyone, and there is no accurate means of telling how many go out? A. That is so; I have myself, personally, for a number of years, made that test at the western frontier, at Detroit and Port Huron. The only means by which the information can be obtained is by ascertaining from the railway companies the number of ins and outs, and I am satisfied that the difference between these two figures represents the net immigration at such points.

Q. The only way, I suppose, to find out how many left the country would be to station men at these points? A. It may be a question for the Minister to devise a scheme for obtaining the ins and outs, wherever there is a channel of communication between Canada and the United States. Wherever there are transportation companies who keep records it can be done.

Q. I do not think there will be any difficulty about obtaining returns from the railway companies? A. Perhaps not.

By Mr. Watson:

Q. What value do you place on an individual immigrant, or the head of a family as a producer? What are they calculated by the Department to be worth? A. A successful family will produce from $500 to $600 a year when settled.

By Mr. Livingston:

Q. A family of how many? A. An average of five.

By Mr. Watson:

Q. What do you consider they are worth to the country per annum? A. That is a very speculative question. It has been discussed in the United States, and I have given a series of calculations before this Committee. It is found that an immigrant in the United States brings into the country a value of about $60, and we find from our own returns that we do not differ widely from that calculation in Canada. But that is only a small portion of the value of the immigrant to this country, if he is at all successful, although the amount, or aggregate of these amounts at $60 a head, represent a very large amount, or aggregate of values, brought into the country.

Q. I think it is a very reasonable question. There is a way of figuring on the value of an immigrant coming into the country. I remember that Mr. Pope figured that a boy of 16 was worth $800 a year. He made that out by capitalizing the value of his production? A. I believe he did.

By Mr. Livingston:

Q. Have you any record of immigration from Germany? A. No, I have not, except at the port of Quebec. We have the beginning of a very considerable immigration.

Q. Could you give us any idea of the cost of that immigration? A. No, there is great opposition presented by the German Government against our literature being circulated.

Q. Did you not pay the expenses of some person going from Ontario to Germany? A. No.

By Mr. Mallory:

Q. Do they not allow our immigrant agents to go there? A. No.

A. What means are taken then? A. The only means we can take of reaching the people in Germany is by reaching the concessioned agents in Germany and paying those agents a commission on every immigrant whom they succeed in sending to Manitoba and the North-West. We are getting good settlers of the German and Scandinavian nationality.

Q. What is that commission? A. $5 per head.

Q. How long have they to remain on the ground before this is paid? A. We do not insist upon such a test. It is really paid as a species of salary to enable us to get the services of these men and to enable us to circulate our publications in Germany.

Q. It is not necessary, am I to infer, that they are to remain in the country; if they come in at all, the money is paid? A. Yes, if they come as settlers, but not as simple passengers. The object is to get our literature and publications circulated. That is the object we are seeking to attain. We could not even at enormous expense, do this in any other way; not by any way of trying to pay directly the salaries of persons in Germany. It is the only possible door open to us for access.

By Mr. Livingston:

Q. In what way do they circulate your literature? A. We have publications in German and, in fact, in all the languages of Europe. We send these publications out to the agents.

Q. They circulate them free, and all they get is this $5 per head for the settler? A. That is all

Q. Is it not true that you have paid persons to go from Ontario to Germany? A. No, Sir. I may state, however, that on one or two occasions persons have gone from Manitoba and the North-West, and part of their expenses have been paid on the understanding that they would bring immigrants back from Germany with them.

The Committee adjourned.

MR. FLETCHER'S EVIDENCE.

OTTAWA, 15th June, 1887.

The Committee met at 10.30 a.m., Mr. P. WHITE (Renfrew) being in the Chair.

Mr. JAMES FLETCHER was called and examined as follows:—

By the Chairman:

Q. Your position in connection with the Department of Agriculture is that of Honorary Entomologist? A. Yes, Sir.

Q. Without pay? A. Yes, Sir.

Q. You have given a good deal of attention to entomology? A. Yes, Sir, I have studied it for a great many years, and have been before the Committee three or four times.

Q. Will you tell the Committee whether any new insects have been more than usually obnoxious this year? A. There have been one or two new insect pests and some of the old ones, which heretofore had not shown that they were injurious or particularly injurious, have developed in very large numbers. The laws regulating the amount of insect presence are not fully understood because sufficient attention and study have not been devoted to them, but we find that there are certain broad generalizations which we can take advantage of in making our studies practical and applicable to the use of horticulturists and agriculturists. We find from experience that a certain insect may be developed in very large numbers at any given time; but we very seldom find that these large numbers continue for any lengthened period or number of years. As instances of this I will mention one or two of the most notable visitations of injurious insects. The Rocky Mountain Locust, or Hateful Locust, which did so much injury in our North-West Territories about 10 years ago, and during the last year in the North Western States of the Union. Now, these developed in very large numbers and destroyed everything before them; but all of a sudden they stopped, and no one can understand the reason. We find that the efforts of man to keep injurious insects in check are a considerable factor, but the chief source of help comes from the parasitic insects by which they are attacked and the diseases incident to insect life. Whenever there is a very large number of animals in any one place diseases are generated from over multiplication, and wherever there are many insects there are sure to be a great many parasites to feed upon them. Some of these prey upon one species only, but many of them upon several sorts. During the last four or five years a very large proportion of the clover seed grown in central and south-western Ontario was much injured, so much so that three or four years ago the whole crop was lost; lately, within the last year or two, by constantly writing in the agricultural papers, agriculturists themselves and entomologists have recommended that the method of harvesting the clover should be slightly altered, that is, instead of leaving the clover standing in the field, in accordance with the usual custom, until towards the end of June, the first crop should be cut or fed off as early as possible in June, and not later than the middle of the month. There are two broods of these insects. The first matures at the end of June, and up to that time exists inside the clover seed pod. If the cattle eat the clover by the middle of the month the insects, of course, are not developed, having been either destroyed by the clover being cut before they were matured or having been eaten by the cattle. These insects, I may tell you, are very small, four of them would lie upon the head of a pin, but each one is sufficient to destroy the contents of a clover seed pod. If the first brood be destroyed the second crop is not attacked, because the insects which would have destroyed it had been killed in the first crop. This is a method which my correspondents inform me has been very successful. About the first week of June last year I published a bulletin with a figure in which was given a very short outline of the life-history of the insect, as well as this remedy, which farmers have found to be successful. I distributed these all through the different districts over which clover is grown for seed. Some of the gentlemen saw fit to write and thank me, and to say that they had succeeded, through the adoption of this method, in raising a good crop

of clover seed, and I think the general opinion is, where clover is grown as a seed crop, that a good return can be secured by adopting this method where it could not otherwise. There are also some parasitic insects attacking it. I have bred three different sorts by keeping the heads of clover in glass jars, and it is an important point to notice that these insects which are preying upon the others are materially increasing in numbers year by year.

Another insect which has appeared suddenly in large numbers is called the saw fly of the tamarac (*Nematus Erichsonii*). It is all through Quebec, and also through some of the other Provinces, and has eaten to a large extent the foliage of the tamarac. The tamarac has special value as a tree, as you all know, and is in great demand for railway ties, and besides it will grow in land which is useless for all other purposes. This insect, which was most probably introduced from Europe, developed in enormous numbers; and I may say here that when an insect is introduced from another country it appears to increase in numbers more rapidly than our own pests. It comes without the parasites which keep it in check in its native country. There are certain insects which we term first class, second, third, and occasional pests. There are a few which we call first class pests, because they occur every year and do a great deal of damage. The caterpillar of the white cabbage butterfly and the onion and radish maggots are now first class pests. However, we find that whenever insects are increasing in enormous numbers they are attacked by others of a parasitic nature which are either naturally parasitic upon them or which develop a liking for them. This tamarac saw fly was only discovered in America a few years ago, and when Mr. Fisher and I went through the woods at Brome, P.Q., four years ago we found that the foliage of the tamarac trees for a great many miles was entirely destroyed. Of course the whole object of the economic entomologist is this: when he sees some thing is being attacked, it is not of so much immediate importance to him to ascertain what its exact name is as to find out its habits, so as to devise some means of stopping it. In this instance we had to acknowledge at the start that there were great difficulties. We could not fight a thing which lived on the top of trees and extended over miles and miles of peat swamp. As it increased in enormous numbers, however, some of our own native insects took to destroying it, and instead of wiping off the whole tamarac forests of the country as was anticipated by the United States entomologists, as well as some in this country, during the last year it almost stopped, and was at least restricted to the areas where it had already appeared. Another point which we must bear in mind is one of great importance. Where it first appeared it does not occur at all now. It has passed on from there. It is possible that this insect was introduced into America with specimens of the European larch which were brought here for botanical gardens. It started from those centres and spread all over the country.

Another injurious insect is the White Cabbage Butterfly, the green worm of the cabbage. This insect is very injurious indeed. It was introduced at Quebec some 25 years ago, and has now got all over the settled portions of North America. I have notices of it being in Manitoba and it is in all the Western States. I have no doubt it will go all over the country. We find also that those parasites which breed upon it, after some experiments, have been introduced into America and are increasing in enormous numbers. In answer to your question, I must say that there certainly is a most remarkable abundance of injurious insects this year; but the outlook is quite hopeful for the reason that the parasites are increasing in regard to almost all the first class pests.

There is another class of insects to which I may refer, as I see Mr. Perley is here, and I have a communication from his firm about it. There are insects very injurious to the lumber interest which are known as "the pine borer." They are called erroneously "*the* pine borer," but there are three or four different kinds which attack forest trees and notably two which particularly infest the pine. I do not know that they have any English popular name that you can call them by, and it is not advisable to introduce a name when you can get a scientific one accepted, for the reason that a great deal of confusion would arise. I have frequently plants brought to me

which people use as medicines, and ask if such and such a one is grown in the country. One man, for instance, asked me: "Is Prince's Pine found here?" I said: "Yes, it is in the woods." He said: "It is a magnificent cure for certain diseases." But I said: "There are three different things known as Prince's Pine—the other two not like the first." He said: "I am right on that, and can make it clear because it is a wintergreen;" to which I replied: "There are half-a-dozen different plants known as wintergreen." If a man is interested in any one thing and has a great many thousand dollars invested in it, as for instance in the lumber business, it is not much trouble for him to learn the two Latin names of insects which prey upon the material from which he gets his lumber. The two insects referred to are known by the names of *Monohammus scutellatus* and *Monohammus confusor*. These two insects destroy the timber. The first, as its name indicates, has a shield on its shoulders, and is dark coppery black; the second is larger, of a mottled gray colour, and both have long horns. I reminded the Committee once before that there are two ways of looking at insects—one when they attack and destroy what we want, and the other when they attack and destroy what we do not want In this latter instance they are a benefit. Insects are scavengers in that sense, by removing all that is effete and useless. Every year we have some of the old trees dying off to make room for the young ones, and if these dead ones did not disappear they would choke up the woods. In a brulé, when trees are killed by fire, the dead trees stand erect for a long time and become very hard. In these brulés it takes a great many more years to renew the forest than where trees fall as the result of natural causes. Looking, then, at the life history of these two insects, which we will call the pine borers, we shall find this to be true. A tree is injured or in other instances it is felled by the lumberman. He fells it and leaves it with the bark on. When felled it is in its full vigour; if it were a dead tree it would not make such good lumber. As most of you know a tree is composed of the inner and outer bark and the wood. In between the wood and the outer bark there is a soft layer which is called the cambium layer, where the new wood is deposited. Trees grow on the outside beneath the bark. Now, within this particular part, this soft layer, these insects live, or at least commence their life. When the tree is felled it is at once attacked by insects, the wood not being in such an active, vigorous state as when the tree was standing. It is a law which experience has taught us, that whenever a tree gets into a delicate state it is more liable to attack than when it is vigorous. Two trees being together, the one which is least vigorous will be attacked first. It is perhaps hardly necessary to say here before the Committee that there are four stages of insect life. First the egg is laid, and this hatches into a grub, and this grub, after an active life of eating during which it consumes food enough to carry it through the third quiescent state, in which it does not move, produces afterwards the perfect insect. This insect begins life by the egg being laid upon or in a crevice of the bark, so that the young grub can get at the cambium layer beneath; there the larva or grub passes its life eating this pulpy layer. If it is only an annual insect it passes one year, living its whole larval life in this soft, pulpy layer. But some insects, as these wood borers, live for three years, and when the winter comes on, in order to protect itself from the excessive cold, the grub bores into the solid wood, and then seems to change its habits. It remains there for two years more, feeding upon the hard wood; during the second year it bores further in until it has bored a long channel perhaps two feet in length in different directions right through the wood. If there were but one hole made it would not injure the tree very much, but these insects are innumerable, and if provision be not made for protecting the tree the timber will be spoiled. The experience of lumbermen is that upon which I have relied chiefly in these investigations. I have, of course, very little opportunity of making excursions into the lumber country, and I am thus prevented from getting as much experience as I should like. I have, however, got into correspondence, chiefly through this Committee, with the constituents of members all over the country, and I have at least 1,500 correspondents who convey to me a good deal of practical knowledge with respect to the operations of insects throughout the country. Now, lumbermen tell me that it is their experience that after felling the tree, if they want to leave it

in the woods, they must take the bark off and then cover it with branches. I do not quite understand why the branches are thrown over the fallen tree, but perhaps some of the lumbermen here may be able to give me the information this morning. I do not think any success, so far as the destruction of the insects is concerned, is attributable to these boughs.

The CHAIRMAN—The moisture loosens the bark, and it is found that insects do not attack the wood when the bark has been loosened. It is to save the wood to a great extent.

Mr. EDWARDS—You take off a strip. The bark is not totally removed, simply a strip taken off.

By Mr. Perley (Ottawa):

Q. The object of the boughs is to keep the rays of the sun off the fallen tree. The rays of the sun falling on the tree generate these insects, whereas, if it is in the shade we find that their development is retarded. A. I will correct you, if you will permit me, with regard to one word. It does not generate the insects, but it produces conditions which allow them to be generated. As I have stated, the young grub lives for the first stage of its existence in the soft layer beneath the bark. When the bark is separated from the tree by the above treatment the outer surface of the wood becomes very hard and dry and the young grub cannot effect an entrance. It is possible too that when the habits of these borers are understood we may find that they do not like to go in the shade to lay their eggs; but I don't know about this, and I mention it to show the importance of everyone taking notice of, and studying out thoroughly the life histories of those insects which affect his interests. It would be an easy matter to make such observation when at the shanties, and much practical good might result from it. As far as I can learn the above is the most successful treatment for borers, and until a better is discovered, lumbermen must rely upon that and some of the countless hordes of parasitic insects which attack all insect life; but if all would help a little we certainly should soon find a practical remedy.

By Mr. Trow:

Q. As I understand you Providence has made provisions for the destruction or keeping in check of all these pests? A. Yes, and some of them, I have no doubt, would be kept in check more if the works of Providence were not interfered with by the encroachments of man. Primarily the territory covered by trees was very large and there was an abundance of food for all wood-eating insects; but now that territory has been very much reduced in area, and not only is that the case, but the lumberman by felling trees brings a very much larger quantity of timber into a condition suitable for wood-boring insects to breed in—or, in other words, he not only reduces the quantity of vigorous standing timber, but provides its enemies with a much increased food supply. The supply of food is the most important item which regulates insect presence; when this is unlimited they increase with enormous rapidity and in enormous numbers. They would undoubtedly be kept down by parasites, but we have to do something in the interim, while these parasites are being developed.

Q. Are you aware whether there are any parasites which prey upon the potato bug? A. There are more than twenty, but we consider the potato bug is hardly worth attention, because it is so easily kept in check. Five cents' worth of Paris green and one boy's work will clear a very large farm in a short time.

Q. I was speaking of parasites that attacked them? A. There are a great number, but the potato bugs have an enormous food supply, and consequently they are able to increase in great numbers.

By Mr. Hale:

Q. Is there a likelihood of the potato bug disappearing? A. I think so, and if farmers who grow potatoes would all use Paris green we could wipe them out of the country in two years. As it is, one man goes to great trouble and clears his farm, while another man opposite who may have a little potato patch will permit these potato bugs to be produced in enormous numbers and fly all over the country, so that no matter how clean one man may keep his farm, he is likely to receive the

bugs from others. People seem to forget that this potato bug flies. There seems to be some little doubt still as to whether Paris green can injuriously affect the tubers of potato plants to the foliage of which it has been applied, and I may say that it is in no way possible for it to injure the potato.

By Mr. Perley (Ottawa):

Q. Some years ago I was in the woods and noticed the fire go through the trees in the month of July. Just one week after the fire ran through and killed the tops, stopping the growth of the tree, the number of insects which settled on the outside of the bark was simply innumerable. I mention this to Mr. Fletcher as I am a little curious to know how he accounts for it. I may say it was all standing timber and of very strong growth? A. This is in obedience to the law by which insects are the scavengers of the world, ready to remove at very short notice anything that is dead or useless. Directly a tree is injured the instinct of the insects which feed upon it attracts them to the tree. We see this same principle exemplified by the maggots which attack cabbage roots and destroy the onion. The onion patch or cabbage garden will be perfectly sound until you may happen to bruise the plant. Directly an injury to a tree or plant takes place, as in the case of these pines, it is probable some sap exudes and the odor therefrom attracts all these insects. If they were to wait a little while longer the sap would have dried up round the wound and it would be much harder for them to lay their eggs in the injured bark. The same thing applies to cabbages. A number of cabbage plants may be grown in a frame and while there not a single plant will be touched. If they were left in the frame they would not, of course, attain as full growth as if they were planted out, but they won't be injured by the root maggot. Take the plants out of the frame and put them in your garden. Naturally while handling them they get bruised and at once the odor from them attracts the insects which lay their eggs at the roots, these in due time produce maggots which attach themselves to the plants and destroy them. The remedy we have is as follows:—Directly we have planted them out in the beds we put around them some substance with an odour which destroys the odour of the plants, such as sawdust with carbolic acid in it, sand with coal oil, or a remedy of much less trouble is to sow, in cross lines, amongst the young cabbage plants when put out, or broadcast over the onion beds two or three times during the season, a light sprinkling of gas lime, an article which has a very obnoxious odour for all insects. It is also, however, very poisonous to vegetation if it comes into actual contact with it, so must be used with care. I may say, however, that after a time it becomes a very valuable manure when acted upon by the air.

By the Chairman:

Q. Speaking of the pine borer, in cases where trees are only partially injured by fire, the borer will go into the tree only to the extent of the injury, and will not attack it any higher up? A. That is sometimes the case, but more frequently an entrance once effected the grubs bore into the sound wood and cause it to decay. Where the injury is, the borer is able to lay its eggs, and, as a matter of fact, I think we may say that sound trees are very rarely affected. Apparently, it is chiefly those that have been injured by an abrasion on the bark. With reference to what Mr. Perley said about the trees being burned and the insects appearing on them within a week, I may say that on one occasion I was out camping. I had a fire against a tree, and going back the next day, all around the edge of the injured part, the insects were laying their eggs.

By Mr. Perley (Ottawa):

Q. That was after the fire had injured the tree? A. Yes.

By Mr. Carpenter:

Q. What remedy does the professor suggest for the codling moth in apple trees? A. I will give that in answer to a question the Chairman has just put to me, but which I was interrupted in answering.

By the Chairman:

Q. Have any new methods for keeping insects in check been devised by entomologists? A. During the last year or two a most remarkable and almost unex-

pected new method has been discovered for keeping in check our two greatest pests, the Codling Moth and the Plum Curculio. It is rather difficult to understand the reason of this success, because the amount of poison used is so small that it would seem that it must be inadequate. The egg of the Codling Moth is laid in the calyx of the flower, and it is supposed that the very small quantity which falls upon this part of the fruit is sufficient to destroy the young caterpillar when it hatches and begins to gnaw into the fruit. Similarly, too, with the Plum Curculio the amount eaten must be very small indeed, for the only time it touches the plum is when it gouges out a circle and a hole to lay its eggs in. It is a moot question whether that poisons the insect or whether the arsenic on the plants prevents it coming to them at all, but the practical result is, if we spray plum trees with Paris green just after the flower falls in the spring, we get a good crop of fruit, and likewise if apple trees are sprayed with a weak solution of Paris green, much too small to injure the foliage or the tree, we get a good crop of apples. I have no hesitation in saying that we have discovered a most valuable remedy in this, from the fact that we can thus always get a good crop of apples and plums. During a visit to Nova Scotia I found all through the Annapolis Valley that the best fruit growers spray with Paris green, and most satisfactory results have followed. During the last two years I have received many letters concerning its use, and although some of them have complained that Paris green has injured their trees and destroyed the leaves, I do not know anything more successful than the discovery of Paris green as an insecticide. If the leaves are destroyed, we know the plant cannot produce the fruit. Leaves perform the functions of lungs, and if they do not perform their functions properly the fruit cannot ripen. If the Paris green has injured the foliage, it has been simply a result of carelessness. Paris green must only be used in such weak proportions as will allow it to be destructive to the insect and not to the plant. The best way to prevent its corrosive qualities from proving injurious is to spread it in a spray by means of a force pump, and it must not be put on at a greater strength than three ounces to the barrel of water.

By Mr. McMillan (Huron):

Q. What size barrel are you referring to? A. 40 gallons. I would almost be inclined to say 2 ounces of Paris green; I believe that would be sufficient for this purpose. I desire further to impress upon the Committee the fact that it must be put on as a fine spray, not with the jet so as to drench the foliage.

By Mr. Coughlin:

Q. At what time would you apply it? A. About three or four days after the flower has dropped. The plum at that time is as big as a pea, and this is the time the curculis attacks it. No exact date can be given, because it will vary in different years. Although this year started so remarkably late the lack of moisture made it really a very early spring and now we are enjoying a very early summer so that the plums are three or four days earlier this year, and I say therefore the time for putting on the Paris green is directly after the faded flower has dropped off the plant.

By Mr. Burdett:

Q. Will that remedy also apply to cherry trees and currant bushes? A. Not for the latter, Sir, for you must bear in mind that Paris green contains arsenic and is consequently a dangerous thing to handle. If applied to currant trees some of it would be left on the currants, but with regard to plums, they take a much longer time to ripen and the arsenic would have time to be washed off before they were required for the market. There is no object in putting it on currant bushes as there has been discovered a less violent remedy in hellebore; which is perfectly efficacious against these worms, and is not so injurious to the higher animals. It is a vegetable poison, and although it is so effective against insects, it soon becomes diluted and weakened by dews and rains, and the poisonous properties are lost. It takes about three months for Paris green to be destroyed by the action of the air and humous acids.

Q. What about cherry trees; take red and black cherries? A. I should use a very weak solution of Paris green once, early in the season.

Q. The same as for the plum? A. Yes.

By Mr. Carpenter:

Q. Do you ever use two applications? A. In our climate I think it is as useful to use one. I do not think a second application of Paris green is necessary.

By Mr. Hesson:

Q I suppose it is best to spray it in the morning and getting on the windy side of the tree? A. It is more effective if you can get a still day and go round the tree. You get the distribution better by going round it; a hot sun acting on the arsenical poison increases its corrosive power, but it is claimed that this corrosive effect of the arsenic upon the trees may be prevented by putting into the solution a little flour in the proportion of two quarts to the forty gallons.

By Mr. Roome:

Q. Would not flour prevent the spray being fine enough? A. In mixing the solution for spraying with the force pump, it is best to mix a considerable quantity, say half a barrel. The flour should first be washed into the barrel by putting it into fine sieve and pouring water on to it. In this way it will mix with the water without getting into lumps. The Paris green does not dissolve, but is kept in suspension in the water and in making your mixture first prepare it as a paste, stirring it all the time until it goes into the water. You will then find that when it is in the barrel it is much better mixed.

Q. Is there any form of spraying arrangement that you would recommend? A. No, not specially; I may say, however, I saw in the *Canadian Horticulturist* that a Canadian maker named Robertson, of Orangeville, had produced a very useful force pump, which is highly recommended by the editor of that paper, who has used it, and he says it is as good as anything that has been tried.

By Mr. Burdett:

Q. Would not a solution of Paris green at the bottom of apple trees destroy the borers? A. No, Sir, I think not; there are one or two cardinal principles to be observed in the use of insecticides. Insects do injury in two ways; and they may be divided into two large classes by the way they eat their food. Some of them eat with their jaws, like animals, the others take their food by sucking it up. With regard to the first, the borer gets inside the tree, not by eating its way in, but by the mother insect inserting her egg into some crevice as near the under bark as she could get it, so that the young grub when it hatched could at once begin on the soft bark. If it ate its way in from the outside the application of Paris green would kill it at once. Then, with regard to the other class of insects, that have a tube or sucker, and take in their nourishment in that way. Instances of these are seen in the green flies or aphides, some of which attack almost every plant, and are the cause of the curled up leaves which are so often so be seen upon the tops of cherry trees or rose bushes, and apple trees late in the season. These consume their food by a simple tube, which they drive through the bark, and then suck up the juices of the plant through it. Paris green on the surface would have no effect on them; we have to use different kinds of poisons for these, either some volatile poison, such as pyrethrum powder, which is in common use for house flies, or else some oily substance or hydro-carbon, such as petroleum. Petroleum is not only poisonous to insects to eat, but, if it gets on their bodies, it spreads all over them and suffocates them. Insects breathe through their sides, through spiracles or breathing pores. A drop of oil will run over an insect and choke it, and we find that petroleum is a very useful remedy, although rather difficult to apply. It must be applied in a very much more diluted state than it is naturally, or it will injure the foliage of the plant we are trying to protect. At the very commencement of these investigations into the uses of coal oil as an insecticide the question arose: how are we to mix it, as we know that when we attempt to mix coal oil and water, the oil floats on the top. Well, it occurred to an ingenious American that milk, also being of a very oily nature, might mix with coal oil, and having tried the experiment carefully, he found he could make an emulsion with milk, which again could be diluted with water.

Q. Are you speaking of the crude or refined oil? A. I am speaking of the ordinary oil that people can get in the stores. This ordinary coal oil if it is heated,

mixed with either milk or strong soap-suds, and violently agitated, makes an emulsion which can be reduced to any weakness you want with water. It has lately been discovered, as appears in the new report of the Department of Agriculture of the United States, that this emulsion is a very valuable remedy against a most injurious class of insects, called cutworms. One of our great troubles has always been the cut worm on the onion beds. This emulsion can be used against this insect by spraying it over the onion beds. It has, too, a very injurious and poisonous effect on all cut worms. By the limited experiments which have been tried in the United States I can see that it is going to be a most valuable remedy.

By Mr. McNeill:

Q. What is the proportion of coal oil? A. The best proportion in making your original mixture would be two gallons of coal oil, one of water and about half a pound of soap.

By Mr. Watson:

Q. What about the milk? A. Well you would use a gallon of milk instead of the water, then of course you would not put the soap in. This mixture must then be shaken violently or churned with a syringe. The way I make the emulsion is to heat the soap and water until it boils, then turn it into the coal oil and churn the mixture violently with a syringe for 7 or 8 minutes, when it becomes like cream, and when the emulsion is perfect adheres without oiliness to glass. When you have got this emulsion, before you use it you must mix it with nine times the quantity of water. When you want to use it you put in one part of the mixture to nine of water and use that for spraying. The above formula gives 3 gallons of emulsion, and makes, when diluted, 30 gallons of wash.

By the Chairman:

Q. Is that poisonous to all insect life? A. Yes.

Q. How would it affect the grapes? A. It would not be wise to put it on the grapes as the waxy bloom might be destroyed by it.

By Mr. Fisher:

Q. It is only useful where it comes into contact with the insects, as with the cut worms you referred to? A. Yes; it is also useful in preventing insects coming to the plant. With regard to cut worms I may inform the Committee that I tried another experiment. I took a coal oil can and ran a line of pure oil around the bed, but not on the actual plants. I thought that protected them very well, by turning the caterpillars away, when in their wanderings they came to the line. Those inside it were soon detected by their operations and destroyed.

By Mr. Carpenter:

Q. Do you consider what you have given us is a good wash for borers? A. The best remedies for borers are those of a preventive nature, the application of some substance upon the trunks to prevent the females from coming and laying their eggs there. Soft soap diluted to about the consistency of paint makes a good wash and can be applied to the trunks with a broom.

Q. Early in the season? A. Yes.

By Mr. McNeill:

Q. Has the emulsion ever been tried for potato bugs? A. I do not think so. There is nothing which is so good, or which can be as easily applied, as Paris green.

Q. If it could be applied earlier in the season it would be much safer? A. I do not think there is much danger about Paris green, I mean in having it about. Paris green is so much used now that people take every precaution to keep it from their children and domestic animals, in the same way that they do many other necessary but poisonous substances.

By Mr. Hesson:

Q. What steps have you taken to make the results of your investigation known to farmers? A. I frequently write notes to the newspapers and whenever I see in the public press references to the ravages of insects, I at once write and try to get into correspondence with some of the farmers in the locality, and through them suggest remedies and treatment to the others. Whenever I travel, too, I make a point

of conversing with all farmers and gardeners. Thanks to this Committe I was provided last year with a liberal supply of my Report for 1885, which has been distributed very widely. I have received very great assistance in my work from the public press, particularly the French press in Lower Canada, who gave very kind notices of the Report, and urged the farmers to apply to me.

By Mr. Carpenter:

Q. Has any effectual remedy been discovered for the yellows in peach trees. In the section of country from which I come this disease is very prevalent and those trees found affected we have had to burn? A. I am afraid for the meantime you have hit on the only remedy that is effective. Some years ago at the Houghton Farm Professor Penhallow carried on some experiments by which he claimed that he had discovered a remedy for the yellows in the peach. He states that this disease, on an average, reduces the life of a peach tree to 9 years. His theory was that by feeding the tree, and specially manuring it, it was possible to make up for some deficiency in the soil, and thus strengthening the tree, enable it to throw off this fungous disease. This question I should fancy would be one of the things to be examined at the experimental farm. Many of these fungous diseases require a good deal of attention. One or two in Nova Scotia should be examined; there is a most remarkable disease, probably of fungous origin, in the Annapolis valley which is destroying the Gravenstein apple tree. It does not destroy the whole tissues of the plants but seems to check their growth. When the disease first appears, all that is visible is one, or sometimes more, slight depressions upon the side of the healthy, young branches. Where these appear the growth of the wood seems to stop, and as the tree increases in size no wood is deposited over these spots, but seems to flow along past them, and makes a flattened expansion on each side, and the branch twists and breaks right off in about the third year.

By the Chairman:

Q. Do farmers seem to appreciate the value of these studies? A. Yes, the number of letters I get from farmers asking for information is such that I can say they are very highly appreciated, and if more time could be given to them, there is no doubt they would be still more so. The fact of their practicability and utility requires no further comment than that the United States Government gives such attention to them, and publishes such extensive reports every year.

By Mr. Fisher:

Q. Have you been able to issue a bulletin for distribution throughout the country? A. There was one published last year on the Clover Seed Midge, a thing which required immediate attention, and was distributed in the Clover Seed growing counties. I have not found it necessary to do more than write notes to the newspapers since. I have received great courtesy from the newspapers and magazines and the horticultural papers, and I have to thank particularly the Roman Catholic clergy of Quebec, who have made it a part of their duty to speak of these studies among their parishioners and draw their attention to the fact that they could get information beneficial to them on such matters. I must mention, too, that I have received every assistance from the Department of Agriculture, and I have been allowed to travel for the purpose of making the examination of injurious insects or pests, and the Department has always published anything that I have submitted.

By Mr. McMillan:

Q. What about the rust and smut in wheat? A. They are fungus diseases. I believe that these rusts are a very difficult class of diseases to handle, because their development is affected one year differently from another by certain differences in the atmosphere. It would seem that the conditions are much more favourable for their development in one year than another. I understand, with regard to this wheat rust that in the lower parts of a field you will find it highly developed, while on a higher part of the land there will be none. It is produced from germs, and if these germs are there either in the soil or on the seed, there is a greater probability of its being developed, if the conditions are favourable. Smut is another fungus in wheat, but of a different nature, in that it attacks the whole substance of the plant. I have

never heard of a remedy for smut being used for rust; the two fungi are of a different nature. In England, however, we used to keep down smut by washing the seed in a solution of bluestone. If I remember rightly, the proportion used was 1 lb. of bluestone, that is, sulphate of copper, to 1½ gallons of water. This poisoned about one sack of seed. The seed was put in one pail and the solution poured on it from another and left for 5 or 10 minutes. The mixture was then poured over more seed until all was absorbed. Smut is a fungus called *Ustilago carbo* and attacks wheat, barley, and particularly oats, as well as many of our grasses. Although it only shows itself in the ear it is really right through all the tissues of the plant, having been sown with the seed, or being there, on the ground, from the previous year. Rust, on the other hand, is a fungus belonging to a different class, which attacks the wheat plant on the surface. It is called *Puccinia graminis*, or in its first stage *Uredo linearis*. This fungus passes the winter on old straw, and in the spring the spores are given out and carried by the wind till they rest on growing plants, when they produce the well known rust. Now, so little study has been given to these fungi in Canada, and the means of keeping them in check, that many experiments can be tried with good hopes of success. I do not know whether or not rust has been observed to occur less abundantly in fields where seed has been cleaned for the prevention of smut. Have any of you noticed this point?

Mr. FISHER—I have not.

By Mr. McMillan:

Q. Is there not a shrub upon which the fungus could exist during the winter? A. That is the question of the barberry plant you refer to, I presume. To be honest, I have never believed in that theory, for the fact is that we have rust all over the country and there are very few barberry trees. In England they have whole hedges of barberry, and you do not see any more rust there than here.

Q. I know of a man who planted a barberry hedge, and he noticed that the rust was very much more where these trees were planted than at any other portions of the farm away from them. He removed the hedge and the rust disappeared. He was perfectly certain that this fungus was in the bark of the barberry tree in winter and went back into the wheat in the spring? A. Scientific men cannot swallow anything without proof, although that is very strong evidence, but I believe if you destroyed every barberry tree in the country, you would still have the rust. We know that these microscopic fungi exist in various forms, sometimes on quite different plants, and this barberry theory seems to me possible, although I believe it is not accurate.

By Mr Platt:

Q. It is worst now in the newer sections of the country? A. This would, I think, bear out to a certain extent that it is not at any rate necessary for the fungus of the wheat plant to exist in one of its states upon members of the *Berberidaciæ*, the natural order to which the barberry belongs — for the number of species of this order, which are found in Canada, is so small that I can count them on my fingers. First of all of the family *Berberis* we have the Common Barberry, to which is attributed the distribution of this Summer Rust. This is an introduced shrub, and is by no means generally cultivated throughout the country. Then there are three British Columbian species, of a different nature, and in Europe known by the separate family name of *Mahonia*. These are not badly affected by parasitic fungi. Besides these there are only five other species, all of different genera, and two of these are only found in British Columbia, where one of them, *Achlys triphylla*, is very abundant in the vicinity of the wheat fields on Vancouver Island, but where, on the other hand, Summer Rust on the wheat is particularly uncommon. The other three species, Blue Cohosh, or Papoose Root, the May apple and the Twin Leaf, grow in low ground in the shade of woods. Not one of these is badly attacked by parasitic fungi, and the last named is very rare indeed. So that there are enormous tracts of country in Canada where no plants of the barberry family grow, but yet where the Summer Rust of the corn and grass crops (*Puccinia graminis*) is very prevalent.

By Mr. McMillan:

Q. What is the simplest wash? A. There is nothing simpler than blue stone.

By Mr. McNeill:

Q. I should like to ask Mr. McMillan, if he knows whether the barberry hedge he spoke of was not on the north side and served as a shelter as well.

Mr. McMILLAN—It may have been.

Mr. FLETCHER—That is an important fact to consider.

By Mr. Watson:

Q. What is the best mode of applying blue stone? A. The way I have seen it applied is to put it in water, and after it has dissolved to a certain extent, put the wheat into the solution.

Q. And soak it? A. Yes; for 5 or 10 minutes.

By Mr. McMillan:

Q. Putting the wheat into a salty solution like that might also cause the bad grain by reason of specific gravity to float on top? A. Yes, that might no doubt be true.

Q. How would you treat the mildew on the grape? A. The mildew on the grape has been very carefully investigated by the United States Department of Agriculture, and the report published by Prof. Scribner is one of very great value and contains much practical information. It is in the Library of Parliament, and as anything I might say would be what I have gathered from that report, to save time this morning if any of the gentlemen present wish to see the report, which is I believe the best yet published, I shall be pleased to place it in their hands.

By Mr. Robertson (King's, P.E.I.):

Q. What about the weevil? A. The term "weevil," as I once pointed out, may represents five different things. The one you mean is the Wheat Midge. I fear that no practical remedy has yet been devised for keeping down this "weevil." I believe the only step we can take is to choose new varieties for seed, so as to effect a change from what we have been growing before. If you find that the variety you are growing is attacked, it would be well to try a change of seed, so as to get a variety which develops its seeds at a different time. Mr. Casey told me about a case in his neighbourhood (Elgin), which was also confirmed by Mr. Jabel Robinson, the then Master of the Grange, that they had tried a wheat there called the Democrat. It is found that it matures earlier than others, and before the midge appears, the young kernel is sufficiently mature to withstand the attack of its larvæ. The only practical remedy is to get a wheat which matures earlier. Mr. Arnold some years ago, by a system of hybridizing, produced what he called a midge proof wheat; but unluckily (in one sense), just as he had worked it up to what he thought was satisfactory, the midge stopped. In 1854, it was estimated that Canada lost $8,000,000 worth of wheat from the midge that year. Mr. Arnold carried on his experiments with great care, extending over a period of years, but just before he died he wrote to me that he ceased after the disappearance of the midge, and he did not think there was any of his grain to be found in the country.

By Mr. Sproule:

Q. This midge proof wheat is covered with a heavy bran is it not. I have heard it said, also, that it is not so good for making flour? A. I believe the wheat he produced was of inferior quality, but I think the chief aim was to get a variety that would mature earlier. It was assumed that if a variety of any quality could be developed whichwould ripen earlier than the ordinary wheat, the quality could be improved by hybridizing. This insect which is called the "weevil" in the Lower Provinces, is more commonly known as the "Red worm of the Wheat" or the "Wheat Midge," which is its proper name. It is very small, the perfect insect not being larger than the head of a pin. It will be readily seen that the egg which such an insect may lay must be exceedingly minute in its proportions. This egg would be laid at the top of the scales of chaff, and while it might be that a close chaff would offer some degree of resistance, it is probable that the kernel being more perfectly developed, would betougher, and therefore harder to work on.

By Mr. Mallory:

Q. This midge does not affect the wheat after the chaff is formed? A. It attacks it directly it comes out of the sheath. I think the skin of the kernel being tough, might be a better protection than a close chaff.

By Mr. Fisher:

Q. I suppose the rust which attacks the wheat is the same as that which attacks the oats; and we sometimes have our potato stalks attacked by it? A. It is possible the rust which attacks the wheat may be identical with that which attacks the oats; but it is certainly not the same as that which attacks the potato stalks.

Q. Is that also a fungus? A. Yes, but it is one of the many species which attack the Solanaceae.

Q. I suppose the same mode of dealing with the oats as with the wheat would be effective? A. Yes.

By Mr. Hesson:

Q. You will find that the rust on new land is always in the lower portion of the field. Is that not a fact? A. I believe it is.

By Mr. Sproule:

Q. Have you any remedy for the insects that destroy the turnip? A. You refer to the Turnip Flea-beetle. Yes; after trying it for the last few years I have no hesitation in recommending Paris green for them. It is a most troublesome pest all over Canada and particularly in Vancouver Island. I said to one farmer out there: "You have a nice piece of turnips, but some of them appear to be more vigorous than the others." He replied: "They are not so thick as they ought to be, but this is only the third time I have sown them. We sow three times nearly every year and sometimes four." I then tried a mixture of Paris green and land plaster, and sowed it along two rows. Those rows turned out in splendid condition.

Q. What proportion did you use it? A. In no particular proportion at that time. One of the remedies given in England for this turnip fly is land plaster. The reason given for this is that the plaster, being a quick acting fertilizer pushes up the turnips so rapidly that the foliage increases more rapidly than the insects can destroy it. I think in using Paris green the proportion might properly be fixed at one part to fifty of land plaster.

Q. When do you put it on the plant? A. Just when it shows itself. The idea is to protect the seed leaves. When the two seed leaves show themselves through the ground, if any considerable injury is done to them, the whole plant will be destroyed. These first leaves are really not leaves at all. They are merely reservoirs of food for the young plant, and the leaves that come afterward have the function of absorbing from the air the food which is needed for the sustenance of the plant. These seed leaves are lungs, and you may see how important they are, if, just when they appear, you pinch them off. The plant will die.

Q. Do you think it necessary to repeat the operation of sowing this land plaster and Paris green? A. No; for when the plumule appears it will grow so rapidly and produce such an abundance of foliage, that the insect can accomplish but little injury.

By Mr. Tyrwhitt:

Q. My experience is that there are certain varieties of turnips which are not affected by this fly? A. That is one thing that should always be noticed and an effort should be made to grow a variety that is not subject to attack. We sometimes find that one variety of fruit is not so liable to attack as another. Certain plum trees, for instance, are not so severely attacked by the curculio as others, and the same thing is probably true with regard to the turnip. There is also the remedy of sowing at a different time. I have known farmers keep their turnips out of the ground until everyone said they would not get a crop at all. What they did, was to sow their seed after the first brood of the insect pest had passed. It is only at certain times that plants are liable to attack, sometimes early and sometimes late, and what we have to do is to try and cut in between. This plan of late planting is sometimes adopted to avoid the maggot in the roots of cabbages. Some market gardeners keep their cabbages

out of the ground until it would seem they could have no growth at all; but while the crop is smaller, the cabbage is saved and is better.

By Mr. Hesson:

Q. The same thing in regard to radishes? A. That is a matter I desire to refer to. In all parts of the country the maggot attacks the radishes and does great injury. I would, however, like it to be known that radishes can be grown with very little trouble, by watering them once a week with a very weak solution of carbolic acid directly they appear above the ground. I tried the experiment last year in three different ways, and grew some very fine radishes right in among some that were badly infested.

By Mr. McNeill:

Q. In what proportions did you prepare the solution? A. It is a remedy suggested by Professor A. J. Cook, State Entomologist of Michigan, and is prepared as follows:—Add two quarts of soft soap to two gallons of water, to which when heated to the boiling point, add one pint of crude carbolic acid. For use take one part of this mixture to fifty of water and apply by sprinkling directly upon the plants once a week.

Q. Referring to the rust in wheat again, I did not gather whether your observations in England led you to believe whether, in those fields treated with bluestone, the rust was less than in others not so treated? A. I cannot speak about the rust. What I suggested was that the different fungi which attack cereals had been so little studied, that there might be several kinds and of different natures, all included under the general head "rust," and if this were the case possibly some of these would be destroyed by washing the seed with the solution of sulphate of copper known to be so injurious to fungus life. I have seen it frequently stated that they have neither rust nor smut in Manitoba and the North-West Territories. Mr. Watson may probably be able to answer your question.

Mr. WATSON—There is smut in some of the wheat.

Mr. FLETCHER—Do they use bluestone for it?

Mr. WATSON—Yes.

Mr. FLETCHER—Does that keep it down?

Mr. WATSON—Yes.

By Mr. Semple:

Q. The greatest cause of rust, in my opinion, is rapid growth, in the centre of one of my fields in low places and therefore late, it would ripen at the same time as the other, but having started later it had to grow quicker in order to catch up? A. The rapidity of growth might I suppose produce a weekly plant in the same way that unnatural bodily development produces a weekly animal. It is a common thing to say of a boy who grows tall very rapidly "He has outgrown his strength," and if these rapidly grown plants show their susceptibility to attack from fungus diseases most, it is certainly strong evidence that there is a want of vigour in the plant. The most robust plant is the one that grows evenly right through. There is an unnatural growth when you speak of a plant making too much wood late in the autumn and being liable to injury from the frosts of winter on account of the wood not being properly ripened.

Q. The stem that grows slower is stronger and tougher, and would, therefore, throw off everything that would cause the rust? A. I think climatic influences have much to do with the prevalence of fungus diseases and may allow a pest to exist very much better in some years than in others. All through Nova Scotia last year they had a bad year for the spot in apples, and in some parts of Ontario it also prevailed. It appears to me that local atmospheric conditions have a great deal to do with these things. One of my correspondents may say the black spot is done away with in his county, and then I may get a letter from an adjoining county telling me it is more prevalent there than usual.

By Mr. Robertson (King's, P.E.I.):

Q. Have you any remedy to suggest for the black spot? A. I have not tried any experiments, but I notice that in the Fiji Islands and Australia most successful

experiments have been tried, not for that disease, but for one of the same nature which attacks the coffee trees. Small receptacles, such as tin cans, are kept filled, with a solution of carbolic acid. This vaporises through the trees and has had the effect of weeding out the disease in one of the coffee plantations. I had hopes of trying this year the same experiment on the apples, but have not had the opportunity. It is one, however, which I shall certainly try at some future time.

Q. Is it too late to try it this year? A. No, I don't think so. This black spot or *Fusicladium*, lives in three different positions on the trees. It passes the winter on the dead leaves and young green shoots of the tree, later on it attacks the fruit, and after the fruit is gone you can always find it on the leaves. A remedy which could be easily tried which I believe would be successful, although I have not tried it yet, would be to burn the dead leaves in the orchards, as they have the disease on them, and the young shoots might be sprayed with kerosene emulsion.

Q. I find that the black spot is peculiar to certain kinds of apples—to the Fameuse particularly? A. It certainly attacks some varieties more severely than others; especially the Fameuse, but I doubt whether any variety is actually exempt.

By Mr. McMillan (Huron):

Q. Have you known salt, plentifully applied to the trees in an orchard, assist in keeping off the black spot? I have a large number of apple trees and applied salt pretty plentifully to the roots, and although it did not completely eradicate the black spot the apples grown on the trees were very much clearer next season? A. Perhaps some Nova Scotia members can tell us whether orchards manured with marsh mud are least attacked. It is not the same kind of salt, but still it might throw some light upon this question.

By Mr. Robertson (King's, P. E. I.):

Q. The marsh mud is pretty well impregnated with salt? A. I think it would have the same effect as the salt.

Q. The mud is put round the root of the tree? A. Yes; perhaps Mr. McMillan will tell the Committee how he applied his salt.

Mr. McMillan—I sowed it round the base of the trees in the fall.

Mr. Fletcher—This is very interesting information. Mr. McMillan says good results followed from the application of salt at the base of the trees in keeping down the black spot. In Nova Scotia I heard it stated that the salt air had a good effect in keeping down the black knot on the plum. All along the sea board this plum fungus, it is stated, does not attack the trees which are open to the salt breeze from the ocean. Now, if this be accurate, that is the point we should take advantage of and spray the trees with salt when looking for a remedy, and record the results.

By Mr. Carpenter:

Q. Have you any remedy for the blight on the pear tree? A. That is fire blight. It is a very troublesome thing for this reason:—A remedy which is applied with good results in one place will have no effect in another. I do not think that we can claim that a very good remedy has yet been found, although excellent results are said to have been produced by mulching the trees and keeping them cool around the base. A very curious discovery is said to have been made. It is claimed by scientific men that this disease is actually caused by bacteria; not that bacteria exists there, but that it is caused by bacteria. Some of the medical gentlemen in the Committee may be surprised and even dissent from this; but at all events such is what good scientific men declare. Prof. Burrill, who has studied this one disease particularly, in the Illinois University, has found that he could inoculate trees with bacteria from a seventh culture and produce pear blight. It has been found, however, that by mulching the trees around the base and keeping them cool in the summer, the disease was much less prevalent than in orchards where this is not done.

By Mr. Mallory:

Q. Have you noticed that there is some kind of insect which attacks the mangold? A. In the leaf?

Q. In the leaf and root? A. I have not seen it in the root. I have seen an insect that mines in the leaf; but I have not seen it in the root.

By Mr. Watson:

Q. In Manitoba for the last couple of years, we have had a little green insect which has been killing off the soft maple trees. A. I was in Winnipeg in August and I found that the trees were in a horrible state of dirt. They had been apparently infested by a species of *aphis*—one of those small plant lice—and the whole trees were covered with their honey-like exudation. It would probably entail considerable expense, but the whole of those shade trees should be syringed immediately the insects appear with a pyrethrum wash or a weakened coal oil emulsion. Of course, however, it is just possible they may not be attacked this year.

Q. Last year it killed off some of the trees altogether that had been attacked the previous year? A. From what I could see of the filthy state of the trees, they were covered with the honey-like exudation, which is really the excrement of this insect. This excrement exudes from tubes on their backs, and it is this which attracts ants so much to these plant lice. From what I saw, I was convinced that an aphis had been there.

Q. They cover the whole tree? A. I should recommend that an emulsion of coal oil should be sprayed over the whole tree.

By Mr. Bain:

Q. Speaking of apple trees, we have experienced considerable difficulty in the neighbourhood of Hamilton. A number of apple trees suddenly become brown, just as if a caterpillar had attacked the leaves. They stay that way for two or three weeks, and then the young shoots begin to crack, and by degrees the leaves drop off. It appeared just as if caterpillars were at work as you drove past the orchards, but some farmers told me it was more like a blight. The leaves simply withered away.

Mr. FLETCHER.—I had one letter complaining that the apples dropped in large numbers this spring, but heard nothing of what you refer to.

By Mr. Bain:

Q. In the case I am speaking of the leaves dropped. There was one particular orchard I passed every two or three days, and in looking up the rows, there were one or two which were perfectly brown while the other trees were not affected. The ground was of such a character that this could not have been the effect of frost.

Mr. MARSHALL.—I may say that near Hamilton recently we saw several orchards from the train which were affected in the manner described.

By Mr. Semple:

Q. What do you consider the best wash for apple trees, to make them healthy? A. Soap contains a certain amount of alkali, and cleans out small insects, and does not injure the trees in any way. In Nova Scotia they scrape the trees and whitewash them, which is very beneficial, as lime has an excellent cleansing effect, and being an alkaline earth keeps away insects, and moreover improves very much the appearance of the orchards.

On motion, Mr. Fletcher was tendered a cordial vote of thanks.

The Committee then adjourned.