

## Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- Coloured covers /  
Couverture de couleur
- Covers damaged /  
Couverture endommagée
- Covers restored and/or laminated /  
Couverture restaurée et/ou pelliculée
- Cover title missing /  
Le titre de couverture manque
- Coloured maps /  
Cartes géographiques en couleur
- Coloured ink (i.e. other than blue or black) /  
Encre de couleur (i.e. autre que bleue ou noire)
- Coloured plates and/or illustrations /  
Planches et/ou illustrations en couleur
- Bound with other material /  
Relié avec d'autres documents
- Only edition available /  
Seule édition disponible
- Tight binding may cause shadows or distortion  
along interior margin / La reliure serrée peut  
causer de l'ombre ou de la distorsion le long de la  
marge intérieure.
- Blank leaves added during restorations may  
appear within the text. Whenever possible, these  
have been omitted from filming / Il se peut que  
certaines pages blanches ajoutées lors d'une  
restauration apparaissent dans le texte, mais,  
lorsque cela était possible, ces pages n'ont pas  
été filmées.
- Additional comments /  
Commentaires supplémentaires:

- Coloured pages / Pages de couleur
- Pages damaged / Pages endommagées
- Pages restored and/or laminated /  
Pages restaurées et/ou pelliculées
- Pages discoloured, stained or foxed/  
Pages décolorées, tachetées ou piquées
- Pages detached / pages détachées
- Showthrough / Transarence
- Quality of print varies /  
Qualité inégale de l'impression
- Includes supplementary materials  
Comprend du matériel supplémentaire
- Pages wholly or partially obscured by errata slips,  
tissues, etc., have been refilmed to ensure the  
best possible image / Les pages totalement ou  
partiellement obscurcies par un feuillet d'errata,  
une pelure, etc., ont été filmées à nouveau de  
façon à obtenir la meilleure image possible.
- Opposing pages with varying colouration or  
discolourations are filmed twice to ensure the best  
possible image / Les pages s'opposant ayant des  
colorations variables ou des décolorations sont  
filmées deux fois afin d'obtenir la meilleure image  
possible.

Various pagings.

Appendix No. 1 not printed.

APPENDIX

TO THE

THIRTIETH VOLUME

OF THE

JOURNALS OF THE HOUSE OF COMMONS

DOMINION OF CANADA

SESSION 1896



O T T A W A

PRINTED BY S. E. DAWSON, PRINTER TO THE QUEEN'S MOST  
EXCELLENT MAJESTY

1896

---

VOLUME XXX

## APPENDIX

---

### LIST OF APPENDICES—1896.

- No. 1.—SECOND REPORT of the Select Standing Committee on Public Accounts, being correspondence had between the Departments of Justice and Finance, with reference to Fredericton and St. Mary's Bridge Accounts. *Not printed.*
- No. 2.—REPORT of the Select Standing Committee on Agriculture and Colonization. *Printed herein.*

59 Victoria.

Appendix (No. 2.)

A. 1896

# REPORT

OF THE

## SELECT STANDING COMMITTEE

ON

# AGRICULTURE AND COLONIZATION

SIXTH SESSION, SEVENTH PARLIAMENT

1896

*PRINTED BY ORDER OF PARLIAMENT*



OTTAWA

PRINTED BY S. E. DAWSON, PRINTER TO THE QUEEN'S MOST  
EXCELLENT MAJESTY

1896



# Agriculture and Colonization.

## TABLE OF CONTENTS.

THE COMMITTEE'S REPORT..... ix.

### EVIDENCE.

#### PART I.

AGRICULTURE ..... p. 1.

MR. JAMES W. ROBERTSON, Agricultural and Dairy Commissioner..... 3.

Resources of Canada for the production of food products, 3. Profit between cost of products and selling prices, 4. Law of supply and demand, 4. The British market for food products, 6. Transportation charges, 7. Value of cold storage, 8. British imports of food products in 1894, 10. Suggestions for improving the egg trade, 10. The world's live stock, estimated numbers of, 11. Great Britain's import of dairy products, by countries, 12. Colonial butter season—variation in prices, 14. Preservation of butter by cold storage, 15. British imports of beef in 1894, 16. Shipment of cattle from Australia, 17. Chilled beef compared with live cattle, 17. Chilled beef compared with frozen beef, 18. Net returns from cattle shipped alive, 19. Estimated returns from shipments of chilled beef, 21. Cattle and sheep exports from Ontario and Quebec for each year—1890-'95, 23. Advantages of Government management to start the business, 23. Marketing difficulties—cattle and beef deteriorated, 24. No alternative market in Great Britain, 24. Direct trade connection prevented, 24. Profits of middlemen, 24. Danger from restrictions, 25. Small cattle, 25. Beginning of cold storage, 25. Objections of sentiment prevented by Government action, 25. The plan recommended—meats chilled only arrive in prime condition, 25. Recommendation to purchase 500 cattle per week, 26. Preparation of beef at Montreal, 26. Agreements with merchants, 26. Retail prices fixed, 26. Prices to merchants determined by retail prices, 26. Payments by merchants, 26. No definite number of cattle need be purchased, 27. Maximum of estimated net cost to Government, 27. One year only required, 27. Appointment of inspectors of meat, 27. Other perishable food products, 27. Cold storage for cheese, meats, &c., 27. Extension of butter and beef go together, 28. Export demand for the whole year, 28. Benefit to the Maritime Provinces, 28. Cost per head of export,—Montreal to Liverpool, 28. New abattoirs to be provided, 31. Wrappers for the meats, 31. Plan proposed to provide lasting advantages, 34. British imports of sheep, 37. Foods consumed per head in Great Britain, 38. Swine products imported by Great Britain, 39. Cold storage for cheese, 40. The winter dairying movement, 44. Export of creamery butter by the Government, 44. Butter shipments and prices obtained, 45. Good standing obtained in England, 45. Comparison of prices obtained, 46. Cost to the Government of shipping butter, 46. Those who benefited by the expenditure, 47. A system of cold storage provided for transit, 47. Canada's competition in dairy products, 47. Assistance to creameries extended, 48. The Moose Jaw creamery, 48. Dairying in British Columbia, 49. Assistance to dairying in the Territories suggested, 49. Dairying in the Eastern Provinces, 49. Government expenditure and returns in Prince Edward Island, 50. Plan of assistance to factories, 52. The problem of providing cold storage, 53. The Government's uniform, continuous assistance to dairies, 53. Prime necessities in the construction of cold storage buildings, 54. Comparative export of butter, 55. The primary object of cold storage, 55. The commercial phase of cold storage, 56. The different Provincial Governments, 59. The duty of municipalities to the dairy interests, 60. The corporation of Manchester, 60.

MR. W. SAUNDERS, F.R.S.C., Director, Dominion Experimental Farms, . . . . . 62

The grain productions of the Dominion, 62.

OATS,—comparative results of test growing on the experimental farms, 63. Seeding varieties in point of yield, at the several farms, 63. Leading average results at all the experimental farms, 65.

WHEAT crop of the Dominion, 71. Wheat growing,—results of tests at the experimental farms, 71. Average at all the experimental farms, 72. The most prolific varieties at the several farms, 72. Leading varieties of spring wheat according to the returns obtained at all the experimental farms, 74.

BARLEY crop of the Dominion, 75. Results obtained from test growing of six-rowed barley, 75. Average yield at all the farms, 76. Results from test growing of two-rowed barley, 77. Comparative yields of two-rowed and six-rowed barley, 79.

PEASE crop,—yields of different varieties, 79. Best yielding varieties of pease, as recorded at the different experimental farms, 80. Best varieties of pease, by the average yield at all the farms, 81. Varieties and fertility of cross-bred pease, 81. Seed distribution of cross-bred cereals, 82. Reliable remedy for destruction of the pea-bug, 83. Comparison of results obtained from fresh and rotted manures, 84. Loss of weight in manure during the rotting process, 85. Fertilizing the soil by means of green crops, 88. Sowing clover with barley, 91. Experiments with varieties of clover seeds, 92. The Branch experimental farms, 94. Potato culture, 95. Treatment for smut in wheat, 95. Flax growing, 96. Green crops, fodder—corn and roots, 96. Live stock on the experimental farms, 96. Fruit growing, 96. Varieties of grasses tested, 98. The Dominion experimental farms, as regarded in Europe, 101.

MR. A. G. GILBERT, Manager, Poultry Department, Central Experimental Farm. 102

Progress in poultry raising, 102. Profits from winter-laid eggs, 104. Poultry products in the Maritime provinces, 108. How to treat hens, to obtain eggs in winter, 110. Early hatching and moulting, 110. Best ration for production of eggs, 111. Comparative merits of different breeds, 113. Housing space and yard room, 117.

MR. JOHN CRAIG, Horticulturist, Dominion Experimental Farm . . . . . 121

The fruit crop of 1895, 122. Provincial Associations, 122. Injury to peach buds, 124. Fruit testing at Ottawa, 124. Cultivation of orchards, 126. Record of expenditure and returns, 129. Apple orchards in Annapolis, Tables I and II, 129, 130. Thinning the fruit, 131. How to perform top grafting, 133. New varieties of plums, 136. Growing of cherries, 137. Selection of pears for growing, 138. Test growing of small fruits, 139. Treatment of fungous diseases, 141. Remedy for defective fertilization of fruit blossoms, 145. Cultivation of the cranberry, 147. Cold storage for fruits, 152.

MR. WILLIAM JOHNSON, Vice-president of the Dominion Cold Storage Company (Limited) . . . . . 157

Cold storage company,—proposed plan of operations, 157. Cold storage egg trade, 159. Cost of storage and freight, 161. Cost and capacity of cold storage houses, 163. Guarantee of interest on capital, 164, 168.

MR. JAMES FLETCHER, Entomologist and Botanist to the Dominion Experimental Farms . . . . . 174

Insects injurious to fruits, and the remedies, 174. Household insect pests, 181. The experimental apiary at the Central farm, 184, 191. Grasshoppers, 184. Weeds as affecting agriculture—most noxious species, 186. Duration of vitality in seeds, 189. Preservation of bees in winter, 190.

## Agriculture and Colonization.

MR. JOHN FIXTER, EXPERIMENTAL FARM FOREMAN..... 191

Produce from the Experimental Apiary..... 191

MR. R. F. HOLTERMANN, President of The Ontario Bee-Keepers' Association... 192

Local requirements and profits of Bee-keeping, 192. Seasons of large yields of honey, 193. Markets, 193. How to begin, 193. Handling Bees, 194. Successful management—how to proceed, 194.

MR. FRANK T. SHUTT, M. A., F. C. S., Chief Chemist, Dominion Experimental Farms..... 195

Classification of Departmental work, 195. Analyses of soils and fertilizers, 196–204. Determination of available plant food in soils, 198. General treatment of soils, 199. Naturally occurring fertilizers, 203. Miscellaneous investigations, 205. Original research during the coming year, 206. Experiments with mineral manures. 207. Analyses of well waters, 205.

MR. D. DERBYSHIRE, President of The Ontario Creamery Association..... 209

Success with winter made creamery butter, 209. Canada's contribution to English total imports of dairy produce, 210. Importance of quality, 210.

## PART II.

IMMIGRATION AND COLONIZATION..... 213

MR. A. M. BURGESS, Deputy Minister of the Interior..... 215

Expenditure on account of immigration, year by year, from 1867-68 to 1894-95 inclusive, 215. Expenditure of the appropriation for the current year, 216. Bonus to steamship agents; the United Kingdom, 217. European continent, 218. Icelandic immigration, 219. Scandinavian immigration, 219. Unsuitable classes warned, 219. Government's careful provision of ample means for securing the health, comfort and general protection of immigrants, upon arrival in Canada, until settled, 220. Expenditure for cattle quarantine, 222. Veterinary inspectors' fees, 222. Immigration literature and agencies, 222. Juvenile immigration, 223. An Imperial state paper, 224. Immigrant arrivals in Canada, from 1890 to 1895 inclusive, 225. Steamship rates, 226. Farm pupil business, 226. Immigration appropriation, 226. The repatriation movement, 227. Immigrant arrivals—first ten months of current year, 227. Nationality of Homestead settlers—first ten months of 1895, 228. Homestead entries made in the calendar years 1893, 1894 and first ten months of 1895, by persons coming from the various states and territories of the American Union, 229. Expenditure, Canadian agencies, 230. Expenditure, European agencies, 230. General expenditure, including service in United States, 230.



# Agriculture and Colonization.

## THE COMMITTEE.

(THOMAS S. SPROULE, Esq., *Chairman.*)

Messieurs :

Bain,	Innes,
Beith,	Jeannotte,
Bergeron,	Joncas,
Bernier,	LaRivière,
Blanchard,	Leclair,
Boston,	Leduc,
Bowers,	Legris,
Bowman,	Lépine,
Boyd,	Lippé,
Brodeur,	Livingston,
Burnham,	Macdonald ( <i>Huron</i> ),
Calvin,	Macdonald ( <i>King's</i> ),
Cameron,	Macdowall,
Campbell,	McDonald ( <i>Assiniboia</i> ),
Cargill,	McGregor,
Carignan,	McLean ( <i>King's</i> ),
Carling, Sir John,	McLennan,
Carpenter,	McMillan,
Casey,	McNeill,
Choquette,	McShane,
Christie,	Mara,
Cleveland,	Marshall,
Cochrane,	Metcalfe,
Corbould,	Mignault,
Daly,	Miller,
Davin,	Montague,
Davis,	O'Brien,
Dawson,	Paterson ( <i>Brant</i> ),
Desaulniers,	Patterson ( <i>Colchester</i> ),
Dugas,	Perry,
Dupont,	Pope,
Dyer,	Powell,
Earle,	Pridham,
Edwards,	Proulx,
Fairbairn,	Putnam,
Fauvel,	Reid,
Featherston,	Rinfret,
Ferguson ( <i>Leeds &amp; Grenville</i> ),	Robillard,
Ferguson ( <i>Renfrew</i> ),	Roome,
Forbes,	Rosamond,
Fréchette,	Ross ( <i>Dundas</i> ),
Gibson,	Ross ( <i>Lisgar</i> ),
Gillies,	Rowand,
Gillmor,	Sanborn,
Girouard,	Semple,
Godbout,	Smith ( <i>Ontario</i> ),
Grieve,	Sproule,
Guay,	Stubbs,
Harwood,	Sutherland,
Henderson,	Taylor,
Hodgins,	Turcotte,
Hughes,	Tyrwhitt,
Hutchins,	Wilmot,
Ingram,	Wilson. — 108.



# Agriculture and Colonization.

## REPORT.

The Select Standing Committee on Agriculture and Colonization submit their third and final report which includes, as a portion thereof, the evidence taken by the Committee.

The investigations of the Committee have been conducted under two divisions, viz. : Agriculture and Colonization.

On the first named, Agriculture in relation to its scientific methods and productions, the Committee have had before them Mr. James W. Robertson, Agricultural and Dairy Commissioner; the several officers of the Central Experimental Farm, Mr. William Saunders, Director of the Dominion Experimental Farms; Mr. A. G. Gilbert, Poultry Manager; Mr. John Craig, Horticulturist; Mr. James Fletcher, Entomologist and Botanist; and Mr. Frank T. Shutt, Chief Chemist. Also Mr. John Fixter, Farm Foreman.

In addition to these were heard before the committee Mr. William Johnson, Mr. D. Derbyshire, Brockville; and a paper was communicated by Mr. R. F. Holtermann, Brantford.

The evidence and examination of Mr. Robertson, Agricultural and Dairy Commissioner, related largely to the natural resources of Canada for the production of animals and their products, including manufactures of the dairy, and the importation of these lines of agricultural products by Great Britain.

Mr. Robertson laid before the committee the details of a scheme to establish a trade in the exportation of chilled meat to the English markets, in order to give farmers a market alternative to the export of live animals. His proposal on this project was that the business be conducted for a time under the auspices of the Government in order to overcome existing obstacles which traders feel unequal to combat, but which, in his opinion, could be removed by the prestige of the Government, and that with the trade once established, commercial men would take the business solely into their own hands. His estimates in reference to this proposal will be found in the evidence before the committee, on the 20th and 21st February, ultimo.

In regard to operating winter creameries, the commissioner stated that the progress in this branch of dairying, though not discouraging, was yet slower than could be wished, owing to causes which he stated, but still causes which by a small measure of judicious aid would speedily disappear, and to some extent, had already done so, but others still remained; while he submitted proofs of the gratifying fact that first class Canadian creamery butter, of the export of 1895-96, took well in England, and that this commodity is now being inquired for by dealers, there. The advances made and the prices received in England for butter exported by the Government in 1895, will be seen by reference to his annexed evidence.

Another point which the commissioner emphasized is the absolute necessity of cold storage for the preservation of perishable food products, such as butter, meats, poultry, eggs and fruits, particularly where such products enter into export, in order to place them upon the markets of Great Britain in that unimpaired condition which alone can render them acceptable to the purchasing consumers of that country. This cold storage, he insisted, should be systematized by commencing at the places of production, as feeders to cold storage warehouses at leading points of shipment, supplemented by refrigerator cars over the railways, and cold storage apartments on board of ocean-going ships, and, finally, cold storage receiving warehouses at the trans-Atlantic points of delivery and sale. In reference to trans-oceanic export on board steamships, the commissioner gave it as his opinion that the Government should subsidize such ships as would provide ample cold storage, by paying them for the space occupied by the insulation of chilled compartments.

The committee adopted a resolution recommending to the notice of the Government Mr. Robertson's proposal for the establishing of a trade in chilled meats; and also a resolution recommending to the favourable consideration of the Government for providing a system of cold storage for the preservation of perishable food products intended to be placed upon the markets. These recommendations will be found amongst the resolutions of the committee, immediately following the evidence contained in this report.

The whole matter of the commissioner's evidence will be found of material importance in the consideration of how best to stimulate the productions of Canadian farming, and the mutual relations that exist between agricultural industry and the commerce arising from the supplying of these products to both home and foreign markets.

Mr. William Saunders, Director of the Dominion Experimental Farms, was before the committee on two occasions, and his evidence will be found to convey very much valuable information to the practical farmer in relation to the best methods of cultivation for realizing paying crops and the maintaining of the fertility of the soil. As a primary and leading element towards securing these desirable ends, he has presented in tabulated form the results derived from experiments with the application of barnyard manures in different conditions, applied in the raising of various kinds of crops. The results obtained from experiments under similar conditions are nearly uniform, yet with some interesting variations, according to the crop experimented with.

The Director states in reference to the oat crop of Canada, as a gratifying fact, that this country is ahead of her two chief competitors, the United States and Russia, in the average yield per acre, yet our average production is considerably less than that of some European countries named in the comparison. The yield per acre at the several Dominion experimental farms is furnished, and also the twelve most prolific varieties of oats grown at the Central Farm, and a similar list for each of the Branch farms.

The work of the distribution of three pound packages of seed grain of various kinds to farmers for experiment, commenced in 1889, has been continued each year since. This distribution has amounted to 38,000 three-pound samples of oats which have been sent out to farmers and the results reported back have been highly satisfactory.

## Agriculture and Colonization.

The series of experiments with varieties of wheats, as furnished by the director will be found equally interesting, and the experiments conducted for a series of years, with both these cereals, now furnish reliable data to guide farmers all over the Dominion as to the species best adapted to each Province and Territory.

The experiments with varieties of barley have also been persistently followed up upon the experimental farms, and the results obtained will be found in Mr. Saunders' evidence.

The pea, a valuable product, has been the subject of equally patient experiment, and the results recorded. The pea worm which has in many parts been found to be a serious detriment to the raising of pease, has been overcome, and the treatment to this end is furnished.

The experiments conducted by the ploughing under of clovers and other legumes and green crops reveal a valuable source from which to supply fertility to the soil, especially where barnyard manure is in quantity short of the requirements of the farmer.

The other lines of experiment furnished by the director as having been worked out on the experimental farms are equally instructive and valuable to every branch of special and general farming.

MR. A. G. GILBERT, Manager of the Poultry Branch, at the Central Farm, was heard in reference to the best methods of rearing fowls for profit, the best breeds for given purposes, and the best methods of placing eggs upon the market in fresh and unchanged condition.

The manager's directions for the treatment of laying fowl to secure eggs for marketing in the winter months when prices are highest, form a feature of special value in his evidence.

MR. JOHN CRAIG, Horticulturist, presented gratifying evidence of increasing interest among farmers in regard to horticulture as a paying branch of agriculture when intelligently pursued. His experimental labours in the cultivation of apples have enabled him to furnish tolerably reliable data as to the various kinds best adapted to profitable cultivation in the several provinces of the Dominion according to climatic conditions, and a like remark applies to his observations upon both large and small fruits. His statements bear testimony to the success that has attended the experiments of the past six years for the destruction of fungous diseases in fruit-bearing trees, shrubs and vines, by the timely application of spraying compounds; and in this connection he presented to the Committee some striking object lessons on the value of systematic spraying.

The Horticulturist bears testimony, also, to the excellent work being accomplished by Provincial associations of fruit growers.

Mr. James Fletcher, Dominion Entomologist and Botanist, was also before the committee, and his evidence goes to show that for all the fungous and insect pests that have yet appeared in this country, there have been found successful methods of treatment for their extermination. He described the life habits of several household insect pests, and the best methods of combating them, such as the clothes moth, and the

destructive pest designated "the carpet beetle" which appeared in force in several localities in Ontario last year. The evidence of the entomologist will be found a valuable compendium for the treatment of field and household pests. His evidence is also emphatic as to the care which farmers should exercise in keeping down noxious weeds, some kinds of which threaten mischievous consequences to agriculture unless prompt and decisive measures are adopted for their extermination.

Mr. Fletcher informed the Committee that he was conducting some interesting experiments in connection with the apiary recently established at the Central Farm. One of these experiments is being conducted in the direction of ascertaining the best method for keeping bees through the winter, but the experiments are not yet sufficiently advanced to be presented as reliable data.

Mr. John Fixter, foreman of the Central Farm, supplemented Mr. Fletcher's evidence with a statement of the product derived from the experimental apiary.

Mr. R. F. Holtermann, President of the Beekeepers' Association of Ontario, contributed a paper to the committee on bee culture and management

Mr. Holtermann, who has had extensive experience and opportunities of observation for a number of years, points to the importance of the production of honey as an adjunct to other farm industries, on the grounds that with proper management it is profitable, while it does not lessen or in any way interfere with any other branch of agricultural production.

The committee have incorporated this paper into the evidence annexed, and believe it will be found to contain valuable directions to those about to enter upon beekeeping, or such as may already have started in this line.

Mr. D. Derbyshire, Brockville, President of the Ontario Creamery Association, was heard before the committee on the 2nd April, current. He informed the committee that the object of his colleagues in the association, and himself, in coming to Ottawa, was to press for assistance from the Government to place Canadian winter-made creamery butter upon the markets of Great Britain. He pointed out the ample market open there to creamery butter of a fine grade, and he stated his belief, derived from past experience, that with the assistance of a bounty on winter creamery butter exported, Canadians would gain possession of that market. Mr. Derbyshire's evidence, annexed, will be found a valuable epitome of the progress of the dairy industry of the Dominion, heretofore, and also of the available markets for a yet larger increase of butter production.

On the matter of the second part of this report the committee have heard the evidence of Mr. A. M. Burgess, Deputy Minister of the Interior, who furnished details of interest which give a retrospect of the immigration expenditure for a series of years; also immigrant arrivals and settlement in Canada.

The deputy minister furnished details of the agencies at present employed in the United Kingdom for attracting immigrants to Canada, and the various means utilized to impart to the people of the British Islands and other European countries, information on the resources of the Dominion. The subject of juvenile immigration promoted by associations and individuals is also referred to.

## Agriculture and Colonization.

It is gratifying to find by this evidence that the accommodation provided for immigrants on their arrival at Quebec is not surpassed in excellence, anywhere, in point of promoting health and comfort, and that the immigrants are well cared for by the agents of the department, from the time of their arrival until their destination for settlement is reached.

The deputy minister informed the committee that the efforts of the immigration branch are handicapped by the recent large reduction in the appropriation for immigration, and he urged the importance of restoring the present grant of \$130,000, to its former amount of \$200,000, as the minimum upon which the department can continue to prosecute the work of immigration with vigour.

A perusal of the evidence furnished by Mr. Burgess, and annexed hereto, will show it to be a concise statement of the salient points of the immigration to Canada, from 1867-'8, down to 1894-'5. The details of the last year's immigration are fully furnished.

All of which is respectfully submitted.

T. S. SPROULE,  
*Chairman.*

Committee Room 46,  
House of Commons, 22nd April, 1896.

THE EVIDENCE

PART I

AGRICULTURE



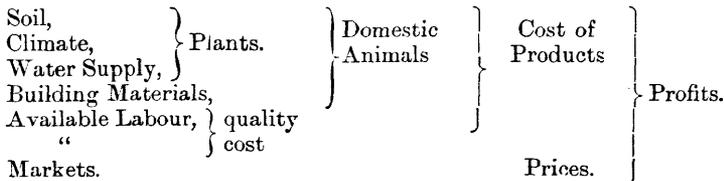
## Agriculture and Colonization.

COMMITTEE ROOM 46, HOUSE OF COMMONS,  
Thursday, 20th February, 1896.

The Select Standing Committee on Agriculture and Colonization met at 10.30 o'clock a.m., this day, Mr. Sproule, Chairman, presiding.

Mr. JAS. W. ROBERTSON, Agricultural and Dairy Commissioner, was present by request, and on invitation addressed the Committee as follows:—

Mr. Chairman and Gentlemen,—I have been invited this morning to give some information on the exportation of perishable food products from Canada, that I might lead up to an explanation of the plan which is proposed for adoption by the Government to improve the methods of exporting—meats and other foods. You will allow me a few minutes to state how this country stands in its capacity and adaptation for the production of perishable food products, in comparison with other countries that compete with us. It is admitted by everybody that the sure way to increase the wealth of a country and to promote its prosperity is for its people to realize on their natural resources, through intelligent skilful labour. The natural resources of Canada are mainly those which can be realized upon through agriculture. The resources of all countries may be classified as, first, those which are inexhaustible, such as soil, climate, and water supply. Fertility of the soil is different from the soil itself; the former is a resource which may be exhausted. Secondly there are exhaustible resources which are not restorable, such as the coal fields, natural gas, and the supply of minerals which once exhausted cannot be restored. Again there are exhaustible resources which may be restored but which are liable to deterioration, such as the supply of fish in our lakes and streams and the supply of water in our rivers,—for water power may be lessened by the denudation of the hillsides of their trees, and the consequent irregularity of drainage and of rainfall. Moreover there are resources which are exhaustible and are still capable of restoration, with improvement and increase by use. Among these are the resources of fertility of soil, building materials, available labour, and educational attainments on the part of the people. These while easily exhaustible, can still be improved and increased by use. Coming to point out the resources that Canada possesses for the production of perishable food products, let me use this chart for a moment to show that, for the production of such fine food products as will give Canadian farmers a fair and good chance with their competitors in other countries, we have excellent resources:



In soil Canada has no superior among all the countries where the people follow farming for a living; but fertility of soil is not always a source or assurance of wealth to the people who live on it. I shall use only one illustration to make my meaning clear with reference to that. The people who dwell on the Delta of the Nile live on the richest soil—I think, that lies anywhere under the sun; and they are among the poorest of people who follow the tilling of land for their living. Even with the fertility of the land of Egypt the people stay poor, chiefly because they have not realized upon other available resources, mainly perhaps that of intelligent labour as applied to their calling. We in Canada have a climate which is admirably adapted for growing very

large quantities of such plants as are suitable for the cheapest production of cattle products. I don't know any land superior to Canada in that regard. Other countries can grow plants that we cannot produce with success at all, but I don't know any that can produce under the influence of its climate and soil, plants that will yield larger quantities of cattle products per acre with a larger margin of profit to the people who produce them. Our water supply is fairly reliable in nearly all parts of the Dominion. These resources enable us to grow fodder plants economically, and with the added resource of available and cheap building materials, they enable us to add to the growing of the plants, the feeding of domestic animals with profit. I need only mention that the provinces that lie eastward of Lake Huron are perhaps better off than the prairie provinces of the Dominion, in possessing plenty of building materials easily available for the shelter of cattle during the period of the year when they must be housed in some comfortable way. Then we have a resource in available labour, which is improving in quality every year. It needs much further improvement. The labour of the Canadian farmers has been certainly characterized by diligence and every kind of forceful persistence under difficulties; but it has not been of that order until recently in most sections that enabled the people to turn out fine food products. It was largely concerned with the production of grain, fodder and primitive products, by means of labour which was not of a high quality in regard to the experience required to turn out fine food products well and cheap. You will allow me to use one illustration in order to get the minds of the members of the Committee in sympathy with my own in viewing this matter. I would not be using a disparaging word about myself in saying that the available labour I have, is of a very poor quality as applied to the work of blacksmithing. I would burn a great deal of coal, waste iron, and make clumsy shoes. I have no available labour of high quality, for that class of work; but that does not mean that I cannot do other things very well. The farmers in the past have had ability of high order for the work they had to do; but not of good quality, or high order for such work as they have to do now and will have to do in the future.

The labour has been of such a nature that the cost has been comparatively low in proportion to the price of the products, mainly because in the production of the things which we have been selling and exporting, we have applied a great deal of horse power and have used labour-saving machinery. Thus, we reduced the cost, so far as the labour element was concerned, that entered into the cost of our products.

#### PROFIT BETWEEN COST OF PRODUCTS AND SELLING PRICES.

Now, I come to the point that bears directly on the subject of my address to you this morning,—the exportation of fine food products from Canada. No matter how well the farmers may do their work, and no matter how excellent the quality of products they may have for disposal, the profits after all will depend on two things, the cost of those products to themselves, and the prices which they can obtain for those products from the markets to which they are sent. I think the farmers of Canada are in the way of reducing the cost of their products as low as they can be brought. I think our farmers are applying as much of labour-saving skill by the use of the best of methods to the making of what they have to sell, as any farmers are. I think, however, there is still a great loss of possible profit to the farmers of Canada, and also to the men who handle the farmers' products, by the obstructions, obstacles, and difficulties that stand between the producer and consumer in the interchange of commodities,—that stand between the cost of the product to the farmer and the price paid by the ultimate consuming buyer, that unreasonably reduce the profits or wages of the producer, and at the same time unnecessarily increase the price to the consumer.

#### LAW OF SUPPLY AND DEMAND.

It may be said there is no use inviting the farmers to go on producing more butter or more cheese, or more beef, or more mutton, or more bacon, or more eggs, or more fruit, unless there is a market for those things, not merely at some price, but at a price

## Agriculture and Colonization.

which will pay the man who produces them, fairly well for his labour. If the price of these products can be raised, you can at once increase the production.

That is the law of supply and demand ; not merely a demand for a product at some price, but a demand at such a relatively high price as will leave the man who produces, satisfactory returns for his labour and his capital. Then, the demand itself depends upon two things. It depends, I think, largely upon excellence of quality, and then on relative cheapness or lowness of price. If everybody in Ottawa could get strictly fresh laid eggs during the winter at 20 cents a dozen they would use that kind, instead of eating other eggs at 15 or 16 cents a dozen ; and the demand would be so greatly increased that there would be no possibility of overstocking the market at that price. Excellence of quality would make a larger consumption per head by present customers, and lowness of price would lead the common people to eat what only the rich can now afford. And therein lies, I think, a great deal for the Canadian farmers to examine ;—whether they could not get the large class of consumers of high priced foods in England to prefer our fine food products, and so get for a portion of our exports somewhat near the prices paid by the wealthy classes for very dainty food. The production will respond to relatively high prices or profits. Just so soon as the profits increase, just so quickly is there a great enlargement in the production. Let me give an illustration. The high class consumers of beef in Great Britain pay rather more than a shilling a pound for the best cuts, eight pence a pound for the second cuts, and four pence for the third class of cuts of their beef. They often pay higher prices than these, but as far as I can learn that is a moderate average for the very best quality of beef. That leaves an average equal to 17 cents a pound, by the carcase, after allowing for the loss in weight in the retailing of the pieces. In figuring out the actual cost of retailing beef and leaving a wide margin for profit, I find a retailer could sell beef with an excellent revenue for himself if he had clear a cent and a half per pound, after allowing for the loss in weight in cutting up. That is a profitable business. I have allowed nearly a hundred per cent above the actual cost of wages and rent. As the business is done now, it costs a little less than two cents a pound of dressed beef in Great Britain, to pay all the expenses of shipping cattle alive from Montreal, slaughtering them on the other side, refrigerating them there, and selling them on commission. The actual cost during the past year, reckoned on the net weight of beef from animals shipped alive, was rather less than 2 cents a pound from Montreal outwards. Allowing the retailer what I call a liberal margin for his services in this business, and counting the cost for transportation, killing, etc., at what it actually cost last year, the total charges incurred in conveying the live cattle from Montreal and the beef from them to the consumer would be  $3\frac{1}{2}$  cents a pound of beef. Taking the  $3\frac{1}{2}$  cents from 17 cents, which is the average price paid by the best class of consumers in Great Britain, leaves  $13\frac{1}{2}$  cents per pound, which, it seems to me, might be available for the farmers of the provinces of Ontario and Quebec for the very best quality of beef.

*By Mr. Cochrane :*

Q. That is on the dressed meat ?—A. Per lb. on dressed beef by the carcase. I say available to the farmers, because the hides and the offal and the tallow should pay all the charges for freight from the farmers' places to Montreal. I am reckoning the business as it is now run, with expenses as charged on live cattle.

*By Mr. Wilson :*

Q. Do I understand you to say  $3\frac{1}{2}$  cents is what the actual cost would be delivered in Great Britain from Montreal ?—A. Yes, from Montreal to the consumers.

*By Mr. Macdonald, (Assiniboia) :*

Q. That is the retailers' profit ?—A. No ; one and a-half cents would meet the expenses of the retailer. I shall tell you how I reached these figures.

*By Mr. Wilson :*

Q. Just excuse me a moment. Do I understand this 2 cents pays the freight and all the costs to the Old Country, including slaughtering?—A. Yes. The 2 cents per lb. was got at in this way: I have copies of some account sales of cattle actually shipped last year from Montreal by Hon. Senator Cochrane. I took the freight charges, the selling charges, the lairage charges, the killing charges, the refrigerating charges and the commission charges, and reckoning the sum of them on the dressed beef, the actual cost was rather less than 2 cents per lb. I arrived at the  $1\frac{1}{2}$  cents per lb. expenses of the retailer by getting information as to how many men were required in a shop to cut up so many animals. Then I made a liberal allowance for rent and labour, added nearly 100 per cent to that, and called it what the retailer might be entitled to charge, after allowing for loss of weight in cutting up. From 6 to 7 per cent is a liberal allowance for the actual loss in weight when the carcasses are bought wholesale and sold retail to customers. I have not allowed anything for the expenses from the farmers' places to Montreal, but on the other hand I have not reckoned in the  $13\frac{1}{2}$  cents a lb., anything of revenue from hide, tallow or offal, although that would quite meet the actual expense of carriage of cattle from farms to Montreal. I figured on shipments of 280 cattle, and the hides, offal and fat amounted in one case to an average of \$11.76 per head, and in the other case to an average of \$11.81 per head at Liverpool. I do not think these would fetch more than two thirds of that amount in Montreal at first.

*By Mr. Cochrane :*

Q. That is the carcass?—A. That is the hide, tallow and the offal,—\$11.76 and \$11.81 cents per carcass. That is to illustrate the point I was making, that if the farmers of Canada came anywhere near getting  $13\frac{1}{2}$  cents per lb. dressed weight for beef in the Provinces of Ontario and Quebec, the production would be enormously increased. I am not saying they could get that—that I am going to discuss in a moment—I am stating what the retail market prices are, and the necessary expenses. If we could get the sum of the retail prices for our farmers less the actual necessary expenses and reasonable profits of the middlemen—carriers and merchants—the production of cattle would be enormously and speedily increased.

*By Mr. Hughes :*

Q. How did the prices compare with last year?—A. The prices of cattle last year were not higher than for the average of three or four years. I have not figured that out accurately, because I do not happen to have the figures for 1892 and 1893.

*By Mr. Cargill :*

Q. Supposing you got an animal that would net 500 lbs. dressed meat at  $13\frac{1}{2}$  cents per lb. at Montreal, it would be equal to \$67.50 for the carcass. What would that animal be worth, on its feet before being slaughtered?—A. Last year at the prices cattle were sold at, such an animal would not have fetched more than about \$43 to \$45. That is at last year's prices, but if the carcass could be sent through this route, with the obstructions removed, then it would sell live weight for just as much as it would fetch as dressed meat.

#### THE BRITISH MARKET FOR FOOD PRODUCTS.

The English are good customers for food products; of all people who purchase food they are the best. They are the customers of the world, for the nations of the world that produce a surplus of food products. I have looked over the map and the returns of the British Board of Trade and I find nearly every civilized country is a competitor for a place in the British markets. Denmark, Germany, France, the United States, and all the rest of them are engaged in a most strenuous, and merciless though peaceful, competition for the best place in her markets. If you want to pursue that point further, there are Spain, Italy, Austria, Sweden, Norway, Finland, and nearly all other countries

## Agriculture and Colonization.

whose people are civilized that send foods to England. I find very few exceptions; the British take either fruits, cereals, meats or other animal products from them.

*By Mr. Gillmor :*

Q. Is there any reason for that? A. Yes; because England has found a most valuable resource in the skilled labour of her mechanics, and manufacturers.

Q. There is no obstruction in getting into the British markets?—A. England buys from whoever sends her the best quality of what she wants at the lowest price. There is one peculiarity, in this connection, that I may mention. The British are great sticklers in the old country for respectability in name, as to the food products they buy and eat. The English purchaser will not buy equally good food from two countries at the same price unless the food bears an equally respectable name. The purchaser over there is guided a good deal by the names of things; he has got into the habit of buying in that way. I once went into a shop over there and found the best Canadian cheese selling at 6d. per lb., while the best Scotch cheddar was selling at 10d. per lb. at the same counter; and yet the Canadian cheese was superior in quality, flavour, appearance and nourishing properties. That was 14 years ago, when the name of Canadian cheese was not as good as it is now. You can now get Canadian cheese offered under its own name and there is no discounting it on that account. But in other things it is not so, as for instance, in beef and meat products. The meat which sells best in the retail shops is labelled "best Scotch." I do not know that it is raised and fed on Scotch farms; possibly a good deal of it is brought up and reared as far west as Calgary, in our own North-west country, and acquires the good name of "best Scotch" when it reaches the hands of the retailer who handles it.

### TRANSPORTATION CHARGES.

Before passing on to the next chart let me refer to the opinion which has prevailed in the minds of a great many of our people, that distance from market was the great obstacle to successful admission to the British markets, and also that the great absorber of profits was the circumstance of being so far away from market. I have made some examination of that question and do not find that distance bears any special relation to the cost of transportation. Those of you, who have studied political questions in the larger sense, will remember a remark made once about the British farmer that he would be sufficiently protected always by the circumstance that his competitors had to pay the freight on the goods which they sent in from abroad. Now, the freight charges on our fine food products are a very small proportion of their value to the farmers here. I am going to base my statement on the prices the farmers here realize, and not on the prices the consuming purchasers pay, on the other side of the Atlantic. The actual freight charges on cheese shipped from Ontario and Quebec, where the most of our supplies go from, do not exceed 5 or 6 per cent of the value of the cheese as sold at the factories. That is the total cost for freight charges between the nearest shipping station in Ontario and Quebec and the ports of London, Liverpool, Bristol and Glasgow. I doubt very much if the English and Scotch farmers or dairymen get their cheese carried to the markets for more than one or two per cent less than we do. I have not at hand the details of transportation charges in Great Britain, but I have enough information to show that the average cost of freight over there will be nearly 3 per cent of the value of their cheese, while the average cost of ours is about 5 per cent. In that respect Canadian farmers are not far behind their English and Scotch competitors.

*By Mr. Cochrane :*

Q. Freight over there is much higher than ours?—A. It is much more per mile per ton. The average freight charges on our creamery butter before cold storage was put on did not exceed  $2\frac{1}{2}$  per cent to us, and with cold storage it would not exceed 4 per cent, on the value of the product at the station of shipment, from Ontario and Quebec to Great Britain.

*By Mr. Wilson :*

Q. Do you mean to say the charges on our butter are only 4 per cent of its value?  
—A. The whole charges for transportation. I am not speaking of charges for commission, etc.; I am speaking simply about transportation services and charges.

The average transportation expenses on live cattle, from stations in Ontario and Quebec to the ports of landing in Great Britain, have been from 25 to 30 per cent of their value at the point of shipment. The great obstacle which has hindered us from getting the best class of customers, and the high prices paid by them in Great Britain, is not distance, but deterioration in quality during transit. Deterioration of quality is not a necessary factor in distance or in length of time. It has been so with us, and this is why we have been hindered from getting relatively higher prices, and the best class of buyers from being our regular customers.

#### VALUE OF COLD STORAGE.

Perishable food products are not valued according to their nourishing properties. They are valued mainly according to their daintiness of flavour. That is the quality that brings a high price. If a man were to value peaches according to their intrinsic value for nourishment as a food, he would never pay the prices that they are sold at from time to time. Daintiness of flavour is the quality that will gain for us the best class of customers at the highest prices the market will afford. It becomes necessary, therefore, to send not merely nourishing food products, but those having a dainty flavour. These need to be preserved during transportation and while waiting for a profitable demand. While I don't want to enter into any lengthy discussion this morning, on the shipment of butter and cheese, I want to show what is possible in the transportation and cold storage service, while keeping a perishable food product for what might be called a better market. Last summer, in my capacity as Dairy Commissioner, I ran a creamery at Moose Jaw, out in the middle of the North-west Territories. We had a rather insufficient refrigerator at the creamery in the early part of the season; because it was not built early enough, our early made butter could not be kept as cold as it ought to have been. The market out there was exceedingly dull in June, July and August, and prices were very low, from 14 to 15 cents. I held that butter at the creamery as best we could under these rather unfavourable circumstances, it being a new venture there with respect to our refrigerator. I shipped over 500 boxes of it to Montreal before the end of August. I sold 100 boxes then in Montreal at the very top market price, which was 18 cents a pound, for the latest made butter in the lot. I put the remainder of that butter, made in May, June, July, and in the early part of August, into a refrigerator warehouse in Montreal. Many reasons kept me from selling that butter about November or December. Then I carried out my original intention without saying much to anybody, thinking I would see how that butter would compare in Great Britain with other butter that had not been so treated. I shipped the June and July butter to Manchester in boxes.

*By Mr. McGregor :*

Q. Was it sent in a refrigerator car?—A. Yes, it was sent in a refrigerator car from Moose Jaw to Montreal, but from Montreal to Manchester it went without refrigeration as it was winter time and quite cold.

I did not play any deception on anybody. I sent it simply as Canadian creamery butter. It was complained of as being a little stale in flavour. That was because the refrigerator was not complete at first. I ordered it to be sold at once. The price, as compared with what I might have got in Montreal, is no guide, because the market might go up or down; but being sold simply on its own merits, the prices ranged from 95 up to 108 shillings a hundred weight, or an average of 100 shillings a hundred weight. I took the Grocer's Gazette of London, England, of that date and looked at the highest quotations of butter. The quotations there are usually a little higher than

## Agriculture and Colonization.

the sales, so as to attract butter to the market. On that same week the quotations in Manchester for the very finest Danish butter were from 115 to 118 shillings, so that the very best Danish butter sent in, fresh made, fetched only 10 shillings a hundred weight more than some of our butter made in June. Choicest Colonial butter coming in from Australia and New Zealand was selling at from 106 to 110 shillings, or the very finest butter coming in refrigerator compartments, fresh made, was only 2 shillings a hundred weight or  $\frac{1}{2}$  a cent a pound more than some of our butter made in June and sold in January. All I want to demonstrate is this, that in these perishable food products we can keep the quality intact without great expense, and then we can meet our competitors in the English market with quality as good as theirs. At the same time, fine Danish butter in casks was selling at from 108 to 112 shillings a hundred weight, and the finest American from 88 to 96 shillings a hundred weight. I took all the quotations from the Grocer's Gazette.

*By Mr. Cochrane :*

Q. What is the weight of their cask?—A. 112 lbs. They are almost like our old firkins, but they are not headed in on the top.

Q. Just wood?—A. Yes.

Q. The butter placed next to the wood?—A. No; they are lined with parchment paper or butter cloth—nearly all with parchment paper. I was pointing out that the highest quotation for the finest American butter was 96 shillings, and some of our Moose Jaw butter reached 108 shillings and sold all through at an average of 100 shillings a hundred weight.

*By Mr. Macdonald (Assiniboia) :*

Q. This Moose Jaw butter was in boxes?—A. In 56 lb. boxes, square and lined with butter paper inside.

Q. Parchment paper?—A. Yes. The boxes cost from 15 to 16 cents each at the factory where they are made.

Q. Was all the cream separated by separators or by deep setting?—A. A little by deep setting and some by hand power separators.

*By Mr. Cochrane :*

Q. You gathered the cream?—A. Not much, a little only. We took in milk and ran it through a centrifugal cream separator. Some patrons sent their cream by rail.

*By Mr. Hughes :*

Q. Do you find it makes much difference, the composition of the package in which butter is sent to market?—A. It makes a difference to the appearance and preservation of butter. There is not much risk of tainting unless there is a strong odor from the package.

*By Mr. Cochrane :*

Q. You have no way of knowing whether you realized better prices on one month or the other?—A. Yes, I have the record. The prices vary, but there is not much difference in the average prices of the months of June and July. It was sold in small lots of two, three and four boxes at a time.

*By Mr. Wilson :*

Q. I understood you to say last year that the month did not make much difference?—A. If the butter is once made fine it can be kept fine if it is held properly.

The imports of fine food products to Great Britain in 1894 are shown in the following table :—

BRITISH IMPORTS, 1894.	
	Value.
Animals living (for food).....	\$ 44,237,455
Dressed meats.....	110,594,951
Butter.....	65,489,268
Margarine.....	14,818,075
Cheese.....	26,644,708
Lard.....	13,424,292
Milk (condensed and preserved).....	5,252,277
Poultry.....	2,340,246
Eggs.....	18,426,118
Fruit (apples, plums, pears, grapes).....	12,459,544
	\$313,686,934

These ten items of England's bill for foods imported, come to over \$313,000,000. Let me make one remark before I leave this part of the subject, that while Canada sends to Great Britain a very large proportion of the cheese she imports, the cheese item in Great Britain's bill is one of the smaller items ; and we might somehow and soon get a larger share of some of these bigger items. Of butter in 1894 we sent from Canada \$438,000 worth out of \$65,500,000 worth. We might also get a share of the item for condensed milk.

The difficulty in making any headway with that in Great Britain has been that condensed milks are a good deal like patent medicines in a way. They are bought in proportion to the advertising they receive. When the Nova Scotia company began to introduce their product a few years ago it met with no commercial success, because the advertising expenses were so heavy the company could not continue to meet them from the sales. If a few depots could be started in Great Britain where this product could be put before the public continuously, at a small cost for advertising they would soon recognize the excellence of the product, as they have recognized the excellence of our cheese, and thus we would get a good demand for condensed milk from Canada.

*By Mr. McGregor :*

Q. There are dried peaches too, Professor?—A. Yes, but I included only these four fruits in this statement. That is a large available market, if the prices be such as to pay us. It is a question of what price we can get out of that market for the quantities we send.

#### SUGGESTIONS FOR IMPROVING THE EGG TRADE.

In case I might not come to it again, let me make a remark herein regard to the item of eggs. I have given a statement of the relative position we were able to take with Moose Jaw butter, which had been kept fairly well. Now, Canadian eggs in Great Britain do not stand very well yet as compared with the eggs from France or the eggs even from Austria and from some of these other countries close by. The greatest drawback to the success of our egg trade has been, I think, that the egg merchants, as far as I can find out by inquiry, collect eggs perhaps once a week or twice a week from all customers and from all sorts of places. The egg-waggons bring in some eggs fresh from the nests, some from the farmers' houses and some from shops, where they had been in the sunlight of a window for ten days or more. Complaints in England are, that taking 120 eggs, 100 are fresh and 20 are stale—not rotten or decayed, but just stale—and that causes a lower price and less satisfaction for the whole lot. The result is the same as if a shipper of butter were to ship 100 packages of the finest creamery butter, and to put 20 packages of decently good dairy butter in the same style of package, and mix them all through the lot. There is not any butter in the lot that is bad, but the mixing

## Agriculture and Colonization.

of the 20 packages of irregular ordinary butter with the finest creamery butter would lower the prices for the whole lot (hear, hear). It would be a fair way of encouraging the egg business if our merchants were induced to collect a quantity of eggs direct from the farm houses twice a week and have them branded as fresh laid. If this were done and the eggs put into cold storage and shipped that way, they would get to Great Britain in as fresh a condition as though they were only four days old. The difficulty has been in preventing the mixing of eggs that are a little stale with the fresh-laid eggs.

*By Mr. McGregor :*

Q. Have you got the average price paid?—A. Of eggs?

Q. Yes.—A. No ; but I can give you that at the next meeting. I think that the comparatively low prices that Canadian farmers are getting, compared with the prices that are paid for the best class of products in Great Britain itself, are due in a large measure to the inefficiency of the commercial agencies that exist in this country for handling our perishable food products (hear, hear).

*By Mr. Macdonald (Huron) :*

Q. Would not the extra labour entailed upon the egg men in collecting their eggs once a week counterbalance the additional price that would be realized for the more freshly laid eggs?—A. I do not think so, because I think perhaps two-thirds of the eggs are collected once a week. If more pains were taken to keep these separate, the extra cost would not be more than one-half cent a dozen, as far as I can figure out, and the price in England for strictly fresh-flavoured eggs would be nearly six cents a dozen higher than for mixed lots.

Q. Is it not the custom to put the eggs into a dark compartment and examine them with a light?—A. An egg that is decayed or advanced toward decay can be discerned, but an egg that is simply stale cannot be discerned. An egg begins to decay in, perhaps, two ways. It may decay for food purposes by hatching—decay is not a good word in that sense ; but it may change unfavourably for food purposes by hatching. It is more likely to decay from the fermentations that are started at the pores that go through the shell. An egg may look ever so well when viewed by a candle, and still be slightly stale inside. The egg merchants detect whether they are fresh in flavour by breaking some, emptying the eggs out, and smelling the shells. If the odour is offensive they conclude the eggs are stale. It is, therefore, necessary not only to keep out the rotten, stale, or partly hatched eggs, but eggs that are just slightly stale from having lain ten days in the sunlight.

The following table shows the total number of animals which are available for food, and whence the supply may be obtained :—

THE WORLD'S LIVE STOCK.

—	Cattle.	Sheep.	Swine.
In the world .....	298,873,657	534,848,924	102,172,224
United Kingdom.....	11,207,554	31,774,824	3,278,030
Canada.....	4,060,662	2,513,977	1,702,785
Australasia.....	12,632,018	116,153,632	1,026,014
United States.....	52,378,283	42,273,553	46,094,807

This chart was put up to illustrate whence Great Britain might obtain the food supplies of a fine sort which she needs. It is Australasia that we have more to fear in the competition with cheese and butter than any other quarter. The numbers of cattle there have been increased within the last eight years more than our whole stock. Their

increase in eight years has been over four millions of cattle, and they are going to be very formidable competitors of ours in cheese and butter products. In the United States there are large herds of cattle, sheep and swine. I point out this fact also that it is no wonder that the Australians can capture the English market for preserved and frozen mutton because they have such enormous flocks of sheep compared with any other country.

*By Mr. Cochrane :*

Q. But is the Australian mutton as good frozen as unfrozen?—A. Some of the frozen mutton that has been taken into the United Kingdom in the best condition has been eaten in London and connoisseurs have said it is just as good. I think in most of these cases the quality of the product, if the animals are perfectly healthy, is about equally good from any part of the world. There is a good deal of superstition about the so called exquisite flavour of meats being due to certain localities ; but my own observation convinces me, although certain reputations are attached to things because of the country they come from, things equally good sometimes come from other places.

*By Mr. McNeill :*

Q. That would be the same breed of sheep. For example, you would not compare a Southdown with a Cotswold?—A. Not at all, because in the breed you have an essential difference in the proportion of fat, of lean flesh, and other breed characteristics.

*By Mr. Hughes :*

Q. A Southdown from Canada would be as good as a good Southdown from Australasia?—A. Yes, certainly. The only thing I can say about the quality of meats is this, it seems that the more robust the animal is—the better it is in general bloom of health—the nicer the flavour of the food from it will be.

*By Mr. McNeill :*

Q. With regard to the breed of sheep in Australasia, what are they generally? They breed sheep there generally for wool? A. They do. I have only seen carcasses that are comparatively small.

Great Britain obtains her supplies of dairy products from the countries shown hereafter :—

	Butter. Value.	Cheese. Value.
Total values of imports, 1894. ....	\$65,489,268	\$26,644,708
	Quantity. Cwts.	Quantity. Cwts.
From Canada .....	20,887	1,142,104
United States .....	29,996	672,347
Denmark.....	1,102,493	.....
Australasia.....	292,097	54,375
France.....	424,645	52,969
Sweden.....	266,306	.....
Holland.....	165,157	298,693
Germany.....	137,755	.....
Other countries.....	135,499	45,657
Total.....	2,574,835	2,266,145

In this chart I have put a statement of the imports of butter and cheese into Great Britain. The total value of butter imports in 1894 was \$65,489,268, representing a total weight of 2,574,835 cwts.

## Agriculture and Colonization.

*By Mr. Hughes :*

Q. You mean the cwt. of 112 lbs? A. Yes.—The object of this chart is to give an illustration of the proportionate amount of butter and cheese which Canada sends to Great Britain as compared with other countries. You will see from these figures that Canada's position is a most gratifying one in the cheese column. If we could by any practical means win for ourselves a share of England's market for butter equal to that we have now of England's demand for cheese, we would have about thirty-two millions of dollars for exports of butter in addition to about fifteen millions of dollars for exports of cheese. The butter is the more valuable market in every way.

*By Mr. McGregor :*

Q. What our farmers need is to make as much butter as they do cheese? A. I think more. The market for cheese is now pretty well taken up.

*By Mr. Hughes :*

Q. Are not the United States and these other countries likely to be formidable competitors in supplying butter? A. Nearly all the nations with which we compete are doing their level best to get the best information before their people, how best to produce and how best to market their products. Undoubtedly we shall have to face the keenest competition.

*By Mr. McDonald (Assiniboia) :*

Q. Can they make as good butter from the coarse grasses of the North-west as from the sweet grasses of Ontario? A. Quite as good in flavour. The butter of Manitoba and the North-west is likely to keep longer than Ontario-made butter under the same circumstances. Butter deteriorates mainly from one or two causes, or rather by one original cause, that is by the process of fermentation, modified by conditions of temperature and moisture. The fermentation is started from germs that get into the milk or cream from the atmosphere. The atmosphere of that part of Canada is freer from those germs than the more thickly settled portion of the country.

*By Mr. Wilson :*

Q. When, therefore, the the North-west becomes more densely settled would not the effect be the same? A. It might.

*By Mr. Boyd :*

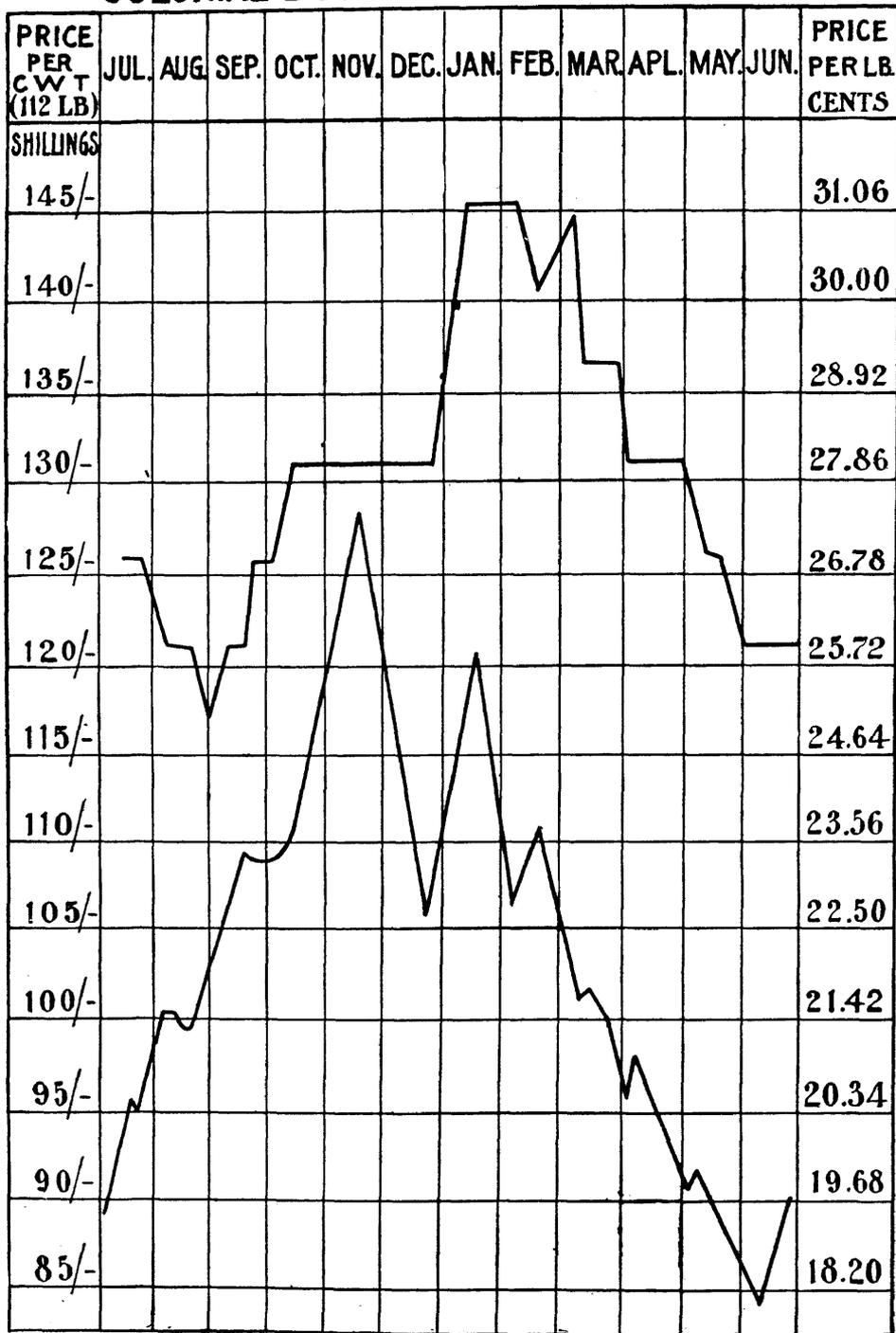
Q. I am surprised at Dr. McDonald asking such a question. Surely he ought to know that the prairie flowers, the pea vines, and the luxuriant grasses that grow on the prairies of Manitoba and the North-west are far superior to those which grow in the east. A. This, I may say in addition; the cool nights in the west, leave the butter more waxy in body in summer. I have a chart here\* to illustrate the comparative prices obtained in Great Britain for butter in 1894. The upper line represents the prices obtained during the several months of the year for Normandy and Brittany butter from France. The lower line shows the prices obtained for the finest Danish, Swedish and Kiel during the same months in the year.

*By Mr. Wilson :*

Q. It varies a good deal?—A. Yes; you will perceive that the price is higher from October to March than from March to October. What this chart illustrates has been repeated annually for the last 15 years. It is not any mere temporary incident that the price of butter was higher from November to March in 1894-5 than during other months. That is why I have been advocating for the last eight or nine years the need for Canadian creamery men—not to speculate in butter but—to provide cold storage

\*N.B.—See next page.

### COLONIAL BUTTER SEASON 1894-1895



\*NOTE:—The upper line denotes the prices obtained in Great Britain for Normandy and Brittany butter: the lower line denotes the prices for finest Danish, Swedish and Kiel butter during the several months of the year.

## Agriculture and Colonization.

accommodation for the holding of butter made in June, July and August, until at least October or November, in such a way as not to spoil the quality, and then to get it into the market when the prices are best.

Q. What is about the average for 15 years?—A. The annual average price of Danish butter f.o.b. at Copenhagen for the last fifteen years is given at 135 shillings per cwt. in 1880, to 93 shillings per cwt. in 1894.

Q. How much a lb. is that?—A. From about 29 cents per lb. in 1880 to 20 cents per lb. in 1894.

*By Dr. Roome :*

Q. Why should there be the drop from February and March?—A. Because shortly after that is the beginning of the production of the English home dairies. The butter market is an elastic market; prices fluctuate a good deal. This chart shows the trend of them.

*By Mr. Hughes :*

Q. The fluctuation is in the season?—A. Yes; with a gradual downward tendency for the 15 years, although the price was fairly constant from 1886 to 1893, at about 107 shillings per cwt. at Copenhagen. That is equal to about 23 cents per lb. there.

*By Mr. McGregor :*

Q. Every year a little less?—A. On the average; yes.

### PRESERVATION OF BUTTER BY COLD STORAGE.

*By Mr. McMillan :*

Q. Have Canadians been successful in keeping butter and placing it on the market in good condition?—A. Not until this year, because we have not had the requisite cold storage accommodation. It is not practicable to keep it without some injury unless we have a temperature as low as 32 degrees Fahr. Any butter kept in ordinary cellars or refrigerators will spoil slightly, and thus in the past we have got a bad name. If the creamery men will not provide accommodation at the several creameries, it will pay them to ship the butter to a central refrigerating warehouse every week.

*By Mr. Grieve :*

Q. Is there anything in the report that butter kept in cold storage for any length of time deteriorates very rapidly after being taken out?—A. No; I think not. Let me make that clear. It is an important point. You have three forms of ordinary substances, the gaseous, liquid and solid. As typical ones I may mention steam, water and ice. There are the vapour of butter, melted butter, and butter. I want to make that clear. You can freeze butter that is known as butter commercially; but the butter-fat does not get frozen. There is mixed with the butter-fat in butter, a percentage of water usually in the form of brine. In salt butter this brine does not freeze till very near zero Fahr. If that temperature is reached and the brine is frozen, it of course affects the butter by expansion; and when the brine is thawed the butter is likely to spoil quickly by the penetration of air through the opening of the grain of the butter caused by the expansion of the brine. But butter can be kept below freezing point, which is of course a long way above zero, Fahr. without being frozen or running any risk of being spoiled quickly when taken out of the refrigerator.

*By Mr. McGregor :*

Q. But butter kept in a refrigerator and then exposed on the counter of a grocery store will deteriorate very quickly will it not?—A. Not in consequence of having been kept cold unless the temperature has been a long way below freezing point and the brine has been frozen in the way I have explained.

*By Mr. McMillan :*

Q. Will butter manufactured in June, and kept in cold storage till October be in equally as good condition as butter made in October, and shipped as soon as it is made?—A. It will commercially go on the market in as good condition, if put into cold storage within two or three days after it is made. If it is kept even a week without cold storage it partly spoils; but if it is kept in a dark and cold storage from within two days of the date of manufacture, it will keep perfectly.

*By Mr. Roome :*

Q. Do you think, if those conditions are observed, it will be equally as good as absolutely fresh butter?—A. I think so. Of course everybody connected with the trade and engaged in the shipment of butter says: "Let us have fresh-made butter." They have never until very recently had fresh-flavoured butter that was not fresh-made. But now by the cold storage process, we can have fresh-flavoured butter that is not fresh-made.

*By Mr. Cochrane :*

Q. You can settle that question as to whether the butter would be equal in quality for sale by having some put in the refrigerator and held, and afterwards compared with the product of the same factory in a later month?—A. There is some difference in the flavour of butter in May and June, and later on in the year, owing to the flavour from the grasses and the length of time during which the cows have been milking.

Great Britain draws her enormous supplies of cattle and beef mainly from the United States and Canada, as the following table shows:—

BRITISH IMPORTS OF BEEF, 1894.

From.	Cattle.	Fresh Beef.	Salted Beef.	Preserved Beef.	Meat Unenumerated.
	No.	Cwt.	Cwt.	Cwt.	Cwt.
Canada.....	82,323	.....	2,729	3,672	671
United States.....	381,932	1,775,538	235,120	205,485	34,315
Australasia.....	.....	304,513	3,375	70,602	10,569
Other countries.....	11,185	24,053	1,087	11,297	144,202
Total.....	475,440	2,104,104	242,311	291,056	189,757

We had a rather larger share in 1895 than this table shows. Lest some of you should find a difference when you come to compare this table with the figures that appear in the Canadian Statistical Year Book, I should say that these figures are taken from the British returns, in which the year ends on the 31st December, while our financial year ends on the 30th June. According to the chart Canada sends no fresh beef. I think there was a very small quantity sent during the year, but the English returns show none. I have nothing to say about the salted and preserved meats because I do not think we will send salted beef or preserved beef in any appreciable quantity from Canada. We shall have to confine ourselves to sending either live cattle or fresh beef, or in all likelihood a quantity of both for many years to come. In proposing a plan for opening up a trade in dressed beef, nothing has been contemplated that would even hint at injuring the trade in live cattle. But if Canadians could have an alternative

## Agriculture and Colonization.

outlet for cattle and meats, every man who sends live cattle to England would be rather better off by having two markets instead of one available. I do not think the shipments of live cattle from Canada are going to be ended at once by any new plan that may be suggested or put in operation. I offer only a few remarks about our possible competitors in the shipments of live cattle.

### SHIPMENT OF CATTLE FROM AUSTRALIA.

There is no risk of Australia competing successfully with us in shipping live cattle. One shipment was sent from there to Great Britain in 1894, and the facts are:—They went by a steamer called the "Southern Cross." The actual freight charges amounted to about \$39 per head. The charges, including freight, insurance, fodder and attendance, amounted to \$68 per head. The cattle were sold for \$88, leaving only \$20 a head for the animals at the port whence they were shipped. In a shipment of sheep from Australia by the same steamer, the freight alone amounted to \$2.50 per head, and the freight with fodder, attendance and insurance came to \$6 per head.

*By Mr. Macdonald (Huron):*

Q. I heard one of the delegates from Australia at the Intercolonial banquet here, saying that they could provide with a profit bullocks for from \$8 to \$12?—A. Well, that may be, but it is also true that when the expenses are so great as \$68 per head for shipping alive, and the expenses are comparatively low for shipping dressed beef, they will send the beef rather than the live cattle.

Q. Have you any statement regarding the cost of the experiment that was tried of shipments from the Argentine Republic?—A. I have some facts. From the Argentine Republic there were shipped in eight months in 1893, 5,643 head, in 1894, 7,831 head, and in 1895, 25,165 head. The cattle from the Argentine Republic have been found to be of comparatively poor quality, from want of good breeding and good feeding; and they have been sold on the average at from \$1 to \$2.50 per hundred lbs. less than the average of last year's sales of United States and Canadian Cattle.

*By Mr. McGregor:*

Q. They are found to be very wild, and not suitable for domestic purposes?—A. They are not bred or fed for economical killing.

### CHILLED BEEF COMPARED WITH LIVE CATTLE.

*By Mr. Cochrane:*

Q. Could you give us any idea of the difference in price per hundred-weight of refrigerated or chilled beef sent across to the British market?—A. I will give an analysis of that as fully as I can estimate it. At the present time, there are no quotations available for dressed beef from Canada, because we have not yet begun the business. I may say in this connection that the carcasses of cattle from the United States, after being slaughtered, sold on an average for 25 cents a hundred pounds higher than the carcasses of the cattle we sent from Canada. There has been some talk as to why the people in the United States keep on sending so many cattle alive when it is said it does not pay as well as the dressed meat trade would pay. But it must be remembered that the pick of their dressed meat goes into their own markets in the Eastern States, and the beef they send from the United States to Great Britain is not all choice by any means.

*By Mr. Hughes:*

Q. The beef they send dressed?—A. The beef they send dressed. I am informed that the choice beef from the large slaughter houses goes to the cities of the Eastern States, and the remainder goes to Great Britain, where it fetches a lower price. Taking the average for six months ending the 30th June, 1895, I find that the prime or first quality of domestic cattle was sold in London at \$8 per hundred pounds live weight. When I said that at a meeting a few weeks ago, the statement was afterwards disputed

by certain shippers of cattle. My authority was the report of the Secretary of Agriculture of the United States, which said the information was from official sources. This is the statement. The price to the Liverpool buyers of prime domestic cattle was \$7.43 per 100 pounds live weight. At the same time, in those markets, hindquarters of beef sent in refrigerators from the United States sold at from \$10.50 to \$13.50 per 100 pounds wholesale. At Birkenhead and Deptford, whole carcasses, not merely hindquarters, were sold at from \$10 to \$10.75 per 100 pounds. Another statement made in the report of the Secretary of Agriculture of the United States is that the maximum price for chilled beef from the United States has been considerably above the top prices at any time obtainable for beef from American cattle killed upon landing at the abattoirs of either Deptford or Birkenhead. That seems to me to be a very remarkable result, seeing that those shipped alive are the pick of the cattle.

*By Mr. McGregor :*

Q. About what did it cost to ship over per 100 lbs?—A. I will give you an estimate of that in a moment.

*By Mr. McNeill :*

Q. Does that mean after deducting freight?—A. It means the actual selling price wholesale for the dressed beef from the two sources on the markets in Great Britain. I am now making a comparison of the quality of the beef that may result from the different methods of shipment.

*By Mr. Hughes :*

Q. What the English consumer pays?—A. What the English wholesale merchant buys at.

Q. It has nothing to do with the freight at all?—A. Not my statement at the present time.

*By Mr. MacDonald (Assiniboia) :*

Q. The price of the refrigerated beef was above that of the highest price for beef from cattle sent over alive?—A. It brought a higher price when sold by the carcass there.

*By Mr. Macdonald (Huron) :*

Q. What explanation do you give for that condition of things?—A. That the quality of the beef is slightly deteriorated by being shipped alive. The journey affects the quality unfavorably, whereas the quality of the other beef, not so good to start with, is not spoiled in transit.

Q. Rather improved?—A. Rather improved.

*By Mr. McGregor :*

Q. The offal brings more there than here, which makes up for the loss?—A. Yes, in part.

*By Mr. Cochrane :*

Q. Would not this fact have something to do with the buyers; when they know there is a cargo of live cattle to be slaughtered, would the matter not be more in their hands than if the meat were refrigerated?—A. No, because as it is now arranged the beef can be refrigerated and kept for a month at the depots.

#### CHILLED BEEF AS COMPARED WITH FROZEN BEEF.

As far as the wholesale men are concerned there is a very decided difference in the price obtained for refrigerated beef and frozen beef. The two are quite different in quality, and the difference is especially shown when the roasts are served up cold. The Australian frozen beef brought from \$6.50 to \$7.00 per 100 lbs., as against \$9.00 to \$11.50 per 100 lbs. for chilled beef.

## Agriculture and Colonization.

*By Mr. McDonald (Assiniboia):*

Q. Does frost deteriorate the quality or flavor of beef?—A. It does. The frost seems to rupture the cells and the juices run away when the beef is thawed. The beef also has a somewhat mussy appearance.

Q. The fibre of the beef is separated, that is, one fibre from the other?—A. I think so.

*By Mr. Hughes:*

Q. How do you account for it that fish can be kept frozen and yet it is just as good when you eat it?—A. If one were a connoisseur of the flesh of fish, when it was served cold afterwards I think it would be found to be less firm in texture. Let me make this statement further in connection with the time I have given these figures for, nine months ending 30th September, 1895. Scotch sides were selling in the London market from \$11.25 to \$14.62 per 100 lbs. English sides were selling at \$11.25 to \$12.87½ per 100 lbs. United States and Canadian from \$9.00 to \$11.50 per 100 lbs. of beef. There was thus a very considerable difference amounting to between 2¼ and 3 cents per lb., wholesale, between the domestic beef and the imported beef; and the closest examination could not discover any appreciable difference in the prices at which the beef from these different sources was sold retail. The difference disappeared between the wholesale purchase and the retail sale, so that a good deal of the cheaper bought beef called Canadian and United States was retailed afterwards, I am satisfied, as the "best Scotch." That is the general belief in Great Britain among those who have made a study of the question.

### NET RETURNS FROM CATTLE SHIPPED ALIVE.

I desire to make special reference to the difference between the returns estimated to be obtainable for beef shipped dressed and chilled, and the actual returns on two lots shipped alive last year. I have here with me the account sales of 280 head of cattle. They were not specially selected but came to my hands in the usual course of correspondence. The first lot of 100 head were sold in Liverpool on the 2nd October and the second lot of 180 head on the 5th October. They were good cattle, killed in Liverpool, refrigerated there, and the dressed beef was sold at the highest price obtainable to 30 or 40 different customers; that is, they were jobbed to make the most of the transaction. The lot of 100 head dressed out an average 742 lbs. of beef. The price at which they were sold was \$8.67 per hundred lbs. of dressed beef or a total of \$64.36 per head. The average revenue from the hides was \$5.47 per head, from the offal \$4.51 cents, and from the fat \$1.83.

Q. What do you include in the offal?—A. The guts, liver, lights, and the glue making parts. The total gross revenue, from the figures I have just given was \$76.17 per head. There are certain charges to be deducted from this. Included in these are the freight from Montreal to Liverpool, dock and market dues, the killing and refrigerating expenses, the commission for selling, which taken altogether amount to \$15.43 per head. Deducting these charges of ocean freight, dock and market dues, etc., the net value at Montreal was \$60.74 per head.

*By Mr. Cochrane:*

Q. After they left Montreal?—A. No; that would be the price at Montreal.

Q. Does that cover the charges at Montreal? A. It covered the charges from Montreal outwards except the fodder and attendance on board ship and the insurance.

*By Mr. Grieve:*

Q. What is the average live weight of the animals?—A. I do not happen to have that information.

*By Mr. Boyd :*

Q. What is the average weight dressed ?—A. 742 lbs.

*By Mr. Pridham :*

Q. That would be about 1,300 lbs. live weight ?—A. About that. There is one point that I want to mention. I do not know who paid for the fodder and attendance on board ship. That is not shown in the records.

*By Mr. McMillan :*

Q. The shipper always pays that at Montreal ?—A. I have not included any charge for that in the \$15.43 which I have given for freight, dock and market dues, killing etc. You would therefore have to add to that sum, the cost of fodder and attendance on ship board.

*By Mr. Wilson :*

Q. What would that be ?

MR. McMILLAN—About \$7 per head.—A. I will find out exactly what the amount is, and add it to my evidence, so as to make it clear.\* I have no doubt, however, that Mr. McMillan's statement is correct.

Now, with regard to the other shipment of 180 head, which were sold in Liverpool on October 5th ; the average weight of the animals was 773 lbs. of dressed beef, which sold at \$8.78 per 100 lbs. of beef, making a total of \$67.87 per head. The hides brought \$5.47, on the average, per head, the offal \$4.67, and the fat \$1.62 ; the average gross receipts per head being \$79.63. The average charges for ocean freight, dock charges, killing and refrigerating, commissions, etc., amounted to \$14.96, leaving the net returns at Montreal \$64.67 per head, without deducting the actual cost of fodder and attendance on board ship.

*By Mr. Cochrane :*

Q. When the steamship companies carry the animals at so much per head, do not they feed them ?—A. No ; the shipper buys the fodder and pays for the attendants.

The following tabular statement presents these figures in clear form for examination and comparison :—

*Returns as per account sales of 280 cattle sold at Liverpool.*

From 100 cattle sold October 2nd :

Average weight dressed beef, 742 lbs. @ \$8.67 per 100 lbs..	\$64.36	
Average per head, hide.....	\$5.47	
do do offal.....	4.51	
do do fat.....	1.83	
		11.81
		<hr/> 76.17
Less—Ocean freight.....	10.11	
Dock and market charges.....	2.78	
Killing, refrigerating, etc.....	1.33	
Commission.....	1.21	
		<hr/> 15.43
		<hr/> 60.74

NOTE :—The cost for hauling cars at Montreal, loading, wharfage, insurance, feed on board ship, ropes and pails amounted to \$3.88 per head.—J. W. R.

## Agriculture and Colonization.

From 180 cattle sold October 5th :

Average weight dressed beef, 773 lbs. @ \$8.78 per 100 lbs..	\$67.87	
Average per head, hide.....	\$5.47	
do do offal.....	4.67	
do do fat.....	1.62	
	11.76	
	79.63	
Less—Ocean freight.....	10.08	
Dock and market charges.....	2.32	
Killing, refrigerating, etc.....	1.35	
Commission.....	1.21	
	14.96	
Average per head.....	64.67	

Taking the two lots together the averages of 280 cattle are :—

Average weight dressed beef.....	762 lbs. per head.	
Average returns at Montreal.....	\$63.26	do

### ESTIMATED RETURNS FROM SHIPMENTS OF CHILLED BEEF.

Based on these two statements of account sales I want to make an estimate of the returns that might be made on 280 head of cattle if killed at Montreal. In doing this I am taking the average weight of beef the same as actually sold at Liverpool, viz. 762 pounds as the average of the two shipments or lots. The weight would be more if the animals had been killed at Montreal, but in the meantime I am taking for Montreal the average as it was in Liverpool. I allow the loss in weight in retailing at 6 per cent. The net weight sold retail would therefore be 716 pounds. Butchers in this country tell me the loss is about 7 per cent. In selling through depots in Great Britain, however, we would sell in larger pieces, and therefore 6 per cent would be a fair allowance for loss in weight by retailing. I estimate that the first cuts making 358 pounds would sell at 8 pence, or 16 cents a pound, or a total of \$57.28. Those who know the British market will agree with me that 8 pence per pound is a low price. Second cuts, 179 pounds, I place at 5 pence or 10 cents per pound, making \$17.90; and third cuts, 179 pounds at 3 pence or 6 cents per pound, making \$10.74, or a total of \$85.92 for the whole carcass, giving an average of \$11.27 per 100 pounds on the weight of the carcass wholesale. Now, I allow for the cost of retailing in this case \$9.72, which gives a net return from the retail shop of \$76.20 per carcass. Deducting the charges at Montreal for killing, refrigerating, cold storage, freight, cold storage at depot in Great Britain (all of which I estimate at \$15, or rather more than the cost of shipping alive and killing at Liverpool), this gives a total of \$61.20 per carcass at Montreal. To this it is necessary to add the value of the hides, offal and fat, which I place at two-thirds of the value that they realize at Liverpool, or a total of \$7.88 per head. That added to \$61.20 gives us a total of \$69.08 as against \$63.26 realized on the average per head for the cattle killed in Liverpool. Then there is \$7 to come off the \$63.26 for fodder and attendants on board ship, which would make a difference of about \$13 per head in favour of the killing on this side, without reckoning anything for the saving we would have by the less shrinkages in weight and the saving we would have in the ocean freight charges for the dressed beef, the carriage of which would be cheaper than the estimate I have made. The saving in freight and the less shrinkage in weight might amount to at least \$3.00 per head. Then, I have made another calculation of the estimated return from 280 head of cattle if killed at Montreal. The following table shows the estimated returns from 280 head of cattle if slaughtered at Montreal instead of being shipped alive to Liverpool as they actually were.

The average weight of beef as actually sold wholesale at Liverpool was 762 lbs. per carcase. Allowing 6 per cent for loss of weight in retailing, the net weight realized upon by retail sales would be 716 lbs. per carcase. Estimated to be sold:

First-class cuts —358 lbs. at 18 cents.....	\$ 64 44
Second-class cuts—179 lbs. at 12 cents.....	21 48
Third-class cuts —179 lbs. at 8 cents.....	14 32
	<hr/>
Total .....	\$100 24
Less expenses and profit of retailer at 1½ cents per lb.....	\$11 43
Expenses slaughtering, refrigerating, chilling, freight, cold storage, etc., at.....	15 00
	<hr/>
	\$26 43
Net returns at Montreal for beef per carcase.....	\$73 81
Add, revenue from hide, offal and fat at two-thirds the actual value at Liverpool .....	7 88
	<hr/>
Total .....	\$81 69

This shows a total revenue at Montreal of \$81.69 per head as against \$63.26 per head actually realized, a difference of \$18.43 in favour of killing at Montreal and shipping chilled beef, if the prices mentioned can be realized.

In this comparison I have claimed nothing for the saving of shrinkage in weight of the live animals during the passage from Montreal to Liverpool and nothing for the expenses for fodder and attendance on board ship during the voyage. Every penny a lb. that can be added to the retail price I have mentioned, is equal to \$14.32 per carcase of wholesale weight of 762 lbs., so that, if you can put one penny a lb. on these prices which I have quoted, you would have an additional revenue of \$14.32 per carcase of that weight.

*By Mr. Hughes :*

Q. I understand these prices are low for retail prices in England. I suppose you have erred on the right side in every element you have taken into calculation?—A. I think so.

*By Mr. McNeill :*

Q. Don't you think about a shilling a lb. is nearer the actual retail price in England for the first cuts?—A. I dare say it is.

*By Mr. Cochrane :*

Q. Have you no scheme whereby you could put the Canadian beef on the market alongside with the Scotch beef and in the same condition?—A. Yes, that is the object of a plan I am about to explain for shipping dressed meat from Montreal to Great Britain, but as it is now after twelve o'clock, I had perhaps better defer it to the next meeting.

## Agriculture and Colonization.

COMMITTEE ROOM 46, HOUSE OF COMMONS,  
FRIDAY, 21st February, 1896.

The Select Standing Committee on Agriculture and Colonization met this day at 10.30 o'clock, a.m., Mr. Sproule, Chairman, presiding.

Mr. Jas. W. ROBERTSON, Agricultural and Dairy Commissioner was present by recall and addressed the Committee as follows :—

Mr. CHAIRMAN and GENTLEMEN.—In accordance with the permission for which I asked yesterday I shall read a statement of the plan proposed for opening up a trade in dressed meat with Great Britain. It is similar to the memorandum which was submitted to the Government on the subject.

To give stability to the profits from farms, and thus to insure prosperity to the whole country, it is necessary that all perishable food products from Canadian farms should secure as good a place relatively in the British markets as has been won by Canadian cheese and creamery butter. Judicious and energetic action by the Government can accomplish as much for beef, mutton, pork, poultry and other food products as has been done for cheese and butter. It is most urgent and desirable that something should be done, particularly for beef, mutton, lamb, and poultry.

### FALLING OFF IN NUMBERS OF CATTLE EXPORTED FROM ONTARIO AND QUEBEC.

There has been a decided falling off in numbers of cattle exported from Ontario and Quebec since 1890. The following table shows the numbers shipped from Canada to Great Britain.

	Cattle.	Sheep.
1890.....	122,182.....	43,780
1891.....	118,947.....	32,157
1892.....	98,755.....	15,932
1893*.....	80,899.....	1,780
1894.....	82,217.....	121,304
1895.....	96,546.....	255,508

The figures from 1890 to 1894 inclusive are for the years ending 30th June, and the figures for 1895 are taken from those published in the *Montreal Gazette*, compiled from the returns of the weekly shipments during the period of navigation. Of the 96,564 cattle shipped in 1895 it is reported that over 40,000 came from Manitoba and the North-west Territories.

### ADVANTAGES OF GOVERNMENT MANAGEMENT TO START THE BUSINESS.

Much benefit would result to those engaged in the cattle trade and to the agricultural interests generally by the opening up of a business by which cattle would be slaughtered in Canada, and dressed beef sent direct to the consuming purchasers in Great Britain. There are many transportation and commercial difficulties in the way which no private individual or joint stock company can successfully overcome. The business is one which is urgently and essentially important to the welfare of Canadian farmers, and because the Government can remove or overcome the obstacles to its successful establishment without the expenditure of a large, if any, sum of money, it seems fitting and proper that the Government should take it up.

That this business cannot be inaugurated from Canada by private enterprise is evident from the tremendous disabilities from which the Great United States packers and

\*For ten months only.

shippers backed by millions of dollars have not been able to escape. The government control of this business would win for it a status and name in the United Kingdom, which no private individual or joint stock company could ever secure. The prestige of powerful government administration, joined to the reputation of the government, in having successfully assisted in putting Canadian cheese and butter on the British markets in the best way, would vanquish active hostility from the retail butchers in Great Britain without any commercial struggle involving loss.

The Government would be in a position to select the pick of the cattle at Montreal and would thus prevent any sentiment from being foisted upon the consumers in Great Britain that might lead them to regard the dressed meat trade from Canada as a "Cheap John" affair for the disposal only of beef from inferior cattle which were not fat enough to be shipped alive.

## MARKETING DIFFICULTIES UNDER THE PRESENT METHODS.

### CATTLE JADED AND BEEF INJURED.

1. When Canadian cattle are shipped alive by railway and afterwards by steamship they arrive in Great Britain in a jaded condition. They look their worst, and are about at their worst for killing for beef. Both of these conditions enable the British cattle buyers to beat down the prices. The beef from Canadian cattle when shipped and handled in that way does not reach the consumers in such a condition as to secure the reputation for good quality which it would obtain if the consumers were able to purchase the beef at its best from such cattle as are fed in Canada.

### NOW NO ALTERNATIVE MARKET IN GREAT BRITAIN.

2. Formerly when Canadian cattle could be sent to the interior of Great Britain they could be grazed and fed on grass or succulent fodders on English or Scotch farms for a few weeks. They gained tremendously in weight and recovered quickly in quality. That alternative outlet for Canadian cattle caused relatively higher prices to be obtainable and also gave a steadiness to the price and demand which is now wanting.

Canadian shippers with their cattle at the port where they have been landed, in the United Kingdom, have no alternative but to sell at once or within two weeks at whatever price they can get. If they hold over for even a fortnight the cost of feeding becomes a large expense; and the arrival of fresh shipments by the next steamers gives the buyers an additional argument which they use most effectively in further depressing the market and lowering the prices.

### DIRECT TRADE CONNECTION PREVENTED.

3. As a matter of fact a considerable quantity of the beef from Canadian fed cattle does not reach the British consumers under the name of Canadian beef. Misrepresentations which go on in that practice, work directly and continuously to the injury of the Canadian farmers, and prevent Canadians from establishing the trade connection between the consumers and the producers of Canadian products under their own name, which alone can insure a satisfactory continuity of the demand.

### PROFITS OF MIDDLEMEN TOO LARGE.

4. The buyers of cattle at the landing ports and the retail butchers in Great Britain get more than their proper share of the ultimate price which is paid by the consumers for the beef from Canadian cattle. The enormous profits which they exact, and which mainly come out of the pockets of the Canadian farmers, are little short of extortions.

## Agriculture and Colonization.

### DANGER FROM RESTRICTIONS.

5. With the restrictions on the importation of live cattle imposed by the Imperial Government, such a condition of affairs might readily be brought about as would cause irretrievable disaster to the live stock interests of Canada. An alternative means of reaching the consumers with Canadian beef is the only means whereby a safe and elastic outlet can be provided for the increasingly larger numbers of cattle which are being reared and fattened in Canada.

### SMALL SIZED CATTLE.

6. At the present time there is no opening for the exportation of small sized cattle such as are most commonly grown and fattened in the Province of Quebec.

### NO COLD STORAGE SERVICE UNTIL 1895.

7. Dressed beef has not been shipped from Canada hitherto because cold storage service, in warehouses in Montreal and on board ocean steamers, was not provided of an adequate sort for any of our perishable food products until it was taken up by the Government during the last year. A greater measure of success than has attended the cold storage service for the putting of Canadian creamery butter on the British markets can attend the shipments of dressed meats and other perishable food products to Great Britain.

### OBJECTIONS OF SENTIMENT PREVENTED BY GOVERNMENT ACTION.

8. The question of sentiment on the part of the British consumers is a powerful and far reaching factor in determining the way they buy and the prices they pay for the articles of food which they consume. The name "frozen beef," and the stories set agog about the abominations of slaughter houses, etc., are powerful to keep the best class of customers from buying, or from letting it be known that they do buy, anything but the "best English" and "best Scotch" beef.

If beef as good and as cheap as the best English and best Scotch could be obtained from shops or depots in the United Kingdom, under the name of "Canadian" and under the supervision of the Canadian Government for one year as an object lesson, the best class of buyers and consumers in each of the large cities where these depots were placed could be attracted to give preference to the Canadian article. The beef could be sold at prices much lower than the current prices for the best quality of English and Scotch beef, and an ever growing demand could be created at such prices as would leave it possible for Canadian farmers to obtain relatively higher prices than they have been getting during the past few years.

### THE PLAN RECOMMENDED.

#### MEATS CHILLED ONLY ARRIVE IN PRIME CONDITION.

9. The prime object should be to put Canadian beef and other meats within the reach of the British consumers in their best condition under their own name, and in such a way as to attract the best class of purchasers to be our permanent customers. In shipments of beef and other meats from Canada it is necessary that they should be chilled only. The distance and time required for shipment are not more than sufficient to permit the beef and other meats to be properly cured, when they would reach the stores or retail depots in the United Kingdom. The meats should be designated "Canadian Beef," "Canadian Mutton," "Canadian Lamb," "Canadian Poultry," etc. When the quality and reputation of Canadian meats under their own name are recognized and established,

Canadian shippers could continue in competition with the producers and sellers of meats from all other countries upon an equal footing, and with a fair chance of securing the best customers, particularly if they could offer better value in better meats at even the same price per pound.

#### RECOMMENDS PURCHASE OF 500 CATTLE PER WEEK.

10. To permit this to be done and as an object lesson to the producers and shippers of animals and meats from Canada, I have the honour to recommend that provision be made for the purchase of about 500 head of cattle per week at the port of Montreal during the shipping season, and that dressed beef from such cattle be sent as "Canadian Beef" to the United Kingdom, and distributed, through retail dépôts, in Bristol, Birmingham, Glasgow, Liverpool, London, Manchester and other cities, in such a way as to secure a recognition of its good qualities.

#### PREPARATION OF BEEF AT MONTREAL.

11. Arrangements can be made for the slaughter of cattle at abattoirs in Montreal. The beef should be covered by distinctively Canadian wrappers of attractive appearance. It should be chilled in cold storage chambers. It should be carried in cold storage compartments, on board the ocean steamships. It should be taken into cold storage chambers at the port of landing, and from there distributed to and through the retail dépôts in the cities mentioned.

#### AGREEMENTS WITH MERCHANTS.

12. The distribution, through the retail shops or dépôts in cities of the United Kingdom, could likely be effected best by making agreements with merchants of good standing, of sufficient means and business ability, to supply them with a certain quantity of beef per week. This would avoid the need for engaging a large number of men as salaried officials.

#### RETAIL PRICES FIXED.

13. The prices at which the different cuts of beef should be sold to the consumers, should be fixed by the Commissioner designated to take charge of the work, on behalf of the Canadian Government. These should be advertised widely and effectively in the several cities, as well as on bulletin boards in the shops.

#### PRICES TO THE MERCHANTS DETERMINED BY RETAIL PRICES.

14. The beef should be supplied to the merchants in the several cities, with whom agreements were made, at such a price per pound for the whole carcase as would be agreed upon from time to time. That price would be based upon and varied according as the rates were varied at which the merchants were authorized to sell the different cuts of beef.

The profits of these merchants would arise from the margin between the amounts realized from the retail sales, at the prices which they were authorized and which they agreed to charge for the different cuts, and the amount which they paid for the beef taken by them from the Government weekly.

#### PAYMENTS BY MERCHANTS.

15. The merchants in the several cities, with whom agreements were made, should be required to pay for the beef weekly, and their payments might take the form of checks or deposits to the credit of the Receiver-General.

## Agriculture and Colonization.

### NO DEFINITE NUMBER NEED BE PURCHASED.

16. It should not be made compulsory on the Commissioner in charge to purchase 500 or any other number of cattle every week. The number to be purchased and killed should be left to be regulated from time to time by the activity of the demand and the success of the distribution through the retail dépôts in Great Britain.

### MAXIMUM OF ESTIMATED NET COST TO GOVERNMENT.

17. The actual net cost to the Government for the management of the whole business, would depend upon the prices which may prevail in Canada for cattle during the season of 1896. If prices in Canada be relatively low, compared with former years (which would be most unfortunate), the whole business could likely be managed without any cost, loss or charge to the Government and show a profit; but in case the prices of Canadian cattle in Canada should be relatively higher in 1896 than in former years (which would be a good thing for the country) a sum up to \$30,000 might be required to meet the expenses which are inseparable from the inauguration of the business at the abattoirs, on board the steamships, at the central dépôt at port of landing, and at the retail dépôts or shops for the distribution of beef and other meats in the United Kingdom.

### ONE YEAR ONLY REQUIRED.

18. The business need not be managed by the Government for longer than one year, after which it would be doubtless carried on by private enterprise.

### APPOINTMENT OF INSPECTORS OF MEATS.

19. The beef shipped under the Government control in 1896 should be inspected and graded. The merchants in the several cities who handle beef would become familiar with the quality and names of the different grades, if more than one grade should be established. After the first year, the Government might appoint "Inspectors of meats for export" at abattoirs at Montreal, Quebec, Toronto, Winnipeg, Calgary and any other place where the business required. The merchants in the several cities of the United Kingdom would then be in a position to purchase by cable or otherwise a given number of carcasses of beef whose qualities would be certified to, by the official inspectors of the Government. This plan would avoid the need for sending the beef or meats forward on consignment and would open up a good demand on a safe basis, from the time when the Government gave up the charge of making the shipments.

### OTHER PERISHABLE FOOD PRODUCTS.

20. A beginning could be made in a trade for the shipment of "Chilled Canadian mutton," "Chilled Canadian lamb," "Chilled Canadian poultry," fresh-laid eggs and fruits, through the same agencies.

21. From the trade in dressed meats would grow up in Canada associated industries, such as, the rendering of tallow, the tanning of hides, the making of glue and others.

### COLD STORAGE REQUIRED FOR CHEESE, OBTAINED WITH LITTLE EXPENSE IN CONNECTION WITH STORAGE FOR MEATS.

22. The cheese trade of Canada has reached proportions as large as seem safe, excepting for the natural growth, which may keep pace with the annual growth of demand from increase of consumers. During the months of July, August and September, a large quantity of cheese shipped from Canada does not arrive at the ports of Great Britain in the best condition, owing to the fact that it has been overheated in the railway cars, or on board the steamships. There is an urgent need for cold storage

on board the steamships, for the protection of our cheese trade. It now meets much keener competition in the British markets than it did a few years ago, and to hold our own, advantage must be taken of ever economical agency for the preservation of the good quality of the product during transportation. Cold storage for cheese could be provided on board the steamships with almost no expense to the Government, in conjunction with the cold storage accommodation for the carriage of dressed meats.

#### EXTENSION OF BUTTER AND BEEF GO WELL TOGETHER.

23. The making of butter in creameries during the winter can be increased very greatly, and the feeding of cattle and swine for beef and pork uses, can be joined to the winter dairying with very great benefit to the farmers. An extension of these two branches of agriculture go well together.

#### EXPORT DEMAND FOR WHOLE YEAR.

24. After the close of navigation at the port of Montreal, the exports of cattle from Canada each year have practically ceased. That has resulted in a great lowering of the prices of fat cattle until the opening of navigation in the spring of the following year. A good export demand for Canadian dressed beef might be maintained during the whole year after a trade is once opened up.

#### BENEFIT TO THE MARITIME PROVINCES.

25. In former years the want of an export outlet for cattle and beef has led to the shipment of surplus beef from the western provinces to the maritime provinces. That has prevented the farmers in those localities from selling their fattened cattle to advantage. A steady and profitable demand, such as would be created by the inauguration of a dressed beef trade from Canada, would take all surplus fattened cattle in the western provinces and Quebec for the United Kingdom, and leave the markets of the maritime provinces comparatively bare and available to the farmers who live adjacent to them.

That is the memorandum as prepared by me. The other page and a half deal with the estimates. That would not come before this Committee, but I suppose will come before the House in the regular way.

#### CATTLE EXPORT CHARGES,—MONTREAL TO LIVERPOOL.

*By Mr. McMillan :*

Q. I was a little astray yesterday in regard to the feed and care of cattle. I find \$4 a head is what it costs?—A. \$4? I am to add to my evidence what the cost was in the cases of the 280 cattle reported on.\*

*By Mr. Cochrane :*

Q. What is that you say?—A. It is in regard to the estimate which Mr. McMillan gave yesterday of the cost on board the steamer for fodder and attendance. It was spoken of yesterday as being \$7 per head ; it actually is, Mr. McMillan says, about \$4 per head.

*By Mr. Featherston :*

Q. I notice in a report in this morning's *Ottawa Citizen* a statement in regard to your address before the Committee, reading :—"On one lot of 100 steers shipped from Montreal, slaughtered in Liverpool and sold there as dressed beef, the freight, commission, &c., amounted to \$15.43 per head. On another shipment of 180 head the expenses averaged \$14.96." The report goes on to say, "These steers, Prof. Robertson claimed, would have netted \$16 more per head at Montreal, if slaughtered there and forwarded as dressed beef," I would ask if this report is correct?—A. The report is correct in substance, but it does not give the details upon which I based the estimate of that extra revenue. It was based upon the retail prices I mentioned.

\*NOTE :—The cost for hauling cars at Montreal, loading, wharfage, insurance, feed on board ship, ropes and pails amounted to \$3.88 per head.—J. W. R.

## Agriculture and Colonization.

Q. The report goes further and says that cattle sold at a fair average price for beef in England would have netted \$30 more per head than if shipped alive?—A. That was deduced from certain rates of retail prices for beef which were specified in the Committee yesterday. It was not a saving in freight, but it was chiefly the extra price realized by the retail sales.

Q. Making \$30 per head?—A. Nearly, but it took account of the charge for fodder and attendance at \$7 per head as mentioned yesterday, whereas that was corrected this morning to \$4 per head.

*By Mr. Wilson :*

Q. There was a saving in freight?—A. I did not bring that out yesterday. I estimated the freight on the dressed beef for the purposes of my calculation as given to the Committee, as being the same as the freight on live cattle last year. But the newspaper report took account of my remark that the saving of freight and shrinkage in weight might be \$3.00 per head.

*By Mr. Featherston :*

Q. This freight is only an expenditure between Montreal and Liverpool. You say nothing of the freight on the other side?—A. These are the figures from Montreal outward to Liverpool including freight, insurance, expenses at the lairage, killing, refrigerating and selling expenses in Liverpool.

Q. You cannot do it for \$15 per head?—A. I gave the actual and correct figures from the account sales received for the 280 cattle I mentioned.

Q. Including the steamship freight?—A. Yes, I gave the actual figures in regard to 280 cattle. I got the account sales from Hon. Senator Cochrane.

Q. Then he must have had a very low freight, what was his freight?—A. The freight in bulk for one lot of 100 head of cattle was £207, 16s., that would be £2, 1s., 6d., per head.

Q. That would be about \$10 a head?—A. Yes. The freight on another lot of 180 head of cattle was £373, which would be also a little over £2 per head. These account sales came to me in the course of ordinary correspondence and I merely used them yesterday to illustrate what the actual charges were on these shipments of cattle sold in Liverpool on the 2nd and 5th Oct. 1895.

Q. They were handled more cheaply than is usually the case. We estimate not less than \$5 a head expense over there after they are landed?—A. There can be no objection to having these examined by the Committee in full in order to learn the details.

Q. You say \$10 ahead would be about the freight in the case you spoke of. Then there were nearly \$5 expenses for feed and one thing or another, which makes about \$15, to say nothing of the expenses in lairage and for slaughtering, etc. It is almost impossible to get it done for less than \$19 a head?—A. I included everything in the statement except charges on the steamer for fodder and attendance.

*By Mr. Cochrane :*

Q. Is there a great difference between the slaughtered cattle and the live stock?—A. I put the charges for 180 cattle into four divisions. The average for freight \$10.08 per head ; for dock charges, etc., in that group, \$2.32 per head ; for refrigerating, killing, etc. \$1.35 per head ; for commission \$1.21 per head ; making average expenses \$14.96 per head.

*By Mr. Smith :*

Q. Have you a statement of what is intended to be done with fresh pork?—A. I am coming to that in a moment.

*By the Chairman :*

Q. You spoke of 500 cattle per week. Would that be for a certain number of weeks in the summer or for summer and winter both?—A. For as long as the supply could be obtained.

Q. You have the estimates there?—A. We would take about one-tenth of the cattle going through Montreal in the summer time. The total export last summer was about 5,000 head per week. Let me offer a few explanations that may save some questions, although I am willing to answer as many of them as I can. If the business is gone on with, I propose to have the cattle bought openly and publicly in Montreal, and to have a statement published every week in two leading papers in Montreal, giving the names of the men from whom the cattle were bought, the number of cattle bought, their weight and the prices paid. The information would be open to everybody and prevent any possibility of favouritism being shown in buying cattle from any individual.

*By Mr. McMillan :*

Q. Could you carry on the business from Montreal during the winter?—A. Not yet; want of cattle would be the draw back.

Q. And suppose you had the cattle they would have to be reshipped into the cars in Montreal. There would be no vessels to put them into?—A. My opinion on this is that there would be abattoirs after the first year at Calgary, Winnipeg, Toronto, and Montreal and Quebec, and from each of these places the dressed beef would be shipped in refrigerator cars to St. John, N.B., or some other port. That is for the winter service.

Q. The attempt was made nine years ago or so to send beef to England and refrigerators were put into some vessels. The companies, however, found it did not pay them and took the refrigerators out. Will the people sending the meat now put in the refrigerators themselves? A. I know some of the steamship companies put in excellent refrigerating plants several years ago and took them out again because it did not pay. I think it was because the accommodation on the steamship was premature. The trade was not ready for it then. Last summer the refrigerating appliances on the ships running from Montreal served the purpose for carrying butter over. The accommodation was not as good as it might have been, had mechanical refrigerators been provided. We could not afford that the first year, and we used ice only; but during the coming year, I understand that one or two of the steamship lines will put in mechanical refrigerating apparatus, which will enable us to ship butter in still better condition.

*By Mr. Featherston :*

Q. That is dry cold air?—A. Yes.

*By Mr. Cochrane :*

Q. Have you figured out the difference in the cost of shipping the dressed meat and the live animals? There should be a great advantage in shipping the dead meat from Calgary and western points as compared with the live stock?—A. After the business is established I think there will be a clean saving of at least one third on the expenses of the shipment.

*By Mr. McDonald (Assa.) :*

Q. How will it affect the transportation companies?—A. The railroad and steamship companies will make as much money because they will be carrying these carcasses for less outlay. For instance, there will be less expense for fuel. The increase in the business will be so great that it will be better for them, as more high class freight will go forward. There are one or two other matters that I might mention in this connection. I have suggested that the cattle might be killed in abattoirs in Montreal. I have already received communications from the company owning the abattoirs at Montreal

## Agriculture and Colonization.

offering to kill the animals at a reasonable rate per head ; to refrigerate the carcasses and to put them on board the steamships. It is not proposed that the Government should invest any money in buildings except, perhaps in the direction of supplying some of the fittings for the retail depots in Great Britain. I think the business could be managed entirely without the Government owning the premises or incurring any expenditure in that way.

*By Mr. Featherston :*

Q. The Government would not be liable for any permanent expenditure?—A. No.

### NEW ABATTOIRS TO BE PROVIDED.

I do not say it disparagingly, by any means, but the abattoirs at Montreal are rather unsightly, and they are not very conveniently situated for the export trade. The Abattoirs Company have written me saying that if they know soon that this business will be gone on with, they are prepared to put up, at their own expense, new abattoirs large enough to handle the business which I have mentioned. They will charge no more for the killing and refrigerating than they charge for the best work they do now.

Q. What accommodation is there now?—A. The accommodation is large enough, but the buildings are old and somewhat unsightly. My fear is that this business, if once inaugurated, would meet with the keenest hostility from the English butchers. They would leave no stone unturned to prevent our getting a footing in England ; and if the present abattoirs were used, our rivals would not hesitate to have them photographed and scattered broadcast throughout Great Britain. In this way they might create a prejudice against the business which it would not be easy to overcome. Recognizing the force of this reason, the Abattoirs Company say they are prepared to put up new buildings and undertake the expense attendant thereupon. The charge they stipulate for is 60 cents per head for killing and dressing ; they now charge 50 cents, and 60 cents per head for the best work ; the charge is to be 15 cents a carcass for the first week for refrigerating.

*By the Chairman :*

Q. Does that charge of 60 cents give them the offal?—A. Yes, as they get it now. It does not give them the hide nor the tallow, but it gives them those parts not used for food.

### WRAPPERS FOR THE MEATS.

Then it is proposed to get distinctively Canadian wrappers for the meats. Such beef as I have seen going forward from other countries has been put up in unsightly and cheap canvas, so that a good deal of the meat looks mussy and nasty when it arrives at the retail shops. I propose that we should put up our beef in strong canvas, as strong even as duck if need be, with the word, "Canadian" stamped on it.

*By Mr. McGregor :*

Q. What would it likely cost?—A. I have an estimate of the cost from one of the mills and it might come as high as 75 cents a carcass. The suggestion has been made that the cover should be of filled cloth, so that stains would not show through it and thereby render the sides unsightly.

*By Mr. Featherston :*

Q. It would be practically air tight?—A. The seams would not be air tight. Precautions of this kind would involve expense that might be regarded as unusual. We might expend \$1.50 on each carcass in order to make the sides look attractive ; but I am satisfied that it is to our interests to present the meat in an attractive form for every body who may see it when it lands.

Q. Would not rough canvas do?—A. I fear the rough canvas that I have seen is of such a character that it would be objectionable and unserviceable. It catches all kinds of dirt on the surface, and looks mussy.

*By Mr. Innes :*

Q. Quite a large trade has been done from my section in dead meat. The proposal, therefore, to open up this trade cannot be regarded as new?—A. Oh, no. The only thing that is new is to try and reach the consumers on the other side of the Atlantic through the proposed retail depots, and also the refrigeration by mechanical means in steamships from Canadian ports.

*By Mr. Featherston :*

Q. Have you investigated the American system of shipping dead meat?—A. Yes, but not as thoroughly as I would like. During the next few weeks, however, I propose to see something more of it. I know their general methods, but I have not been able to make as complete an examination as I would wish.

*By Mr. McMillan :*

Q. Is their meat sold to commission merchants?—A. No; some of the firms have their own depots in Great Britain. One firm alone is said to have over 80 depots from which they sell the beef. They are still labouring, however, under this disadvantage, the British people suppose that the beef coming from Chicago is not as good as the "best Scotch" or the "best English." These firms, therefore, get a class of customers that buy a lower grade of beef than that sold under the name "best Scotch."

*By Mr. Featherston :*

Q. I may say that I have eaten as good American beef in Scotland as I ever ate in my life.—A. I am satisfied that some excellent beef is sent over.

Q. I think the slaughtering of all the western cattle should be done in the West. If that were arranged, it would give the Ontario farmers a better rate of freight for live cattle?—A. According to the knowledge which I have, the jading and bruising of the animals occur mainly on the railway journey, and yet I have not been able to free myself from the impressions made on my mind on two occasions in crossing the Atlantic on steamships which had cattle on board. We had rough weather, I saw the cattle four or five times and they suffered very much. I am inclined to believe that these rough passages were not characteristic of what usually happens.

*By Mr. McGeorge :*

Q. The distillers claim that the cattle gain all the way over during the voyage?—A. No doubt they may in the summer time; or at any time with a smooth passage, I dare say they would.

*By Mr. McMillan :*

Q. The first time I went over with 60 head of cattle of ours, there were other two lots for which \$2. per head were offered at Montreal more than for mine. But when mine were put on the market there they averaged \$5 more a head than those for which more was offered at Montreal.—A. I went on board a steamship not many weeks ago to see the cattle at St. John, N.B., and in conversation with some men who had been in that business I learned that a loss of five, six and eight dollars per head was common, when there was not some one interested in the cattle with them all the time to see that the feeding was regular and that the cattle were well cared for.

*By Mr. Featherston :*

Q. That is the great secret of success in the trade, having them well cared for. If not you lose all your profits and more too?—A. Yes.

## Agriculture and Colonization.

I have not said much about the selling of the meats on the other side. I am confining myself now to beef. I can only speak of the proposals, and they may need to be modified if the business is gone on with, after business conferences are had with the men who are likely to do the selling. We may propose to them certain things and they may decline to go into agreements like that. However, the proposal is that there should not be more than two men on salary in Great Britain. The meats would be sold at the several cities by merchants who know each city and know its trade. The Government might have to fit up the shops to some extent to make them attractive. It is possible a merchant might say: "I would not fit up a shop as you want it for only six months' trade, although I am prepared, if the thing goes on, to take the fittings off your hands at a price." The Commissioner in charge for the Government would have to fix the retail selling prices comparatively low at first; and I think it would be advisable to have a good deal of advertising done through the columns of the newspapers, as news, and not as trade advertising matter.

*By Mr. McGregor :*

Q. You don't propose to go into the retail trade?—A. Yes, to an extent.

*By Mr. Irnes :*

Q. If you go into this you will find that the newspapers will not advertise you gratuitously?—A. Well, the newspapers there have already advertised the matter as a thing the Government was doing for the sake of the farmers of this country. For instance, the "Liverpool Courier" has already given a favourable editorial on the subject. The "Scottish Farmer" said, in effect, that the Canadian Government was, of course, looking at the scheme from the point of view of the Canadian farmers, but the action of the Canadian Government would have an effect on the Scotch farmers as well; and since the proposal was to have the produce of Canada sold under its own name, it was likely to do the Old Country farmers good service rather than injury.

Q. Oh, yes, that is generally; but when it comes down to individual cities or towns, you will find it will be different.—A. It will be different, no doubt. What we propose to do is to go to a business man, in Manchester for instance, and say: "If you are inclined to become the representative of the Commissioner for the Canadian Government, to have the exclusive handling of the meat in this city, we will agree to open one, two or three shops, and will agree on retail selling prices, which will be advertised on a bulletin board or tablet in these shops." If the average retail price by the carcase should be 15 cents, then the Government would agree to furnish this man with so many carcasses per week up to 50 or 60, or a number to be agreed upon, at the rate of say 13½ cents per pound wholesale, leaving him 1½ cents per pound for his expenses and profit. We would not be responsible at all for collecting the money from the retail purchasers. He would pay the Government at the wholesale rates agreed upon, and the margin would be his profit. He would not be bound to take any given quantity, and the Government would not be bound to supply him more than the quantity agreed upon. A refrigerator could be fitted into each shop to hold two or three days' supply. Beyond that, meat could be sent from the central refrigerator depot when required. When the demand was good, the Commissioner in England could cable to Montreal to send larger supplies, and, if the demand was slack, he could send word not to send any until further orders. The meat could be kept six weeks without deterioration, and there would be no need to send it out from Montreal until there was a fair prospect of its being required for immediate consumption.

*By Mr. Wilson :*

Q. Is six weeks as long as you could keep it without deterioration?—A. Yes. I think after that it would begin to show a little mustiness, and take a darkened colour outside.

Q. But, so far as flavour goes, do you think it would be all right?—A. I think it would keep for six weeks with improvement.

## PLAN PROPOSED TO PROVIDE LASTING ADVANTAGES.

The object of this proposal for managing the retail part is to avoid a very serious objection, and to achieve a business arrangement which would be permanent in its benefits. It would be almost impossible to administer a Government business in Great Britain, if the men who managed the retail shops were on salaries, and collected the money and paid it into the credit of the government. That would be open to very grave abuses, and would be almost impossible to manage well. I would not recommend the government to put a finger in a pie like that. But if merchants with whom agreements are made take the meat wholesale and collect the money for it, there would be no risk of loss, or pilfering, or mismanagement. Each merchant would pay for the meat week by week, and if the bills were not paid weekly, he would not get any more meat. This would simplify the system, and make it safe. The other object to be gained, and the more important one, would be this. If the government engaged men on salaries, when the government dropped out of the business the business would drop to pieces, so far as getting into direct touch and connection with the consumers was concerned. We would not have laid a foundation upon which a superstructure of permanent trading could be built afterwards. These merchant salesmen with whom agreements are to be made would be men of good repute, ability and means, who would know their business. The government, after the first year, would need to employ an inspector only in Montreal to grade the beef, so that any shipper could have his cattle slaughtered in Montreal at his own charges, under Government inspection. He could then offer to sell 100 or any number of carcasses on that inspection, grade No. 1, 2, or 3, as the quality might be. I expect these merchants, who had begun to sell on behalf of the government in England, would go on buying beef direct from Canada, as others now buy cheese and butter. That is how the proposal, I think, would achieve these two objects.

*By Mr. McGregor :*

Q. Are the Americans acting along that line now?—A. No, some of the companies that slaughter cattle have their own depots in England and sell for themselves. They manage their own business over there in that way. But just because it is Chicago slaughtered beef, they get a class of customers who buy cheaper cuts than the ones we would expect to get.

*By Mr. Innes :*

Q. Do you propose to have a wholesale buyer in each place?—A. We propose to have one man in each city and not more than two or three shops in any city.

Q. And the retailers would buy at their own risks?—A. Yes, only in this way, that the retail prices which the merchants, with whom agreements are made by the Government, must sell, are to be fixed by the Canadian Commissioner. If it was advantageous to drop the price 1, 2 or 3 cents per pound retail, we would do so, and the price at which the merchant was charged by the Government for the meat would be dropped accordingly.

Q. At the end of the week if any remained over he would have the responsibility of disposing of it.—A. Yes, but he would not be required to buy any quantity per week more than he could dispose of.

We would let him buy as little as he could sell. Supposing we had arranged to sell up to 500 a week over there, and in one week all these merchants had not sold more than 300, we would still have 200 in hand at the central refrigerator depot, and would cable at once to Montreal to kill only 300 the next week. We would always have enough on hand to make supply elastic.

*By Mr. McMillan :*

Q. I am afraid it would be almost impossible to fix the price at which they would sell, because whenever they had a settled quantity, and the meat would be a certain time on their hands they would reduce the price in order to get rid of it?—A. No

## Agriculture and Colonization.

merchant in any city would be required to have more than three days' supply on hand and there could be no objection to his selling the beef as low as he liked, only he must not charge higher than the prices fixed by the Commissioner.

*By Mr. McGregor :*

Q. He would only require the best cuts?—A. He would require three classes of cuts, I think. The beef would be cut up in three classes, first, second and third. A large proportion, or about one half of the carcass, would sell as first class, a quarter of the carcass as second, and the remainder as third class.

*By Mr. Featherston :*

Q. You could not always depend on getting the maximum price?—A. If the retailer wanted to sell cheaper we could not help that. The object is this mainly: We furnish these men in the several cities with the very best class of beef. Supposing the very best English and Scotch cuts were selling in the same city at a shilling a pound, if the merchant could charge a shilling a pound retail for Canadian beef, and buy it from us at a very great deal less, he would be taking all the profit, and we would not be getting consuming customers to know the relative cheapness of Canadian beef. The object is to get customers to these shops at retail prices that we can afford to sell at without any loss.

Q. Good butchers might come and buy a lot of our best cuts when the price was low and take them to their own shops?—A. I fear we could not prevent that, although there is before the Imperial authorities a proposal to make it a misdemeanour to label, brand or sell any imported meats as the best English and the best Scotch.

*By Mr. McMillan :*

Q. I think there is a scheme on foot to have all those who sell foreign meats in the English markets licensed?—A. I would favour that as being a good thing. I am quite willing to admit there are many difficulties in the way, and it is because there are difficulties that the Government should undertake the business, no private concern having been able to surmount those difficulties so far.

*By Mr. Innes :*

Q. The difficulty is in carrying out the details?—A. Yes; there are lots of difficulties. I may say that, after all, while every thing has been considered as far as I have discussed this business with the shippers of meats and butchers, there will doubtless be need of modifying the plan as circumstances arise and have to be met.

*By the Chairman :*

Q. How far have the arrangements been made already? What do you propose in the outline that has been drawn up?—A. No definite business arrangements have been made. I have merely been authorized to make inquiries as to what arrangements could be made. No agreements can be made and no expenditure can be incurred until the money has been voted by Parliament for the purpose. The whole plan has been submitted, information obtained, and propositions made to several firms, inquiring whether they could carry out what it was proposed to do in case Parliament sanctioned the plan and voted the money.

*By Mr. McMillan :*

Q. Would the sale of this meat in the different cities in the old country not be influenced more or less by the sale of live cattle that are sent there during the week?—A. I think to a very limited extent. I think that no more than one quarter of the dressed beef from Canadian cattle that are sent alive is ultimately sold as Canadian beef. The rest goes as the best English and best Scotch.

Q. Last year we shipped one lot of cattle, the average was 1,400 lbs, and we had \$75 per head at our own door. Two weeks after we sent over another lot, and we did not get \$60 per head although they were not 30 pounds lighter. I mention this because I am afraid it will be impossible to settle the price of the slaughtered meat while the price fluctuates so much, of the live animals which were being sold in the British markets.

*By Mr. Wilson :*

Q. The Commissioner in England would look after that?—A. By cable correspondence and otherwise.

*By Mr. Featherston :*

Q. But the retail trade does not fluctuate so quickly?—A. I find these fluctuations to be unaccountable. I think the buyers on the other side use all kinds of unfavourable conditions to force the price of live cattle down, and if there was an alternative market in Montreal for these cattle, and the men over there knew they could be sold in Montreal as well as shipped alive, a dull market would not come so readily in either Deptford or Birkenhead after the first year.

*By the Chairman :*

Q. I suppose you could not give any definite information when this would be announced, or the arrangements would be completed, so the public might be informed?—A. That lies with the Government and Parliament. The proposal asks the Government to put in the estimates the sum of \$300,000 for this purpose. This sum is asked for not to be spent for the maintenance, but in order that there should be sufficient funds available to purchase about 500 head of cattle a week for eight weeks, that being the possible time before the returns from the cattle will be available to use over again. That is to say, a credit of \$300,000 is asked for, with a limitation of loss or cost for maintenance of \$30,000. My own impression is that the whole plan could be carried through without any loss at all.

*By Mr. Roome :*

Q. Three hundred thousand dollars would be sufficient to form a credit to carry that on?—A. I think so. There might be expense of \$40,000 a week for actual purchase of cattle and other expenses.

*By the Chairman :*

Q. Where would you purchase your cattle?—A. In Montreal, for the first year.

Q. From buyers who brought them in?—A. Yes. I think the business could be financed with a capital available for six weeks, but there might be a time in the season when it would be advisable to send over 800 head of cattle per week. We count on two weeks in Montreal, not usually you know, but we might need that. I think it would be desirable to have the meat thoroughly cooled and chilled. Then we might count on two weeks on the ocean.

*By Mr. Featherston :*

Q. Then you want your cattle cool and the fever reduced before killing?—A. Yes; and then we might count on two weeks on the other side before the returns were available to use over again.

*By Mr. McMillan :*

Q. You cannot count on less than ten or twelve days on the ocean?—A. It was thought safer to have provision made for eight weeks; and if the money was returned more quickly of course the vote would not be called upon.

## Agriculture and Colonization.

*By Mr. Roome :*

Q. Have you anything to say with regard to pork and mutton ?—A. Yes, I propose to show a chart indicating the other two branches of the meat business.

*By Mr. Boyd :*

Q. Do I understand you to say you do not intend to purchase in any other place but Montreal for the first year ?—A. For the first year the killing would be done in Montreal and the purchasing could be done there as required. After the first year, with the Government inspection, I think abattoirs would be in operation in six or seven places. The business would then be done by private commercial enterprise, and not by the Government. The Government would appoint inspectors to grade the quality.

*By Mr. Featherston :*

Q. This last fall all the best cattle that arrived in Montreal came from the Northwest. It would be a great advantage if the Government could have these cattle slaughtered in the west instead of at Montreal. The colour of the meat would be much better ?—A. Some of the larger firms interested in cattle out there have already discussed the desirability of slaughtering at Calgary, and I said that if the plan were gone on with, and I were intrusted with the management of the details, I would not offer any objection to a train load coming down for trial. Some of the firms have offered to sell two or three train loads of cattle from the ranches, to be killed at Montreal, and to send similar cattle alive to Liverpool, through the usual channels, in order to discover what difference there would be in the returns from them.

### BRITISH IMPORTS OF SHEEP.

The following table shows the number of sheep and lambs and the quantity of their products imported into Great Britain in 1894 :—

From	Sheep and Lambs.	Mutton, Fresh.	Mutton, Preserved.	Preserved meats, other than Beef and Mutton
	No.	Cwts.	Cwts.	Cwts.
Canada.....	135,622	.....	1,258	2,320
United States.....	198,138	23,121	3,626	68,394
Denmark.....	63,439	.....	.....	.....
Argentine Republic.....	73,446	585,729	.....	.....
Australasia.....	11,952	1,439,502	106,619	43,965
Other countries.....	11,952	246,714	1,425	35,703
Total .....	484,597	2,295,066	112,928	150,382

Looking at the imports of Great Britain we find that of the sheep and lambs, Canada, in 1894, sent 135,622 head. The number was greatly increased during the past year with the result that there has arisen an agitation against the trade, and it is complained that Canadian sheep suffer from scab. If our sheep and lambs could be sent into Great Britain in the dressed meat form, I think it would be much better. It would cost less for carriage and yield better returns at the port of shipment. To that chart I may add one remark, that the home supply of all meats that the English consumers buy is the main source of supply.

## FOODS CONSUMED PER HEAD IN GREAT BRITAIN.

Of beef the annual consumption is estimated at 65½ pounds per head of the population. The following table will illustrate the point I desire to make. It is the estimated consumption per head of population in the United Kingdom for the year 1892:—

	Lbs. Consumed per Head.	Lbs. Imported per Head.	Lbs. Home Products per Head.
Beef.....	65·7	15·4	50·3
Mutton.....	28·3	5·4	22·9
Pig meat.....	28·6	14·3	14·3
Other meats.....	2·2	2·2	
Butter.....	15·0	9·5	5·5
Cheese.....	13·5	5·5	8·0

The prices obtainable in Canada for cheese are largely determined by the output of cheese from the dairies of England and Scotland, where it is estimated they make 8 lbs. for every 5½ lbs. imported from other countries.

To revert to this mutton business for a moment. This diagram will illustrate the relative prices obtained for the best Scotch mutton. The red line shows that the prices range from 5s. 6d. to 6s. 6d. per 8 lbs. That line indicates the fluctuations for the six years. New Zealand lamb or mutton is represented by the black line, and it fetches not very much more than half the price per pound which is obtained for the best Scotch mutton. Until recently New Zealand mutton has gone into England mainly in the frozen state. It is held that by freezing it, injury is caused to the texture or flavour. With the arrangements which we propose to make for cold storage compartments I see no reason why Canadian mutton could not be sent into the English markets and take a place very near the Scotch mutton. We have done so already with cheese and I do not see why we should not do it with mutton.

*By Mr. McMillan :*

Q. Has there not been a stagnation in the market in Australian mutton? The mutton from there is too heavy and too fat, and our Canadian mutton is generally fat? —A. That is in keeping with the whole trend of British tastes. The British people object to any meats that are too fat.

*By Mr. Cochrane :*

Q. Do you think the difference in the price as between Australian and Scotch mutton is due to the fact that the Australian mutton is frozen or it is not so good in quality?—A. I think there are three factors which make the difference. One is that it is frozen ; the next, that it is Australian and not the “best Scotch” and the name counts for a great deal ; and the third factor, and not the least of the three, is the intrinsic quality of the mutton where originally grown and slaughtered.

*By Mr. McGregor :*

Q. I understand that in Australia they mostly raise the Merino, while with us Southdowns and Shropshires are the principal breeds?—A. Southdowns, Shropshires, Cotswolds, Leicesters, Oxforddowns and Dorsets are the best for us. This chart will show the place where American chilled beef stands as compared with the price of Scotch mutton. It is about one shilling to about one shilling and four pence per stone of 8 lbs., lower than the price of Scotch mutton. This chart is prepared to show everything that is favourable to the Australian and New Zealand trade. It is published under their auspices and shows that American chilled beef for the whole carcase, sells at a higher rate than the Australian or New Zealand frozen beef for the hind quarters only.

## Agriculture and Colonization.

*By Mr. McGregor :*

Q. Is the Australian mutton in England sold by wholesale or retail?—A. They have depots there and sell in any quantities, by the carload or down to three or four carcasses. There is no limit so far as I know.

*By Mr. Pridham :*

Q. Is it your intention to try the experiment with sheep and lambs as well as beef?—A. The intention is to start with beef and after a few months or weeks to join on lamb, mutton, poultry and eggs.

*By Mr. Featherston :*

Q. I think there would be a good opening for sheep and lamb because the embargo there has hurt us severely?—A. There could be no objection to adding sheep and lambs; but in going into a business of this kind, it is best to be cautious and not put on too many things at first.

*By Mr. McGregor :*

Q. When you are opening a shop you have got to keep a supply of mutton. If the salesman bought Canadian beef from one place, and English mutton from another, the shop would not be a Canadian shop?—A. I would like to see the plan applied to sheep as soon as possible.

### SWINE PRODUCTS.

The imports of swine products are enormous and are continually increasing. The following table shows the quantities imported in 1894 :—

From	Pork, Fresh.	Pork, Salted.	Bacon.	Hams.
	Cwts.	Cwts.	Cwts.	Cwts.
Canada .....		7,702	254,443	50,576
United States .....	4,339	150,186	2,561,203	1,075,270
Denmark .....	2,015	61,360	766,828	1,785
Holland .....	133,526	1,935	23,666	
Sweden .....		1,791	72,541	
Other countries .....	40,503	2,045	10,923	2,153
Total .....	180,383	225,019	3,689,604	1,129,784

This shows the import of swine products into Great Britain. Canada sends no fresh pork, a little salted pork and a considerable quantity of bacon and hams. I would like to say in connection with this chart that last September, the pork packers in Wiltshire, where there are the great packing houses for England, were paying 9½ cents per lb., live weight for swine weighing from 150 to 160 lbs. I know that it is not fair to pick out the high prices, for a high class article with a very limited trade, and try to apply them to the products of the country generally, but it seems to me there is room for opening a fairly large trade by sending fresh pork to the United Kingdom, either to be sold as fresh pork or to be cured over there.

*By the Chairman :*

Q. I thought pigs were always bad sailors?—A. Yes, I would not send them over alive. I would send them over in cold storage. By doing that, you would do two things. You would get the consumers to buy our pork as fresh pork, or you might even get the

packers there, who buy our cured bacon and hams, wash, trim and smoke them, to pay higher prices for the fresh pork.

*By Mr. Cochrane :*

Q. How do you figure out  $9\frac{1}{2}$  cents live weight, for dressed meat?—A. " $9\frac{1}{2}$  cents per lb. live weight will give about  $11\frac{1}{2}$  cents per lb. dressed meat. Pigs shrink about 18 per cent from fattened live weight to the dressed weight.

*By Mr. McMillan :*

Q. But not if they are very fat?—A. These are small hogs of 150 to 160 lbs. Then it was limited to this, that the lard must not be above  $2\frac{1}{2}$  inches thick on the back. Our bacon must certainly be produced both lean and mild to suit the market over there.

*By Mr. McLean :*

Q. May I ask if you have been in correspondence about opening up the depots on the other side?—A. I have received letters from several people offering to take up the business, but without any definite terms being mentioned. The intention is that some one should go over to Britain and make enquiries personally before any arrangements are made.

Q. I suppose you are satisfied it could be done?—A. I think so and without much trouble.

Q. It would have to be managed altogether from the other side as to the supply?—A. As to the distribution, yes.

#### COLD STORAGE FOR CHEESE.

I have mentioned in my memorandum one word about the need for having cold storage for cheese. Last summer I think, three separate shipments of cheese were made in cold storage compartments. These were landed on the other side in so much better condition than with ordinary storage, that the merchants in Montreal who are the largest exporters say that they are quite ready to pay the 5 shillings a ton increased freight rate to get cold storage for cheese on the steamers, that is, cold storage with ventilated compartments through which air would be driven, keeping the temperature at about 40 degrees. The steamship companies say if cold storage compartments are provided for meats they will fit up other compartments and give the cheese men all they want for an extra charge of 5 shillings a ton. It is not expected that this service would cost the Government anything except perhaps an allowance for the space occupied by the partitions. The steamship people will put up the compartments if they are guaranteed against loss on the space occupied; and they say that for the expenses of fitting up the compartments and cooling them 5 shillings a ton would pay them.

*By Mr. McGregor :*

Q. From your knowledge of the business do you think that cheese would be just as good on the retailer's counter if it was kept down to 40 degrees and then exposed to a temperature of say 70 degrees in a shop? Do you think it would be just as good as if it had not been kept in cold storage?—A. Quite as good.

Q. You do not think that after it has been in a refrigerator you have got to dispose of it pretty quickly?—A. The injury to our cheese trade through the lack of refrigeration comes about in this way. There are large shipments in June, July, August and September. When any one cargo arrives in a heated condition on the other side, everybody expects bargains, and a demoralized tone is produced in the market at once. The benefit that would arise from the cold storage would not be so much that it would prevent deterioration in all the shipments as that it would prevent the demoralization of the market, which is always more or less caused by the landing of damaged goods. If only one lot in ten should be injured by overheating on board ship, to the extent

## Agriculture and Colonization.

of 2s. 6d. a hundred weight, the loss would be as much as would pay 5s. a ton all around for cold storage service.

*By Mr. McMillan :*

Q. Would you be able to ship the cheese as green, if you put it in cold storage ?

—A. Not quite in the summer time.

*By Mr. McGregor :*

Q. It ripens after it is shipped?—A. It ripens now on the voyage to a considerable extent. If it is put on the ship green and the temperature should go up above 65 Fahr., then it is injured. Accommodation on the same steamships could also be provided at almost no extra expense for fruit, by compartments that could be kept cool and be ventilated by the driving of cold air through them. I am very hopeful that if these perishable food products could be put in retail shops in Great Britain for one year, under the name "Canadian," we would get so many customers to know our goods that every man in the trade would share in the profits that would arise from the business.

*By the Chairman :*

Q. Your proposal then would be for the Government to build cold storage warehouses over there?—A. In Great Britain there are now cold storage warehouses in nearly all the large cities and we would expect to arrange at a fixed rate per week, per cwt. When the Government gave up the business after the first season of operation, there would be no plant or buildings on hand except perhaps the small refrigerating plant in the shops and some fittings to make them attractive.

*By Mr. Cochrane :*

Q. You will have to put a refrigerator in the shops?—A. Yes; there would not be need of a refrigerator in the shops of Great Britain to preserve the meat, but I think it would make them a good deal more attractive if the main part of each shop was kept at a temperature of about 40 degrees; and it would not cost much to have it so with glass partitions. The refrigerating machines are made now to cost comparatively small sums and they do their work efficiently.

*By the Chairman :*

Q. What do you propose to produce the cold, ice or chemicals?—A. It would be by mechanical refrigeration and by the circulation of chilled dry air. That is said to be the best method of cooling; and the machinery for that purpose is now being made also in Montreal.

*By Mr. McShane :*

Q. I would like to ask the Dairy Commissioner a question in reference to a statement of his reported in this morning's *Citizen*. He speaks of cattle being shipped to Liverpool and being sold there as dressed beef, the freight, commission etc., amounting to \$15.43 per head. On another shipment of 180 head, the expenses averaged \$14.96. These steers, Professor Robertson claims, would have netted \$16 more per head if slaughtered there and forwarded as dressed beef. How do you make that out Professor Robertson?

*Several members :*

He has explained that twice.

THE CHAIRMAN.—Perhaps Prof. Robertson could repeat his explanation. So far as I could learn, the explanation he has already given to the Committee was satisfactory.

PROF. ROBERTSON.—The statement in the *Citizen* while substantially the conclusion I reached, does not give the facts, mentioned by me, on which the conclusion was based. I did not intimate that any cattle shipped as dressed beef last year would have netted a higher price than the same cattle shipped alive, if sold through the usual wholesale and retail trades as they now exist. What I did say was, that I had, and I gave, the actual returns for 280 head of cattle shipped alive last year, as shown in the account sales submitted to the Committee; and then I pointed out that if those same cattle, taking the weights as returned in the account sales, had been sold, as I think they could easily be sold, retail, at the prices mentioned, of 8 pence per lb. for the best cuts, and 5 pence per lb. for the second cuts, and 3 pence per lb. for the third cuts, they would have netted that much more in Montreal than was actually realized by the shipments of the live cattle. And, then, I said further that if the dressed beef were sold retail at 9 pence per lb. for the best cuts, 6 pence per lb. for the second best cuts, and 4 pence per lb. for the third cuts, they would then net about \$20 a head more than they actually did net, basing my conclusion upon the possibility of the meat being sold retail at these prices, which, as everybody in the Committee who knows the English trade is aware, are prices lower than prices at which the best beef has been selling during the past year.

To the \$20 were added then \$7 mentioned in the Committee as the cost of fodder and attendance, and the saving of freight charges on the dressed beef estimated at the lowest at \$3 per head. The sum mentioned for fodder and attendance turns out to be \$3 too high, and so the \$30 estimate is to be reduced by that amount. The very gist of the whole thing is this, that the Canadians have not been getting as much for their cattle as they should have been getting, because too large a share of the prices paid by the consuming purchasers has stayed in the tills of the retailers, or the middle men, over in Great Britain. It was to show a means whereby we could get a larger share, our rightful share of that, that I made the calculation I did.

*By Mr. Featherston :*

Q. Without making comparisons of live cattle and dressed cattle going into the wholesale market?—A. Not comparing them as carried on last year, but comparing the returns as obtained last year with the returns that might be expected through retail depots.

*By Mr. McShane :*

Q. Are you aware that within the last four or five years there was hardly one man in the shipping business who has not been almost ruined? Are you aware of the fact that the banks of our province, and of the Dominion, have lost over \$4,000,000?—A. I am aware of two things, from what has been told me. I am aware that shippers of cattle say that they have lost money.

*By Mr. Boyd :*

Q. There are others who have made money?—A. I am aware that the shippers claim that they have lost money. I am also aware of the fact that farmers have been getting lower prices than they should have been getting out of the amounts paid by the consumers of Canadian beef; and so, if the shippers have not been making money, the business has been done by somebody in such a way as to prevent our Canadian farmers from getting their share of the returns from the other side. The fact that the shippers have not been making money and our farmers have been getting less than their rightful share, points to the need of a change in the manner of carrying on the business.

*By Mr. McMillan :*

Q. As a farmer, and one who ships his own cattle, I am under the impression that the shippers have given the farmers all they could give them.—A. You will permit me to make this further explanation. Nothing that I have said in the Committee, or in

## Agriculture and Colonization.

advocating the scheme elsewhere, has ever hinted that the shippers of Canadian cattle have been making too much money. This scheme, if put in operation, would help the shippers to make money by giving them an alternative market for cattle. A member of the Imperial Parliament said, in my hearing, that one retail butcher had made a million dollars in five years out of retailing in his many shops American and Canadian beef as the "best English" or "best Scotch." The object of this plan for opening up a trade in dressed beef is that the enormous profits which have been staying over there in the tills of the merchants may come this way, and that the shippers may get their fair share of them.

---

Having examined the preceding transcripts of my evidence of the 20th and 21st February, I find them correct.

JAS. W. ROBERTSON,  
*Agricultural and Dairy Commissioner.*

## COMMITTEE ROOM 46,

HOUSE OF COMMONS,

WEDNESDAY, 25th March, 1896.

The Select Standing Committee on Agriculture and Colonization met this day at 10.30 o'clock, a.m., Mr. Sproule, Chairman, presiding.

Mr. ROBERTSON, Agricultural and Dairy Commissioner, was present by re-call and addressed the Committee as follows :—

Mr. Chairman and Gentlemen,—Most of the information I gave to the Committee at the two last meetings I was before you, was on the plan proposed for the shipment of dressed meats in cold storage, to the United Kingdom, and I did not touch on the work that had been done and is to be done in handling dairy products.

*By Mr. McGregor :*

Q. Did you take up the idea of preparing the meat for shipment?—A. I did when I was before the Committee at these two sessions. When I had the invitation for this morning, I thought I would speak on the progress of dairy work in the different provinces of the Dominion, mainly as it has been promoted by cold storage service. In connection with that, I propose to report to the Committee what has been done in two matters that, seemingly, are rather imperfectly understood.

## THE WINTER DAIRYING MOVEMENT

in the Dominion of Canada has been growing very slowly. The chief difficulty is that the men who carry on the manufacturing of the butter during the winter are not able to do enough business to make that part pay them. The farmers, this winter, are very well satisfied with the returns from their milk ; but the men who run the factories do not do enough business to make any adequate return for their investment and their labour. Therefore the business is growing much more slowly than it should and would otherwise do. I perceived that difficulty, if I may say so, several years ago.

Five years ago when I was before this Committee, I suggested that a bonus should be given for winter-made butter, made in creameries, and sent abroad in certain conditions. That proposal did not meet with approval, and, as another means of helping this winter dairying movement forward, I recommended that the Government start winter dairy stations to demonstrate that butter could be made profitably during the winter ; and after it had been made, to try and get some help towards the opening up of a market for the product, in Great Britain. At that time there was a recommendation by the Dominion Dairymen's Association that the Dominion Government be asked for a grant of \$5,000 to send shipments of butter to Great Britain regularly, to demonstrate to the people there that butter sent from Canada in a fresh-made condition was of good quality, and to show the producers and shippers on this side that it would meet with a good demand and beget a good trade afterwards. As soon as ever the winter dairying movement attained proportions large enough to supply the local Canadian markets, the business came nearly to a standstill.

## EXPORT OF CREAMERY BUTTER BY THE GOVERNMENT.

In the winter of last year, 1894-95, there was more winter-made creamery butter in Canada than the local markets could take at a price fairly profitable to the producers. Thus, while we were recommending the farmers to go into winter dairying extensively, there was no satisfactory demand for the butter after it was made. The causes that brought about that state of things was unusual. That led me, as Dairy Commissioner, to recommend the Government to accept creamery butter of fine quality and to ship it to Great Britain, for two reasons: first, to relieve the market here from a surplus of winter-made butter that could not be sold for local consumption, and which, in the absence of an export demand, threatened to bring the price of finest butter down

## Agriculture and Colonization.

by 4 or 5 cents per pound; and secondly, to demonstrate that that butter would make such a name for itself in the English market that afterwards a good demand would exist at profitable prices. In accordance with that proposal, a quantity of 75,926 pounds of butter was handled—a comparatively small quantity. At the same time, it had the effect of relieving the market so much that the prices of all the creamery butter made in January, February and March last year, was at least 4 cents a pound higher than they would, otherwise, have been. In handling that butter I found a quantity of it unfit for shipment, not because of its quality (because we declined to receive any butter of inferior quality), but on account of the kind of packages in which it was made up. It was accordingly sold at Montreal, and realized 20·16 cents a pound gross. The expenses were not taken off that sum.

### BUTTER SHIPMENTS AND PRICES OBTAINED.

*By Mr. McMillan :*

Q. It only brought 18·76 cents a pound when the expenses were taken off, according to the statement given in the House?—A. That is the net return. I am speaking now of the price at which it was sold in Montreal. Of the remainder of the butter handled, the quantity that was shipped from the Experimental Dairy Stations was 34,684 pounds. That was from the stations controlled by the Government, butter made under our supervision. The quantity obtained from other creameries shipped to England under the arrangement was only 22,591 pounds. The bulk of the butter shipped to Great Britain, was the butter made in our own experimental dairy stations for educational and demonstration purposes. There was one-half more of it shipped than all the rest received from other sources.

As a result there was a demonstration of the fact that our creameries in Canada could turn out butter in the winter time that would please the consumers in Great Britain and establish a permanent demand for itself there. There was a demonstration to the shippers of butter in Canada, who, up to that time, had not sent any butter made during the winter to Great Britain, that butter made then could be sent to Great Britain, and please the consumers there. Montreal shippers objected to the plan because they said the butter made in Canada during the winter was not fit to compare with the butter imported into Great Britain from other countries. As a matter of fact, all the shipments of winter-made butter, last winter, were those forwarded by myself at the 20 cents per pound advance; but this winter the Montreal shippers are shipping regularly. Another class of people that were decidedly and clearly helped were those who were manufacturers of butter, and who had been unable to market their product.

### GOOD STANDING OBTAINED IN ENGLAND.

When I was in Western Ontario this winter, going to a series of meetings, I met at Hamilton a Mr. Campbell, who is salesman for a creamery at St. George, Ontario, who was one of the men who had written previous to the exportation of butter by the Government in 1895, that he could not sell the whole output of that factory. He told me that he had been shipping the butter from the St. George Creamery this winter to the same firm in Manchester whom I had dealt with, and he had been getting 21½ cents per pound at St. George, Ontario, for some shipments. Then I found in the *Woodstock Sentinel-Review* of last week, a clipping which I will venture to read to the Committee :

The shipments of butter from the Black Creek Creamery to England this year have commanded the highest prices in both the Manchester and London markets for colonial make. Messrs. Ballantyne & Sons last week received the following letter from one of the largest firms in Great Britain dealing in dairy produce :—

MANCHESTER, February 29th, 1896.

MESSRS. THOS. BALLANTYNE & SONS,  
Stratford, Ont.

DEAR SIRS,—We have received delivery of 45 packages ex-“Mongolian”; A.C. 58 is correct both in colour and saltness, and has been sold at 106s.

Choicest Australian is selling at 100s. London. As we pointed out before we can make more for your butter than for it; the only fault is that you don't ship enough.

(Signed) ANDREW CLEMENT & SON.”

## COMPARISON OF PRICES OBTAINED.

This price, after deducting freight, insurance and commissions, nets 21c. per lb. in Stratford. The best price for prints delivered at the Stratford station for shipment to Toronto at the present time is 20½c., so that a half cent a pound better was obtained from the English shipment. The fact that this shipment brought 6 shillings a hundred more than finest Australian, which is at this season grass butter, and is transported in refrigerator steamers, is sufficient testimony to its superior quality.

As Dairy Commissioner, I shipped some butter from the Black Creek Creamery in 1895, under the 20 cent per lb. advance—the first that was sent from there—and have opened up a trade for that butter with this firm in Manchester. They are now getting butter from the same quarter in good condition and are paying a satisfactory price for it.

*By Mr. Featherston :*

Q. 100 lbs per one hundred weight?—A. 112 lbs.

*By Mr. McMillan :*

Q. Can you tell us what the price of butter was at the time of that shipment of 75,000 pounds last year?—A. It ranged from 63 to 90 shillings.

Q. Some of it went up to 90?—A. The earliest shipments that were sent over. The range of prices this winter has been a good deal higher than last winter for Canadian butter, and our butter has gained in the relative position it occupies in the butter trade.

Q. I have a statement and used it in the House, showing that a large quantity of our butter was in bad condition, being too old and too stale. That statement correctly described the condition of the butter?—A. Well, the reports I have from the firm to whom the butter was shipped were to the effect that the butter shipped last winter was the first winter-made butter they had received, that it pleased their customers well and that if similar shipments could be sent regularly, there would be a large demand for it at good prices.

Q. The statement I read was from Clement & Son, Manchester?—A. I have published the official letters and part of them appear in last year's report under their name. Let me say also in this connection that Mr. Campbell is a well-known gentleman being Treasurer of the County of Brant. When I met him on the platform of the railway station the other day, he observed to me: "You were handicapped last year, because you did not have a chance of sending good butter." He had been informed by somebody that the butter did not give satisfaction, although as a matter of fact it did please well and led to a satisfactory demand this year at good prices.

## COST TO THE GOVERNMENT OF SHIPPING BUTTER.

I would like to put before the Committee also a statement of the exact cost to the Government of shipping the butter, in order to show that the matter was not ill-considered or badly managed. When the recommendation was made to advance 20 cents per lb. and send butter to Great Britain it was well known that the price in Great Britain, at that time, was lower than the price prevailing here, and therefore, a vote of \$3,000 was asked to meet the expected deficit. It was not expected that the butter would sell in Great Britain for the same price that was advanced on it here. The object was to demonstrate that the winter-made butter was good and to open up trade for the three classes of people I have spoken of, viz. : the patrons, the shippers and the manufacturers. The whole cost of the shipments, the whole amount paid out for the butter was \$15,190.86. There were two items of expenditure for freight and storage, making the whole amount \$15,571.52. The revenue amounted to \$11,819.61, leaving a net loss of only \$3,751.91 on the whole transaction. The bulk of it was butter sent from our experimental dairy stations, the amount thus sent being 34,684 lbs. The market

## Agriculture and Colonization.

price obtainable for that was 21 and 21½ cents a pound, so that the patrons got a little less than they were getting before. The money used in paying them 20 cents a pound on butter to be exported experimentally, was largely for illustrative and educational purposes, and the small sum expended on the other butter at the same rate of loss would not amount to more than between 13 and 14 hundred dollars. The expenditure was really part of the educational and experimental work, and that consumed the sum that was voted for this purpose.

### THOSE WHO BENEFITED BY THE EXPENDITURE.

The producers—the patrons of all creameries—received for their butter in Canada more than they otherwise would have obtained ; so they got the benefit of the expenditure. The expenditure also gave the consumers in Great Britain a small quantity of Canadian butter when butter was very low in price. That led to inquiries concerning our butter, and resulted in a more active demand during the summer, as reported by Messrs. A. A. Ayer and Company, the largest shippers in Montreal, and others. According to their report there was a better demand and a more steady demand for Canadian butter last spring and summer than formerly, and that from quarters where demand had been created by the advertising it had received through the action of the Government.

### A SYSTEM OF COLD STORAGE PROVIDED FOR TRANSIT.

That was followed by cold storage on steamships and cold storage service on the railways, the object being to get our butter before the English consumers in its very best condition, and to let them know we could send a quality which would compare favourably with what they received from any other country. It might be said that a direct result of that was, whereas in 1894 there were shipped from Montreal 32,065 packages, there were shipped in 1895, 69,664 packages, and the butter arrived in Great Britain in better condition than ever before. It pleased the consumers so much better, that now we have really an active demand for Canadian creamery butter under its own name ; and the shippers say they are willing to pay the increased cost of cold storage service on the steamers, themselves, rather than do without it. The whole cost of that service was not large. The expenditure for the cold storage service on the railways, comprising payments made to the Grand Trunk, and Canadian Pacific Railways for running refrigerator cars once a week on most of the routes running into Montreal and picking up small lots of butter on the way, payments for building the insulated compartments on the steamships and the extra freight charges paid to the steamship companies for space occupied, amounted to \$13,279.62. This was the total cost to the Government, of providing cold storage for carrying rather more than three million pounds of butter, so that the whole expenditure for cold storage last year if charged up against the butter was less than ½ a cent a lb. Besides carrying the butter in better condition, the service we gave resulted in getting Canadian butter advertised in England, in a most favourable way.

### CANADA'S COMPETITORS IN DAIRY PRODUCTS.

It is to be borne in mind that we have to compete, in England, with other countries like Denmark and Australasia. In those sister colonies the Governments paid a bonus, to start the exports up to 6 cents a pound of butter, while the cost to the Government of this country, last year, of the butter sent to England in cold storage chambers, was not more than ½ a cent a pound. Our competitors are paying much higher ; they are giving cold storage at the points of shipment, paying graders there, and giving cold storage on the steamships.

I take the responsibility of saying as Agricultural and Dairy Commissioner, that Canada could not spend any other money more advantageously for the best interests of the people who live in this country, than if she spend five times the amount of money

in developing the butter trade this year that she did last year. It must be remembered if our butter trade is allowed to go back, people from other countries will occupy the market and we will not secure admission so readily afterwards. We have now gained a favourable entrance and we should make an effort to keep that market. We can produce butter, better and cheaper than other countries can. Hitherto we have been handicapped in getting our butter to the English market in such a condition that the consumers there would be pleased with its quality. Now we are able to more than hold our own.

In that connection there are many points that might be touched upon but there are just a few I would like to mention to make clear what has been done in this matter.

#### ASSISTANCE TO CREAMERIES EXTENDED.

Following up the business during the summer of the past year we were able not merely to help the creameries in Ontario and Quebec, that are this winter shipping butter through the channels which were opened up by our shipments in the previous year, but we had more need and opportunity to help the more distant portions of the country where the local authorities were not willing or able to give the help which was needed. For instance, at Moose Jaw, we managed a creamery as one of our Dairy Stations, and there the farmers will realize over 19 cents a pound for summer butter made at that creamery. A large part of that butter was sent to Great Britain to be handled through the agencies opened up by the butter shipped to the old country under the auspices of the Dominion Government.

*By Mr. Featherston :*

Q. What percentage of the butter went to England?—A. 533 packages went altogether, out of the total make of some 940 packages. The amount exported was valued at \$5,230 net after all expenses had been paid. The total make of the factory was valued at \$10,160.

*By Mr. Bergeron :*

Q. What did the packages contain?—A. They were mostly square boxes of 56 lbs., and were lined with parchment paper.

Perhaps I might mention in this connection that in that North-west country, it is the intention this year to continue the creamery at Moose Jaw and to take control of creameries at Prince Albert and at Indian Head. This is being done not because the people have not sufficient intelligence to manage the business but because they have no marketing facilities. We will control these creameries only until such time as the way has been opened up and they are able to do the business for themselves. It costs the country practically nothing. We charge 4 cents per pound for making the butter and pay the patrons everything the butter realizes above that 4 cents. In this work we are merely lending the name of the Government to open up a trade for those who are so situated as to be unable to do it themselves.

Up to last year, there had been no winter-butter trade from the Maritime Provinces. The total shipment from Canada of winter-made butter was 75,000 lbs. in 1895, while this winter of 1895-96 at the central creamery at Charlottetown, there will be manufactured close to 100,000 lbs. ; and that could not have been done if the trade had stuck at 16 cents a pound in Ontario and Quebec, in January, February or March, 1895. I am convinced that no expenditure of public money has given Canadians as good results as that expenditure of \$3,700 last year.

#### THE MOOSE JAW CREAMERY.

The butter of the Moose Jaw creamery which was sold in Canada commanded a higher price than that sent abroad.

## Agriculture and Colonization.

That sent to Great Britain was June, July and August make. That sold in Canada was a later make and was sent to Vancouver, B.C., when it was dearer. It commanded 22½ cents at Moose Jaw. In British Columbia the people have been importing large quantities of butter.

*By Mr. Carpenter :*

Q. What were the farmers realizing who sold to the stores in the neighbourhood of Moose Jaw?—A. With difficulty they got 8 to 12 cents in the summer; and the demand was only for what could be consumed in the locality.

Q. And yours commanded 19 cents?—A. Yes.

Q. The whole season?—A. On the average for the whole season. Let me make this clear. All over Manitoba and the Territories there has been an absolute dearth of demand for dairy butter, except in a few localities. The success of the farmers now depends on making the butter in creameries, utilizing the cold storage service to carry the butter from the Territories and Manitoba to Montreal, and ultimately to Great Britain, for not more than 10 per cent of its value.

*By Mr. McMillan :*

Q. Was the Moose Jaw butter shipped from the North-west in one shipment?—A. Yes, one lot only was sent to Montreal.

Q. And put in cold storage?—A. Yes. We have a cold storage room at the creamery.

Q. You stated you had some ingredient to mix with the butter to enable it to retain its keeping qualities?—A. It has not been used in the butter from the dairy stations, for this reason. It has been used in Denmark and Australia but with doubtful results, as it is said to render the butter unwholesome. In place of using it in our butter we have been putting brine made of it on the top of the butter. In that way we have preserved our butter. At the present time I have in Montreal 36 packages made in March of last year—1895—some of which have been preserved in this way and is still in very fair condition. The use of brine on the surface has been very beneficial in keeping the flavour.

### DAIRYING IN BRITISH COLUMBIA.

In British Columbia, the farmers felt the necessity of going into this co-operative dairy business, and the Local Government appointed a committee to consider the best means of promoting dairying.

Three propositions were considered:—(1) To encourage butter making in the province by granting a bonus on butter made in creameries, (2.) to give a bonus to those who imported improved dairy cows and (3.) to assist the people to establish creameries. The committee on looking into the matter recommended the latter course, leaving the people to produce as cheap as they could. It was, therefore, recommended to the British Columbia Legislature that the government grant loans to dairying companies up to 75 per cent of the cost of the creameries, to give the farmers a chance to establish them.

### ASSISTANCE TO DAIRIES IN THE TERRITORIES, SUGGESTED.

In the North-west Territories, where they have no Provincial Government, or means of raising Provincial revenue, I think the people need some financial aid to start creameries. Where the farmers are willing and desirous to go into the business, I think judicious loans might be made to companies to erect creameries, and in localities like Moose Jaw they would soon pay it back. At Moose Jaw it has been a great success, the business being now self-sustaining, so far as the Government management is concerned.

### DAIRYING IN THE EASTERN PROVINCES.

IN THE PROVINCE OF QUEBEC, my assistant, Mr. J. C. Chapais, has been doing excellent work. Our work there has been chiefly done by means of travelling instructors and at the dairy school at St. Hyacinthe, which is run by our Department in connection with the Provincial Dairy Association.

IN NEW BRUNSWICK, we have a school at Sussex, where we give instruction in cheese making and butter making, which has had the effect of bringing the cheese and butter in that province up to the standard of what is made elsewhere.

IN NOVA SCOTIA we have a dairy station at Nappan.

IN PRINCE EDWARD ISLAND, we have been doing extensive work, and I would like to take a moment to say what we have been doing there, that there may be no misunderstanding as to the nature, the scope and the effect of our work in that province. Anybody who has had to do with the selling of cheese knows something of the difficulty of marketing it in such a way as to give satisfaction to those whose product he sells.

When the Government undertook to promote the establishment of factories in Prince Edward Island there was not any intention of assuming the financial and commercial responsibility for a long period. But as in the case of Moose Jaw, N.W.T., and Prince Albert, N.W.T., and other distant points, there was no convenience for marketing cheese for export, and therefore the people were timid and said they did not want to undertake the business for themselves. I did not wish to undertake the selling of the product, having found such work exceedingly irksome and unsatisfactory, but it seemed to be the best thing to be done, and I have been doing it for 28 cheese factories and two creameries. The quantity of cheese last year was a little over 25,000 boxes.

We charge 1¼ cents a pound for making cheese and 3½ cents a pound for butter. These charges realized about \$23,800 from the patrons for the making of cheese and butter at the factories which we managed.

*By Mr. McMillan :*

Q. Is that for the milk delivered at the factory?—A. Yes, the people bring the milk to the factories themselves or hire men to do it.

#### GOVERNMENT EXPENDITURE AND RETURNS IN P.E.I.

For wages, rent of buildings, supplies, insurance, book-keeping and stationery, we paid \$23,000 until the close of the cheese making season. There would be bills of probably \$1,000 to come in after that, so the total cost to the Dominion Treasury for dairy work in Prince Edward Island up to the end of the cheese making season did not exceed \$500 for the summer of 1895; and we turned out cheese and butter to the value of \$155,000.

It is not easy to sell cheese satisfactorily. Anybody who has been in the business knows that; and I have been quite patient under all the kindly remarks that have been made in the newspapers about me, in that respect. I sold the P. E. Island cheese to the good firm of Hodgson Brothers, of Montreal, on private terms, for this reason; in view of the condition of the market then, they did not want the price at which they purchased, to be known until they sold the cheese. The firm of Hodgson Bros. offered me more than anybody else, but it was not quite enough in my opinion. I thought the market was going up, but instead of that it has gone clean down. I think it is going up again. They were quite fair in making this proposition which I felt bound to accept, that they would pay me a certain price, which was higher than any one else in Canada offered; and at the same time they would allow me for the patrons of the factories whose property the cheese were, one-half of the profit whatever it was, if there was any.

*By Mr. Featherston :*

Q. It was a kind of a one-sided bargain?—A. Well, the cheese were good and they wanted to get them.

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

Q. Did you mention the price?—A. I did not because they asked me not to.

## Agriculture and Colonization.

By Mr. MacMillan :

Q. It is something that is complained of all over, that the country does not get the full benefit of this information until it is too late. As soon as a transaction is completed the country should be put in full possession of the whole of the facts?—A. The facts were published in the Montreal papers next day, that the cheese had been sold on private terms.

The people who have complained all along said that as soon as this cheese was sold, the price of cheese would go up, because the holding of these cheese depressed the market. That was said all over by these croakers. As soon as the cheese were sold the price went down, perhaps because I had been helping to hold the market up by refusing to accept low prices. If the money from the cheese were public money, the people would have a right to know all about it; but the transaction was for the patrons of the factories of Prince Edward Island; and I was trying to get the highest price I could for them. I think after all is said and done, I got a higher price for that cheese than the average price of cheese in any other province in Canada. While these commercial responsibilities are not agreeable to me, and I should be glad to be relieved of them, I never try to escape them when they are forced upon me as duties; and I have taken the course I have, because it was necessary to keep the factories running. I have an open letter which I am sending now to the farmers of Prince Edward Island to show that it is simply and solely for the farmers own benefit that I have undertaken this work, so far, and that for the same reason they should now undertake it themselves.

The letter shows why, having done so much, we should continue to help these factories, because our object was to educate and not to absorb commercial business. The letter is as follows:—

### DOMINION OF CANADA.

DEPARTMENT OF AGRICULTURE,  
OTTAWA, 23rd March, 1896.

To the shareholders and Patrons of the Dairying Companies of Prince Edward Island :

DEAR SIRS,—

When I visited Prince Edward Island in my official capacity as Dairy Commissioner in 1890, I advocated the establishment of co-operative cheese factories and creameries. When a joint stock company of farmers was formed at New Perth, to erect buildings for a cheese factory there, I was authorized by the Dominion Government to take the management of it for one year. Fortunately, one of my valued assistants, Mr. T. J. Dillon, consented to go to Prince Edward Island, to act as Dairy Superintendent for the Province.

During the first season of 1892, all the business of the factory was undertaken by this Department. The following year the directors of the company took charge of the drawing of the milk and the disposal of the whey.

Since 1892, co-operative dairying on the Island has grown very fast.

At the beginning of this work in Prince Edward Island, it was neither proposed nor intended that the Government should assume control of manufacturing cheese and butter, and at no time since has it been the purpose to retain the control of the cheese factories and creameries, after sufficient educational help was furnished to enable the Joint Stock Companies and Patrons to manage the whole business successfully themselves. I think the time has now arrived when the larger cheese factories should be managed by the directors of the companies owning them; and I ask the farmers of Prince Edward Island, who are interested in the success of these cheese factories, to again accept my counsel—which I think has been useful to them in the past—and take the commercial responsibility of carrying on the business at the several factories, into their own hands.

I recommend the Joint Stock Companies, who own the several factories on Prince Edward Island, to take the business into their own hands, solely, because I think it is better for the dairy business on the Island that they should do so; and this course is consistent with the attitude and action of the Dairying Service of the Dominion Department of Agriculture since the work was begun. It is not to be taken as an intimation of the withdrawal of assistance and supervision on behalf of the Government; but for the stability, progress and prosperity of the dairying movement in Prince Edward Island, this is the wise course for them to pursue. I am confident the directors of the companies can carry on the business at as low a cost for manufacturing and management, as the charge which has been made by the Government.

I have received communications from the directors of several of the factories, expressing anxiety lest the business should go back, and in some cases, altogether go down, if the commercial responsi-

bility is not taken for another year by this Department. It is said on their behalf that the Joint Stock Companies and patrons fear difficulties with which they may not be able to cope successfully, in three parts of the business,—namely, (1) in the marketing of the cheese, (2) in the purchasing of supplies, such as, rennet, bandages, etc., and (3) in the manufacturing of uniformly fine cheese throughout the season.

I desire to point out under these three heads, what has been done and will be done to ensure continued success.

1. **MARKETING.**—This may be held to include the selling of the cheese, the storing of the cheese, (if that be thought necessary), and (in that case), the obtaining of advances of money on account, in order that the patrons may receive some payment every month for the milk supplied by them during the previous month.

I am informed that an agent of at least one firm, that exports large quantities of Canadian cheese and butter, will be on Prince Edward Island during the season of 1896 to buy and ship cheese, as they are ready for sale.

Several firms in Great Britain, of excellent reputation, who import large quantities of Canadian cheese and butter, are ready to receive cheese or butter from Prince Edward Island on consignment and to sell the same at the highest prices obtainable. They are ready to make arrangements with Prince Edward Island firms to advance up to 85 per cent of the value of the cheese or butter at Charlottetown, when consigned to them.

It is more than probable that as much value can be obtained by selling the cheese regularly every month, as by holding them until the autumn. In that case, no cold storage for cheese would be required.

I am to take charge of a few of the smaller factories on the Island, where such help is really necessary until the patrons are ready to supply larger quantities of milk; and every opportunity will be given to the directors of the companies who manage their own factories, to sell their cheese at the time when I sell the cheese of the factories which are under my management.

In case any circumstance should arise which may prevent the directors of the several companies from disposing of their cheese at satisfactory prices in any of the ways which I have mentioned, if my services can be of substantial benefit to them, the Government will doubtless grant me permission and authority to act as salesman for the disposal of the cheese of even those factories on Prince Edward Island, which are managed by the companies of farmers themselves.

2. **PURCHASING FACTORY SUPPLIES.**—At least two firms, from whom I purchased in the past, are ready to sell factory supplies of similar quality at equally low prices direct to the Joint Stock Companies of farmers. A stock of these factory furnishings will be on hand at some warehouse or depot in Charlottetown.

3. **MANUFACTURING UNIFORMLY FINE CHEESE.**—In most cases the directors of the companies can engage for 1896—if they have not already done so—the services of the cheese-makers who made the cheese at their factory during the past year, or made cheese at some other factory on the Island. They can thus secure the services of experienced, competent men, who know the details of the business thoroughly.

To give the directors of the dairying companies, information, which they might not be able to obtain otherwise, an assistant instructor in cheese-making will be appointed, to help Mr. Dillon, in order (1) that all the factories may be visited frequently and regularly, (2) that instruction and advice may be given to the several cheese-makers, and (3) that a report on the condition of the factory and the quality of the cheese may be furnished to the directors. This course will entail a larger expenditure of money on behalf of the Department, than if the commercial control and management of the factories were continued by the Government. The change is not advised for the sake of reducing the expenditure on Prince Edward Island, but it is for the purpose of putting the business as quickly as possible upon a safe and satisfactory basis, for future extension.

The season of 1895 was a most difficult one in which to dispose of cheese at satisfactory prices. I look for a more active market in 1896. The stocks of cheese at the present time are reported to be smaller than they were at this season for several years. The make of cheese in Great Britain was much less in 1895 than in 1894, and the importations of cheese from Australasia have been considerably less during the past winter than in former years. These facts all point to a steady and active demand for cheese during the coming summer.

I regret the delay in making the final settlement with the patrons of the factories for the business of 1895. Every effort has been made to obtain the highest possible price and to be ready for a settlement with the patrons at the earliest possible moment.

I am, yours very truly,

JAS. W. ROBERTSON,

*Agricultural and Dairy Commissioner.*

#### PLAN OF ASSISTANCE TO FACTORIES.

The Committee will well understand that when the Government undertake the control of any factory, the patrons want us to keep it up for all time; and it has been our difficulty to escape, when we did not desire to continue it. Our course has been, to manufacture and market the product for the farmers in new districts, for a few years, and then leave them to do it for themselves as soon as they could.

## Agriculture and Colonization.

### THE PROBLEM OF PROVIDING COLD STORAGE.

I might detain you one moment more to make a report on the cold storage question as it now has to be faced, and what I think could be done to provide the service that the Canadian people really need.

In all dairy products and other fine food products, the one quality or attribute that makes them of exceptionally high value per pound, is daintiness of flavour. I can find time this morning only to illustrate this principle, which you will catch in a moment—that the quantity of substance in any food commodity is almost no index of its value, but the condition of the substance as to quality and flavour is the one thing that determines its price.

The colour and flavour are the qualities that determine its commercial value. In apples, colour and flavour are what are looked for; a rotten apple weighs as much and contains as much substance as a good apple. We have taken no pains in Canada until almost within the last few years to preserve for long periods, these two things in perishable food products—daintiness of flavour and colour. Cold storage is everywhere resorted to to preserve the daintiness of flavour of butter; and we can never hope to obtain a leading position in the markets of Great Britain, unless we have a cold storage service at the creameries, at the warehouses, on the railways, and on the steamships.

We need cold storage accommodation, not merely for the preservation of the quality of the products, but we need it to lengthen the marketing period. It has been complained a little in certain quarters that cold storage merely provokes and permits speculation. Now, the speculation that consists in buying a quantity of an article with a view of holding it for future consumption, is a wholesome factor in trade and not a disastrous one. We make cheese in Canada for five and a half months, and cheese that are made then have to be spread over twelve months of consumption. So it is said, if we can lengthen the period of consumption for apples and other fruits and for cheese and butter without deterioration in their quality, which we shall be able to do by means of cold storage, we have every reason to expect we shall be able to get the bulk of our products on the market at the very best time, in regard to prices, available or obtainable. I have said before the Committee, on other occasions, that the average price in England for butter of the best quality is 6 cents a pound more from October until March, than from April until August. Now butter can be held from June until November, at a cost of not more than half a cent a pound for storage, and, if held at a proper temperature, without losing the least bit in quality. That has been demonstrated by our experiments in shipping. It is, therefore, of very great importance to have cold storage in order (1) to preserve daintiness of flavour, and (2) to prolong the season of consumption, and (3) to give us a chance to get at the market at the best time, when the highest price is being paid. That would promote making more butter here, and with it would come the feeding of more swine, and the associated industries that would respond quickly and make our country a great deal more prosperous than it is at present.

There is plenty of cold storage accommodation in Montreal for all the products offering there for export, judging from what is proposed to be constructed now in addition to what is already in existence. There is also likely to be ample accommodation at Quebec. There is not yet adequate storage accommodation at Winnipeg to serve so large an area. There is not adequate cold storage accommodation at Calgary for the district from which the butter will go across the Rocky Mountains westward. There is none for public use as yet worthy of the name at either at St. John, N.B., Halifax, N.S., or Charlottetown, P.E.I. Now, if cold storage service could be provided at these points—Calgary, N.W.T., Winnipeg, Manitoba, St. John, N.B., Halifax, N.S., and Charlottetown, P.E.I.—nothing could be done that would tend so much to help the people who live in the country tributary to these points, to get a fair return for their labor and a fairly large return for their products, especially those of the perishable kind, of which I have spoken.

### THE GOVERNMENT'S UNIFORM, CONTINUOUS ASSISTANCES TO DAIRIES.

I may say in conclusion that I have made these statements for the sake of showing that the dairying service from its inception in 1890, up to the present moment, has been

on a consistent line of action, that plans have not been sprung hurriedly for a certain particular or political effect, but that all through the object has been to help our farmers to get a larger return for their food products. The cold storage service is to assist in conveying products to the consumers, in their best condition, that the two classes—producers and consumers—might be brought closer together and a permanent and mutually profitable trading connection established between them.

*By Mr. McGregor :*

Q. It would not be a bad idea to give us the method of making these refrigerators at home. Everything depends upon the goods being in perfect condition when they are shipped from the West. Give us the best possible idea of a refrigerator in your report, and then we will be able to experiment with a fair sized one at home. I do not mean a portable one, but one that could be put up at home, and contain 300 or 400 pounds.  
—A. I might say, —

*By Mr. Carpenter :*

Q. You had better describe one that is suitable for a farmer's use.—A. I might say that I am at present working on a special bulletin dealing with that matter with illustrations for construction. I could not in 10 minutes give you much information to be taken down verbatim. It will be a bulletin of probably 20 pages with plans and will be issued in a short time.

*By Mr. Featherston :*

Q. Will that give the information asked for?—A. Yes ; I am willing to answer any questions you may desire to ask, but I could not go into the subject of cold storage buildings as fully as in the special report on that subject.

#### PRIME NECESSITIES IN THE CONSTRUCTION OF COLD STORAGE BUILDINGS.

*By Mr. McGregor :*

Q. You spoke of a certain building you are now constructing at your creamery?—A. Well, the main thing in cold storage building is thorough insulation. That is more important in many cases than the cooling medium or agent. If you get through insulation you are able then to protect the contents from being heated by any external influences of temperature. The cheapest way of constructing the building with thorough insulation, is by making at least three hollow spaces in each wall and filling in the hollow spaces for at least a short distance at the bottom with a substance called mineral wool, which will keep any air from passing into or out of the air spaces. For a cooling medium or agent in the country districts, there is nothing better or cheaper than ice. If butter is to be kept, ice alone is not quite sufficient. The cheapest way would be to put the ice in bulk over or close beside the cold storage chamber.

Q. Would you let it drip down the pipes?—A. No, leave the ice in bulk with the flooring of the ice chamber, water tight and the drip can run away. The air cooled from contact with the ice should be let into the chamber over a series of metallic plates, or through metallic tubes, whereby the moisture in the atmosphere will be condensed leaving dry cold air to enter the refrigerating chamber.

Where a temperature below 36 or 38 degrees is desired, the cooling from the blocks of ice should be supplemented by a number of galvanized iron pipes, 12 inches in diameter, passing from the ceiling to the floor on one side of the chamber. These may be filled with broken ice mixed with salt.

For carrying on this business successfully, it is important that butter should be shipped to some central depot, where it can be held at a temperature of 10 or 12 degrees below freezing point. It is better to ship weekly to a proper establishment than to hold it in imperfect storage.

## Agriculture and Colonization.

Q. How do you do about the doors of the cold storage establishments?—A. The only safe way is to have two doors and a small anti-chamber. You must close one before the other is opened.

### COMPARATIVE EXPORT OF BUTTER.

*By Mr. McMillan :*

Q. Is the export of butter increasing or decreasing?—A. It went up last summer. In many localities where dairy butter was made years ago, cheese displaced it because it paid better. But in the shipments from Montreal last year, there was a large increase of exports of creamery butter.

Q. I see that we exported seven million pounds in 1893; five and a half millions in 1894; and three millions in 1895, so that the reductions have been nearly half—A. Down to June, 1895, there was a serious shrinkage, but since then counting last summer's shipments, the trade has increased.

We are at a very critical and still very favourable period, in that the people in Australia who have been increasing their exports very much, have been bolstered up by their governments and their bonus aid is now being withdrawn. The imports of Australian butter into England have fallen off considerably and we shall get a better chance in that market.

*By Mr. Featherston :*

Q. The shipment of cheese will be less?—A. No, it will be about 4 or 5 per cent more from all Canada during the past season.

Q. Notwithstanding the dry weather?—A. Yes. The make of cheese in Great Britain last year was much less than in 1894. There had been nothing like the make of 1894 there in previous years. The outlook for cheese is fairly favourable, with this qualification: The low prices of bacon and jams are turning people to them. We cannot, therefore, increase our exports of cheese to any great extent, quickly, and must pay more attention to butter.

---

COMMITTEE ROOM 46,  
HOUSE OF COMMONS,  
THURSDAY, 26th March, 1896.

The Select Standing Committee on Agriculture and Colonization met this day at 10.30 o'clock a.m., Mr. Sproule, Chairman, presiding.

Mr. Robertson, Agricultural and Dairy Commissioner, was present by re-call and addressed the Committee as follows:—

I have not much to add to what I have already said on the Cold Storage question, and I shall confine my remarks to illustrating certain principles that are needful to be understood.

### THE PRIMARY OBJECT OF COLD STORAGE.

In the getting of profits from perishable food products, different parts of business are concerned. There is the matter of production, which is attended to by certain classes of men; there is the question of collection, which is attended to by another set of men; there is the business of transportation which is in the hands of another group of men; and the distribution of these food products, which is looked after by another division of men. These four interests or occupations are so inter-dependent, that one cannot be removed or injured without hurting all the others. In considering any system of cold storage, account must be taken of them all, for where one or more of these interests are neglected the others suffer. The middlemen are just as essential to profit-making in Canada as the producers or consumers.

The question is how can the nation's or country's business in the most inclusive sense be conducted so that each class may have a better chance to a larger profit without loss to the others.

Among the products capable of yielding larger profits from an adequate system of cold storage, are butter, eggs, cheese and fruit. Poultry might be added to the eggs. The farmers themselves in handling these perishable commodities have always looked for cool storage to retard the decay of these things. Why put a tub of butter or a basket of eggs in a cellar except to retard any change?

If there be any way whereby the change could be entirely stopped, that would be still better. Cold storage may arrest all change and keep the goods in the same condition they were in when they were produced. Some farmers put butter and eggs and apples in a cellar; and others have been putting up icehouses to preserve butter for a longer period. That is simply for home use and the home market, and that, I think, is the only part of cold storage that the farmers should seek to control.

#### THE COMMERCIAL PHASE OF COLD STORAGE.

The commercial part of cold storage comes next. Already there are commercial agencies in Canada with warehouses for storing goods at low temperatures. In Montreal there are three large cold storage warehouses either in existence or in process of construction. These are commercial conveniences for the handling of goods from anybody at certain fixed rates; and their business last year was said to be profitable to the men who invested money in it. If the business is to be extended into other localities and spread all over the country, it seems to me that the people in those localities who are interested in commerce, as well as in production, should get information as to the benefits that will result from this accommodation, if provided.

As I mentioned to the Committee yesterday, we have now in course of preparation a bulletin giving information as to the methods of refrigeration, the construction of refrigerator buildings, and the temperature at which the different products should be preserved. That is in the line of our work of giving information to people, as to how they can make the best use of their products, opportunities and resources.

*By Mr. McGregor :*

Q. May I ask if you are using ice or using the improved system of ammonia?—A. The bulletin will describe the different methods—there are, perhaps, four methods now—giving the details that are applicable. The ice method alone, which is still in use, is rather clumsy and inadequate; but it serves a good purpose. The ice and salt method has given very good results in most cases. Then, there is mechanical refrigeration by the circulation of brine, and mechanical refrigeration by the circulation of cold, dry air driven into the chambers. We will give information, as far as we can, on all the methods.

Taking the commercial aspect of this question, the merchants themselves, as soon as they see profits in a method of handling any product, may be expected to adopt that method. There may not be profits at first, and it is a question as to whether a merchant is willing to risk his money, or any money, in putting up a cold storage building for the handling of products in his locality. That is a question concerning which I am not at the present moment going to express an opinion; but the cold storage method should, I think, be applied by merchants to the handling of our perishable products, for this reason: Whether they can make as much money or not by the handling of them without cold storage, the fact still remains, that without it our products get to the consumers in bad condition, and therefore, they do not please them so well, and somebody on our side gets less money. The merchants may find a larger profit in handling spoiled goods. I have known them to handle cheap stuff that was partly spoiled, for the reason of the bigger profit in it. At the same time, since Canadians are largely concerned in producing butter, cheese, eggs, poultry and fruit, it is in the interest of the producers to have these things go to the consumers, unspoiled. Our Department is to give encouragement and information, and, it may be, some other help, to the merchants, whereby they may be induced to place these things in the consumers' hands in the best condition, and so get the best class of consumers as customers and the highest price which they pay.

## Agriculture and Colonization.

The railway companies are now giving attention to the transportation of perishable articles in cold storage. They now have cold storage or refrigerator cars and carry goods on these cars at a slightly increased charge. Last year, by way of encouraging shippers of butter to use these cars, rather than the common cars, with their risk of heating, the government paid subsidies for the running of refrigerator cars weekly to Montreal, for the carriage of fresh-made creamery butter. The subsidies served this purpose, that they attracted products to those cars that otherwise would not have gone by them; and the railway companies as a result will provide greater facilities, and more butter will be carried that way.

Cold storage service is needed for the further transportation of products across the ocean. Some years ago, two ships on the Allan Line were equipped with cold storage fittings, but it being found that there was not enough business to make it profitable, the apparatus was taken out. Subsequently some egg shippers in Montreal, and Mr. D. D. Wilson, of Seaforth, began to ship eggs in very rudely constructed cool storage compartments on the ships. They served the purpose very well, but cost a good deal, because they had to be put up every trip, with lumber, and saw-dust and ice piled on top. It was rather a clumsy method of shipping, but it served the purpose for a time. Now, I think the steamship companies are prepared to consider the desirability and practicability of providing mechanical refrigeration on their ships.

If the Government gives subsidies to steamships for any purpose in the way of carrying our products to the British market, I think it is a legitimate field for governmental operation to grant a subsidy towards carrying our products to different ports in a safe condition. I think we have a right to ask that if these products are carried at all, they should be carried in such a shape as to get a good name, the best class of customers, and the highest possible price at the other end.

The steamship owners are not quite prepared to take all the risks, because they say the business is not profitable enough to them. They are prepared to put in the machinery and have mechanical refrigeration if they are guaranteed a certain amount of business. The merchants in Montreal say they will give that business; but they have no association or corporate body which is prepared to guarantee it, but still they say they will furnish the business. All that seems necessary is for the Government to pay the steamships for the space occupied by the partitions of the compartments themselves. The government should pay for that and the shippers say they are willing to pay the extra charge per ton on the butter and the cheese; so that these two businesses now are almost in the way of being self-sustaining, so far as the cold storage for them is concerned.

The only embarrassment is that the steamships say they will provide mechanical refrigeration, required for carrying dressed meats, if a certain part of space is guaranteed to be filled. The actual cost of this mechanical refrigeration on each ship is about \$6,000 for 25,000 feet of cargo capacity. The question now being considered is, how mechanical refrigeration and cold storage accommodation can be provided in the cheapest way on steamships; how it can be done the cheapest for the Government and the cheapest for the shippers. It may be of interest to state that in past times this accommodation has been provided in fixed compartments; and if the compartments were only one-third filled, the rest of the space was wasted and the freight was paid on the whole space occupied by the compartment, because the steamships charged for the space, at so much for 40 cubic feet. After last year's experience the intention is to make adjustable partitions, which can be moved lengthwise of the steamer to enlarge or contract the cold storage space. It can be moved backwards and forwards, and it would be possible to ship a small quantity of butter without paying for the space formerly occupied by the whole of the compartment.

*By Mr. Cochrane :*

Q. You will be able to draw the partition out?—A. Yes, we will have a partition that is movable, so that we can either enlarge or reduce the size of the compartment.

*By Mr. Carpenter :*

Q. The \$6,000 would be the first cost of putting in 50,000 cubic feet?—A. Yes. The steamship companies say it will cost that much for refrigerating 25,000 feet, but I have doubled the space knowing we would not require more than one-half at the very most, at the low temperature for which the calculation is made. Cheese would not need to be below 38° and apples at 34° to 36°, Fahrenheit, in ventilated compartments.

*By Mr. McLean (King's) :*

Q. Is that \$6,000 a trip?—A. The initial cost of the refrigerating machinery, and insulation.

Q. And the additional cost to the steamer is not very much each trip?—A. The additional cost they claim would be equal to 5 shillings a ton of cheese carried in the cooled space,—\$1.25 a ton on cheese carried, and 7s. 6d. or nearly \$2 a ton on the butter.

The shippers of butter and cheese now say they are willing to pay the extra charges themselves, so that there will be no extra charge on the Government.

I had thought of saying a few words on the practical question as to the products to which the cold storage service may be applied. It is absolutely necessary that people who have butter for sale, to be eaten, when either a week old or a month old, should put it where it will not spoil. It is not going to keep without some spoiling, unless kept at freezing point. The creamery men should, therefore, either sell it for consumption or put it where it would be kept cold.

In the matter of eggs let me contribute this piece of information. In all of these matters, if a man can contribute anything of information he should not hold it back.

I find the egg business in Canada during the past few years has been managed in such a way that eggs have been so mixed, no matter by whom handled, that eggs two days old, two weeks old, and three weeks old have all gone into the same case. There has been no effort made to keep separate the eggs collected on the several trips. If the fresh-flavoured eggs are not kept separate from the time they are originally collected they can never be separated afterwards. I have seen all kinds of tests made and have got information from the shippers. In my opinion, looking through an egg at a light only does one of three things; it gives you information whether the position of the yolk has changed by settling, or whether the egg is decayed or is partly hatched.

The egg may have the yolk in the centre and be apparently not decayed, and yet be a stale egg. The English buyer does not want that class of eggs. If he gets one or two of those in a dozen, he says he does not want to buy them. If they go into cold storage, stale, they will come out in the same state. If we sent over strictly fresh-flavoured eggs to England I think we could, get perhaps 6 cents a dozen more for them.

*By Mr. Cochrane :*

Q. Suppose an egg is put into a dark cellar, how long will it remain fresh?—A. I would like to illustrate my answer. Let us take this tumbler as representing an egg. When the egg is laid there is over it a slight film of albuminous matter, which protects the egg from the admission of spores through the shell. Mostly that glare is rubbed off by handling. That egg may begin to decay in one of two ways, either by fermentation or hatching. If the egg be exposed to any foul air, some spore or bacteria from the atmosphere may adhere to the shell; if there be the least moisture from exudation or otherwise, the spores or bacteria may grow and penetrate the shell; in that way decay commences. If you go into a store and watch an expert dealer testing eggs, he breaks one, pours out the contents and smells the shell. Evidently he knows where decay first begins. Professor Saunders and myself are planning some experiments with a view to obtain a knowledge of something which will sterilize the exterior of the shell and so prevent decay.

Q. You think there is a good deal of importance to be attached to the way the eggs are gathered?—A. A great deal indeed.

## Agriculture and Colonization.

*By Mr. Carpenter :*

Q. Gathering twice a week would not be sufficient?—A. I think this will be the outcome of experiments from our work. If the eggs are collected twice or three times a week and are put through a sterilizing solution to kill any germs, and then put into cold storage, they would remain in a fresh flavoured condition.

*By Mr. McGregor :*

Q. What do you think of oiling eggs?—A. The people on the other side of the Atlantic object to a greasy egg.

One remark about cheese. When cheese leave the hold of a steamship in a warm condition they are soft and a little unsightly to the trade and look as if they would not keep well. Then it is that everybody looks for a bargain. The wholesale crafty buyer does not buy to-day, but says he will wait for a chance of those heated cheese at a bargain to-morrow. That sort of thing has the effect of demoralizing the market and keeping the price down. That is a good reason why we should have cold storage.

Q. Does it keep after being in cold storage and then exposed to the atmosphere of a grocery store?—A. Quite as well, with this difference, cheese made in June and July will dry out quicker when cut and exposed to the atmosphere than cheese made in September. That is the result of the difference in the milk and the weather. Cold storage does not make the difference, but the conditions under which the cheese was made.

Now, let me say a few words as to what

### THE DIFFERENT PROVINCIAL GOVERNMENTS

are doing.

THE NOVA SCOTIA GOVERNMENT, I am informed, this year offers a guarantee of four per cent on \$100,000—a guarantee spread over five years, to promote a cold storage building for Nova Scotia. The conditions are that the scale of charges must be submitted to and approved by the Lieutenant-Governor in Council, and that the building must be located in Halifax, a central place to serve the whole province.

IN NEW BRUNSWICK, the Government had before the legislature, a bill, which is reported as passed, whereby that province gives each year for seven years, \$7,500 for cold storage in St. John and other points in the province.

IN PRINCE EDWARD ISLAND, the provincial government has the matter under consideration, and I am not betraying any confidence when I say that the Premier of the province himself told me that the local government are considering the question of erecting the cold storage warehouses for the use of the producers of the province.

I would like to impress upon the Committee that there is urgent need for cold storage accommodation at Calgary, Winnipeg, St. John, Halifax, and Charlottetown.

Q. What about Toronto?—A. Toronto has provided largely for itself as far as I can see. In the provinces I have mentioned, New Brunswick, Nova Scotia and Prince Edward Island, the local governments seem to be willing to provide it.

It does not seem that anything is being done in the meantime by any government for the province of Manitoba and the North-west Territories. The North-west Territories come specially under the control of the Dominion Government. I think it is specially important, for that vast land which contains such tremendous natural resources for agricultural purposes, that they should have a chance of developing those resources, and getting their produce to market in its best condition. This year I hope we will run creameries and get the cold storage business started. I think it would be a good thing not only for that particular part of the Dominion, but for the whole country, for this reason. Nothing has injured the dairy butter of Ontario more than these people sending their overplus of dairy butter down to Montreal and selling it as low as 7 cents a pound. People naturally say they do not want the Ontario dairy butter when they can get the Western dairy butter at 7 cents a pound. Now, by finding for the North-west Territories a market for their butter and sending it abroad, we make the business better over the whole Dominion.

What the Dominion Government might well do in the way of following up what has already been done, is this. Last year, we arranged to pay part of cold storage charges on creamery butter if it was delivered in Montreal in a given condition. This was to show that it could be put on the English market in good condition. The business was done in that way to show both producers and purchasers, what was possible in that line, to convince our people on this side that it was worth while exporting, and to show the purchasers on the other side of the water that we could produce a good article. It seems to me that that was a good thing apart from any other benefit of the scheme to be considered. The main object of paying half the ordinary charges on goods delivered in a certain condition, was to attract attention to a business which would be profitable afterwards, and having once been started, would be continued by the people whose attention had been drawn to its value.

#### THE DUTY OF MUNICIPALITIES TO THE DAIRY INTERESTS.

Then I would also say this. It may go to the country through the Committee and the Report. It is customary for municipalities and provincial governments to offer a bonus to factories or similar undertakings, for the benefit of the local advantages that will accrue because of the trade. I do not know anything whereby any municipality could much better increase the trade of its locality, and get more money spent in the town, than by the development of the dairy industry, more especially now by the aid of these cold storage warehouses, which would help the farmers to get more money for their products, and give them more money to spend.

#### THE CORPORATION OF MANCHESTER,

in England, the municipal corporation of that great city operates the cold storage plant there, and has established it for the sake of giving the consumers good products. In that way, I mean in the way of encouraging a cold storage warehouse, a municipality might be doing a better stroke of business for the locality, than by bonusing a mill. If they bonused a factory which will employ 150 hands, the 150 hands will not spend nearly as much money in the town as 500 farmers would in consequence of the extra income they would get in this way. Almost every town is doing something or another to try to develop its business, and I think this suggestion is one that is well worthy of the consideration of many of them.

Mr. Chairman, I have taken up as much time as I dare, and I have merely drawn the attention of the Committee to two things:—to improve the profits you must pay attention, first, to production and then to distribution.

*By Mr. Cochrane :*

Q. Have you got any scheme in your mind now? For instance, there is this egg question. I should like to know how that is to be conducted. Supposing we had cold storage provided, have you got any scheme to have the eggs gathered properly, and put into cold storage? What would be your suggestion?—A. My suggestion would be this:—to make a proposition to egg merchants all over Canada, that if they would collect eggs in any locality twice a week, and assure themselves that these eggs were fresh from the nests, by taking care that the farmer collected them from the nests regularly, that the Government should pay the cold storage charges and the extra transportation charges on those eggs, up to a shipment of three or four hundred cases, from each egg shipper, two or three times a year, that they might be induced to begin the trade and then carry it on for themselves. The contribution of the Government would be small if they did not go in for more than a few small shipments a year from each exporter. It would give the merchants a chance of testing this plan for themselves, and all the expense for the Government would be paying the cold storage and the extra transportation charges.

Q. You mean that these merchants should gather from the farmer?—A. Yes. No merchant would seek to do that except for the good of his own business afterwards; but

## Agriculture and Colonization.

he would have a chance of doing a larger and more profitable business in the future for himself, if he made this test; and he would run no risk of losing anything by it, while the cost to the Government would not be great. That is the proposition that I would make for this year.

*By Mr. Rosamond:*

Q. Are there any plans for small cold storage warehouses published?—A. There is a very useful journal called "Ice and Refrigeration," which contains plans for all sizes and all methods, but this bulletin we are preparing, I think, will contain plans both for houses and refrigerators for the farmers' own homes, for small towns, and for larger towns, and the whole thing.

Q. When will it be published?—A. I hope in two or three weeks. We are intending to do with that as we did with the bulletin on "Silo," and the other bulletin on the work done at the Experimental Farms and Dairy Stations in Canada, the object being to give directly to the farmers such information as is likely to be useful to them.

Having examined the preceding transcripts of my evidence on the 25th and 26th March, 1896, I find them correct.

JAS. W. ROBERTSON,  
*Agricultural and Dairy Commissioner.*

COMMITTEE ROOM 46,

HOUSE OF COMMONS,

Thursday, 27th February, 1896.

The Select Standing Committee on Agriculture and Colonization met this day at 10.30 o'clock a.m., Dr. Sproule, Chairman, presiding.

Mr. W. Saunders, Director of Experimental Farms, was present by invitation, and addressed the Committee as follows:—

Mr. Chairman and Gentlemen,—In availing myself of the privilege of appearing before you on this occasion to present to you some features of the work of the Experimental Farms, permit me first to refer to some particulars bearing on the more important staple crops of this country. True prosperity in Canada rests largely on the production of good crops. On these depend the advancement of many other industries, notably, those large and important collateral branches of agriculture, the raising of stock and the dairy industry.

## THE GRAIN PRODUCTIONS OF THE DOMINION.

Efforts have been made from the outset, in connection with the work of the Experimental Farms, to ascertain what conditions most seriously affect the yields of the various grain crops grown in Canada and to suggest measures for their improvement. I desire to refer to some of these to-day. Beginning with oats, which is the largest of all the grain crops grown in Canada, we find that in 1891 there were produced in the Dominion 82,515,413 bushels, which, estimated at an average value of 1 cent per pound, were worth about \$28,000,000.

We also find from official statistics that the average yield of oats in Canada is 26·7 bushels. While in this respect we are in advance of our neighbours in the United States, where the average yield is given as 24·2, and a long way in advance of another formidable competitor, Russia, where the yield is said to be only 11·9; we are, on the other hand, much behind Great Britain, where the crop is 40·2, and still more behind that of Norway with 43·9, and Holland with 46·8.

The analyses which have been made by the Chemist of the Experimental Farms of soils in different parts of Canada go to show that they are in no way inferior in regard to their important fertilizing constituents, to the average farm soils in Europe.

The climate in the countries referred to, where the larger averages are obtained, is probably, as a rule, more favourable for the oat crop than the climates found in Canada, but these climatic variations are not sufficient in themselves, to account for these wide differences in yield. This has been abundantly proven from year to year by the better class of farmers all over the Dominion, whose crops average much larger than those of their less enterprising neighbours. It has also been proven by the yields obtained during the past five or six years at the Experimental Farms. This difference of nearly 14 bushels per acre between the average yield of oats in Canada and Great Britain, or of 20 bushels when compared with the yield in Holland, is a very serious question in its bearing on the profits of farming, since every bushel per acre of increase on the average crop of Canada, makes a gain to Canadian farmers, estimating the oats at an average value of 1 cent per pound, of \$825,000. There are two lines of advance open to us in regard to the improvement of this as well as all other crops. The first is better farming, and the next is perhaps equal in importance, namely, the exercise of greater care in the selection of seed, so as to sow only the more prolific sorts. I shall touch on the last line of progress first.

# Agriculture and Colonization.

## OATS,—COMPARATIVE RESULTS FROM TEST GROWING ON THE EXPERIMENTAL FARMS.

*At the Central, Ottawa.*—During the past year, 44 varieties of oats have been grown on the Central Farm in uniform plots, all sown on the same day, side by side, exposed to the same conditions. The yields of these have varied from 74 bushels 4 lbs. per acre to 16 bushels 16 lbs. per acre, a difference of 57 bushels 22 lbs. Taking the average of the whole series putting the poor crops and the good crops together, we find it to be 56 bushels 26 lbs. per acre. The same 44 varieties have been tested on each of the branch experimental farms, sown in each case on fairly uniform land, and all on the same day with the following results:—

*At Nappan, Nova Scotia,* the largest yield was 72 bushels 12 lbs., the smallest 31 bushels, 26 lbs., a difference of 40 bushels 20 lbs. between the best and poorest crop. The average yield putting all the varieties together, was 50 bushels 18 lbs. per acre.

*At Brandon, Manitoba,* the highest yield obtained was 101 bushels 6 lbs., the lowest 41 bushels 26 lbs., a difference of 59 bushels 14 lbs. The average yield of all the varieties being 76 bushels.

*At Indian Head,* in the North-west Territories, the largest crop was 108 bushels 28 lbs., the smallest 45 bushels 20 lbs., a difference of 60 bushels 8 lbs. The average yield of all the varieties at that farm was 79 bushels 3 lbs. per acre.

*At Agassiz,* in British Columbia, the oat crops have been lighter. The highest yield was 59 bushels 14 lbs., and the lowest 17 bushels 2 lbs., a difference of 42 bushels 12 lbs. The average yield there of all the varieties was 38 bushels 26 lbs.

Putting all the plots together, 44 at each farm, we find the average of the whole to be 60 bushels 8 lbs. per acre, and the average difference between those varieties which gave the poorest crop on each farm, and those which gave the best crop, was 52 bushels 1 lb.

It cannot be claimed that all this difference is due solely to variation in fertility of the variety. Some of it is no doubt due to variations in soil which we have been unable to detect, and some of it probably to other causes which we do not fully understand, nevertheless, these figures together with those to follow, do, I think, show clearly that the question of variety is a most important one to which every farmer should give careful attention.

### SEEDING VARIETIES IN POINT OF YIELD, AT THE SEVERAL FARMS.

The twelve most prolific varieties of oats grown at the Central Experimental Farm have yielded as follows:—

	Bushels.	lbs.
Banner .....	74	4
Abundance .....	73	8
American Beauty .....	72	12
Improved Ligowo .....	70	20
Golden Beauty .....	69	4
Columbus .....	69	4
American Triumph .....	68	18
White Russian .....	67	32
Bavarian .....	67	2
White Schonen .....	66	2
Wide Awake .....	65	
Wallis .....	63	28

*By Mr. Grieve :*

Q. How many are white and black especially?—A. I am coming to that in a moment.

These best twelve varieties grown at the Central Farm have averaged 68 bushels 31 lbs. per acre. They are all long white oats and branching, except the white Russian, which is half long and sided

*By Mr. Fairbairn :*

Q. Which is the best as grown on the farm?—A. These 12 varieties I have named have been the best on these uniform test plots where the soil has been the same and the treatment the same. Where in fact everything has been identical, as far as is possible, in connection with the work.

*By Mr. Carpenter :*

Q. And which is the best variety?—A. The Banner headed the list here, but I will give you the record from the other farms.

The 12 most prolific sorts at the experimental Farm at Nappan, are the following :—

	Bushels.	Lbs.
Early Golden, prolific.....	72	12
Golden Beauty.....	69	14
Early Gothland.....	66	16
American Beauty.....	64	24
Golden Giant.....	64	4
Giant Cluster.....	63	18
Abyssinia.....	62	12
Early Blossom.....	62	12
Bavarian.....	60	20
White Russian.....	60	..
Columbus.....	59	14
California, Prolific, Blk.....	59	14

These twelve varieties grown at Nappan, have averaged 63 bushels 25 lbs. per acre.

The 12 most prolific sorts grown at the Experimental Farm at Brandon, are the following :—

	Bushels.	Lbs.
Banner.....	101	6
American Beauty.....	96	6
Holstein Prolific.....	95	20
Bavarian.....	93	8
White Schonen.....	93	8
Early Golden Prolific.....	93	8
Columbus.....	91	26
Golden Giant.....	90	20
Oderbruch.....	89	4
Wallis.....	88	18
Early Archangel.....	88	8
Siberian.....	87	12

These 12 varieties grown at Brandon have averaged 92 bushels 12 lbs. per acre.

## Agriculture and Colonization.

The 12 most prolific sorts grown at the Experimental Farm at Indian Head, are the following:—

	Bushels.	bLs.
Abundance .....	108	28
Golden Beauty .....	104	4
Columbus .....	102	2
American Beauty .....	101	16
White Schonen .....	99	22
Oderbruch .....	99	14
Challenge .....	91	6
Banner .....	90	..
Holstein Prolific .....	89	24
Wide-awake .....	89	14
Early Archangel .....	88	8
Improved Ligowo .....	87	22

These 12 varieties grown at Indian Head have given the largest yield of all, having averaged 95 bushels 33 lbs. per acre.

The 12 varieties which have headed the list at the Experimental Farm at Agassiz are as follows:—

	Bushels.	Lbs.
Early Gothland .....	59	9
Hazlets Seizure .....	52	32
Cream Egyptian .....	49	14
Early Archangel .....	48	28
Early Golden Prolific .....	48	18
Banner .....	48	3
Golden Beauty .....	47	12
Lincoln .....	46	26
Abyssinia .....	46	6
Early Blossom .....	45	20
Bonanza .....	44	24
Abundance .....	43	28

These have given an average return of 48 bushels 16 lbs., the lowest yield of any

### LEADING AVERAGE RESULTS AT ALL THE EXPERIMENTAL FARMS.

The twelve varieties which have averaged best, at all the Experimental Farms, and hence may be regarded as among the most productive oats in the Dominion, are the following, arranged in the order of their average yield:—

	Bushels.	Lbs.
American Beauty .....	75	16
Golden Beauty .....	74	26
Banner .....	73	21
Abundance .....	72	12
Columbus .....	72	4
White Schonen .....	69	31
Early Golden Prolific .....	69	16
Bavarian .....	67	32
Oderbruch .....	67	26
Abyssinia .....	67	20
Improved Ligowo .....	67	2
Early Archangel .....	65	4

Now, it may seem a little singular, and I find it difficult to explain, that the Siberian, which in the experiments at the Agricultural College at Guelph and in other parts of Ontario, has headed the list, as the most productive sort, has nowhere headed the list on the Dominion Experimental Farms. The Siberian comes just below the best twelve, but it does not get into that series, and in discussing that matter a short time ago with the Experimentalist at Guelph, I came to the conclusion, that the strain we have of the Siberian oat may be perhaps a little different from theirs, although we both got them from Europe, about the same time. I am in correspondence with them now and expect to get some of their strain, so that we may grow them side by side, and see whether the difference in crop is due to the quality of the variety, or to some other cause.

These twelve varieties grown thus in the different climates of the Dominion have averaged 70 bushels 9 lbs. per acre. Were it possible to replace all other seed oats throughout the Dominion, with these twelve varieties, it is almost certain that the immediate result would be a considerable increase in the average crop.

(At this point samples of the twelve varieties referred to were shown to the members of the Committee.)

*By Mr. Hutchins :*

Q. Is this variety (the Columbus) the natural colour?—A. Yes.

Q. It is very dark in colour?—A. Yes. That is a variety that was advertised largely in Germany, some three years ago, as a very heavy cropper. We imported some of it, and the first year we tested it at Ottawa it was a very bad season for rust, and the rust struck it so badly that the crop was nearly destroyed. The next season it yielded very much better, especially at the Branch Farms, and this year it done very well, and seems to be a very promising variety of oats.

*By Mr. Pridham :*

Q. Have you discarded black oats entirely?—A. Not entirely. But we find that the black oats yield less, as a rule, than the large, long white oats, and, furthermore, they command about a cent a bushel less on the market, and sometimes 2 cents less. We also find that if a farmer gets black oats on his farm, they almost invariably get mixed with his white oats, and depreciate the value of the whole. The oatmeal millers also are opposed to the cultivation of black oats, because they are liable to become mixed with the white oats and the hulls make black specs in the meal. For these reasons we have thought it unwise to encourage the cultivation of black oats when we have white oats which will give a better quality and a larger yield.

Eight of these twelve varieties, which are the best throughout the Dominion, are among the best twelve at the Central Farm, six are among the best twelve at Nappan, eight among the best twelve at Brandon, nine out of the best twelve at Indian Head, and five out of the best twelve at Agassiz, B.C., showing that these twelve probably represent the very best oats, most generally and widely adapted to the varying climatic conditions of the whole Dominion.

In Bulletin 21, where a summary was given of all the sowings of oats in the week apart test plots, it was shown that, taking the experience of five years at all the farms, the average yield of Banner oats, in 110 tests, had been 54 bushels 11 lbs. and of Prize Cluster, the average of 92 tests, 43 bushels 32 lbs., or an average, taking the whole 231 tests into consideration, of 48 bushels 25 lbs. The treatment these oats have received at the Experimental Farms have been ordinary farm treatment, such as every farmer should give his crops, and the quality of the land on the Experimental Farms does not average better than most of the land in the districts where they are located.

The figures thus obtained over a series of years goes to show that the farmers of Canada with good ordinary treatment of their land and the selection of the best and most prolific varieties of seed, could bring the average of the oat crop much above what it is at present, namely, 26 bushels 7 lbs. per acre.

In the distribution for test, of sample bags of the best and most productive sorts, the Central Farm has done excellent work. Beginning with oats in 1889, when

## Agriculture and Colonization.

534 samples were sent out, the requisitions have since multiplied to such an extent that last year 10,086 samples were distributed and this was much short of meeting the demand. Since this work began in 1889, 38,000 three pound samples of oats alone have been sent out from the Experimental Farms, to about 30,000 farmers. Large quantities have also been distributed from the branch farms during the same period, and these new introductions are fast taking the place of the older, and less prolific varieties. If any member of the Committee desires to ask any questions on the subject of oats, before I proceed to the next point, I shall be glad to answer them.

*By Mr. Wilmot :*

Q. Have you a comparative statement of the weights per bushel?—A. I did not bring these with me in full. I was afraid to give you too many details. The weights, I think, are all marked on the labels of the bottles containing the specimens I have submitted. The long oats are not so heavy, as a rule, as the shorter and plumper sorts. While the long oats will run from about the standard of 34 lbs., or a little below the standard up to 40 lbs., the shorter oats will run usually from 38 to 42 or 43, and sometimes up to 45 lbs, per bushel. As the bushels that I have been speaking of are all bushels by weight, the difference between the two would resolve itself into this; that in the long oats you would have a somewhat larger proportion of husk to the kernel, than in the shorter and plumper sorts.

*By Mr. MacMillan :*

Q. I think it would be well if, after testing these oats in the small plots, you were to take the best varieties and put them into a field, and so ascertain what the results would be in that field. Some ten or twelve years ago we made some tests in small plots, where they were carefully taken care of, but we did not always find that the variety that did best in the small plots did the best in the field plots. So I think it would be well, where you have fields of oats, if you would give us the results of the different varieties in the fields as well as in the small plots. In that way the conditions would be about the same as on the farms throughout the country?—A. These particulars are all given in our annual report. I can give you now the results of the field crops on the Central Farm, but the annual reports of the branch farms are in the printer's hands, and they are not available at the moment.

*By Mr. Roome :*

Q. Do you find that the yields of the field crops are smaller?—A. The yields are smaller as a rule, and partly, I think, for the reason that you do not have the same evenness of land in a large area. There is much to be said in favour of such plots as I have been referring to, which occupy from one-tenth or one-twentieth of an acre each. They are, however, surrounded by a margin of three feet, and the crop is always heavier around the margin than it is around the centre of a field, and there must be some deduction made from the small plots when compared with field crops on that account. It would scarcely be possible to present the results of 44 varieties of oats in field crops on any one farm, because you could rarely get an area of land, even though you limited yourself to a single acre, that would be sufficiently uniform for the purpose.

*By Mr. McMillan :*

Q. But you would always take the varieties that had done the best in the small plots to put upon the field plots, and with a field of five, six or ten acres, that, I think, is the test that is more in accordance with the farmer's experience than the small plots.—A. I might say that at Indian Head there was a field of ten acres this year that gave about 108 bushels of "Banner" to the acre, right through. It was, I think, 97 or 98 bushels by measure, and the oats weighed about 38 to 39 lbs. per bushel. Speaking from memory, I think it was not less than 108 bushels to the acre, showing that that variety has proven itself, as far as field culture is concerned, quite as good in

the field as it has in plots. Some of the other varieties referred to, have not yet been available in sufficient quantities for large fields, such as the Columbus and Early Golden Prolific, these, however, will be sown on larger areas, next season.

*By Mr. Semple :*

Q. What varieties of oats are sown on the fields at the Farm?—A. There are quite a number of varieties sown, chosen from among those which give the best results. As these varieties vary more or less from year to year, the experience of several years is required before correct opinions as to the relative merits of the different sorts can be given. After gaining that experience we take those oats and try and grow them, if we believe they are likely to be permanently good on as large areas as is practicable, so as to have material available for the distribution as many of these as cannot be found in commerce.

*By Mr. Pridham :*

Q. What influence do you think there would be by the changing of seed from the one section of country to the other?—A. This is usually beneficial, but not always. There is so much that we do not yet know regarding the influences which affect the productiveness of varieties of grain, that it is not safe to presume on very positive general statements, but we do know very well by experience that when a variety which has been a productive sort in the past, begins to weaken or lessen its yield in any particular district, if you can get seed from another soil and another climate, of the same variety, you may in a certain measure restore its fertility and increase the yield.

*By Mr. Grieve :*

Q. Do you, as a rule, thoroughly test these kinds of grains before you send them out in small parcels to the farmers of the country?—A. As a rule we do. The varieties I have referred to, of which samples have been shown you, are the principal sorts being distributed this year.

I will now give the information asked for by Mr. McMillan regarding the field crops of oats on the Central Farm. There was a field of "Abundance," of five acres, sown on sandy loam with a small proportion of peaty loam—not very good soil—for oats—and the yield was 44 bushels 22 lbs. per acre. There was a field of "Banner," of five acres, which was a sandy loam, a piece of very light land lying behind the piggery on the Farm. That gave us a yield of 45 bushels 6 lbs. per acre. The land on which the plots were sown was a piece of clay loam on the front part of the farm, a field which contained some of the best land we have. As these were all exposed to the same influences, and all had the same advantages, the varieties being sown side by side, the test is fair, as between the different sorts; and our best land is no better than the average of most good farms throughout the country.

*By Mr. Carpenter :*

Q. You have returns of the tests made of the different varieties from all sections of the Dominion. Which do you find the favoured variety, say for the southern and western portions of Ontario?—A. For oats? That would be a difficult thing to determine at the moment. There are some thousands of returns which would require to be tabulated in order to get that information accurately, I may say, however, that the "Banner" is a general favourite.

Q. I might say so far as my own particular section is concerned, our people think the "Banner" the best variety that has been grown there for years.—A. I think if you took these twelve varieties and tested them in twenty different parts of this province, while you would not perhaps get them to come out in the same order in which they have resulted in the general tests over the Dominion, to which I have referred, but you would find them ranging, I think, near the top in any series of tests that you might

## Agriculture and Colonization.

subject them to. I do not think, however, that it is a matter of any particular moment whether you take the one at the very top of the list or the second, or the third, these twelve are all good sorts, and may, I think, be safely recommended as among the best sorts obtainable. I feel sure that if our farmers could have the seed of any or all these varieties so that they would become the principal sorts grown, that instead of having an average yield of 26 bushels 7 lbs. of oats per acre for this Dominion, the crop would be brought up nearer to the yield they have in Great Britain of 40 bushels, and that would make a vast difference to the profits of the farmer in this country.

*By Mr. Sanborn :*

Q. Have you tried the Rosedale ; it is a good one with us ?—A. It is a very good oat indeed, and usually gives a large crop, but this year, has not come near the top. It has given us a yield of 55 bushels 30 lbs., and stands about twentieth in this series of 44.

Q. It is pretty free from rust ?—A. This year, the Rosedale was only slightly rusted, while some other varieties were considerably so.

*By Mr. Semple :*

Q. Did you test the New Zealand variety ?—A. Not for some times past. We have given it up for the reason that it has not yielded as well as many other sorts.

Q. It was a great favourite in my section at one time.—A. Yes, I believe it has been a favourite in many sections.

*By Mr. McMillan :*

Q. We have entirely done away with the "Banner," which took the place of the "Cluster." We are now trying the "Siberian" which gives us eight to ten bushels per acre more than the "Cluster."—A. The Banner continues to do well with us and we have good reports of it from many quarters. The "Siberian" with us stands about the 35th of these 44 varieties, or the ninth from the bottom.

*By Mr. Cochrane :*

Q. Difference in the soils might make a difference in the results ?—A. Yes, that is often the case, but these varieties were all tested on the same soil.

Q. That might be, but don't you think that one which did not do so well on one soil might do better on another ?—A. Certainly, and the figures I have given can only be taken as a general guide.

Q. The one that is the most productive on the central farm might not be the most productive on another soil.—A. That is quite correct.

*By Mr. Carpenter :*

Q. We find the Siberian not satisfactory with us. The "Banner" is much better in our section. That is the reason why we wish to get an opinion from South-western Ontario ?—A. I think that nearly all the reports we have had of this oat are favourable, but I am not able to give you to-day the exact returns reported from the samples sent out for test.

*By Mr. Cochrane :*

Q. If you sowed a certain kind of oat on land for a number of years and then changed and got another variety, would you not have a better crop ?—A. That depends very much on the variety. I think farmers will always have to be on the look out for change of seed from time to time. There is no doubt that seeds run out after long cultivation. It is therefore necessary for farmers to make these changes, but in selecting a new variety, the choice should fall on one which promises to give large crops. Here the advantage is seen, of the results of the tests made on the experimental farms where

all the varieties are treated alike. Farmers can get a package of one of the most prolific sorts and from this raise enough to sow an acre or more the following year and thus soon get a supply of good seed without cost. By distributing these samples I hope we shall keep our farmers well up with the times. That is the object in view in connection with this part of the farm work.

*By Mr. Semple :*

Q. Do the seasons make much difference in the yield?—A. Yes. The season probably affects the crops more than anything else. During a favourable season plants can avail themselves of much of the plant food in the soil and of the good treatment the farmers have given their land, but in a bad season, the best of land will often only give indifferent returns.

Q. One season might be the best for the "Banner" and another season for another kind of oats. The seasons will make a difference in the yield?—A. I think that a season which is bad for one kind of oat will usually be bad for other sorts. Last August I drove over 200 miles in Southern Manitoba and saw thousands of acres of Banner oats growing, more of them than I had ever seen in my life before. The crop seemed to be uniformly good all through that country, and I think the crop would average 75 bushels to the acre. Wherever I have seen the Banner, tried either here or at any of our branch farms, it has always done well, and we have now tested it for five or six years, and with that much experience fairly safe conclusions can be drawn.

*By Mr. Grieve :*

Q. Don't you think that many of the farmers are going back to the older varieties such as New Zealand, which they sowed many years ago?—A. Occasional inquiries have been made for New Zealand oats, but I think that most farmers are satisfied that some of the newer sorts are better.

*By Mr. Fairbairn :*

Q. Have you had any experience with the Egyptian oat?—A. Yes, the Egyptian has stood well. We grow a variety called the Cream Egyptian which stands 13th on the list of the 44 varieties tested.

*By Mr. McMillan :*

Q. One case came under my observation with regard to Siberian White. A farmer, a friend of mine, took it below Hamilton, and after five or six years he got it back from there, the result being splendid crops by moving from one farm to the other. I believe that would be a good thing.—A. We have adopted that principle at the experimental farms by exchanging seeds from one farm to the other.

*By Mr. Fairbairn :*

Q. The Egyptian oat, with us, yielded 60 bushels to the acre. I paid a big price for the Banner oat and I only got about 30 bushels from the Banner as against 60 from the Egyptian.—A. There may be something in your soil that may be specially favourable for the Egyptian variety.

*By Mr. McMillan :*

Q. We are trying a little experiment. Three years ago we grew a large amount of corn and we were in the habit of growing oats after it. We made the experiment of cultivating 24 acres, 16 of which were ploughed in the fall and the other eight in the spring. The land cultivated in the spring gave us ten bushels more per acre. One of my sons was not satisfied with this experiment and thought he would try it again with 8 acres. Four acres were cultivated in the fall and four in the spring, and this last harvest he told me he was certain there were ten or 12 bushels per acre more on the land cultivated in the spring?

## Agriculture and Colonization.

Q. How many bushels to the acre did you get on your farm?—A. Fifty-eight (58).

Q. We had 60 bushels from 10 acres sown in Siberian?—A. If we could only get a good sprinkling of farmers all over the country to set such an example as Mr. Mc-Millan has done we would soon bring up the average yield of oats in Canada, near to that of Great Britain.

*By Mr. Cochrane :*

Q. Before you leave the question of oats, I think it would be well for you to give the farmers some idea of the best varieties to grow, to keep them from the grasshopper?—A. I fear I should need first to introduce a new variety of grasshopper that would only consume certain sorts of oats, before I could give information of value on that subject.

### WHEAT CROP OF THE DOMINION.

We shall now proceed to consider wheat, which is the next in importance of the cereal crops of the Dominion. Of this grain Canada produced, according to the Census returns of 1891, during 1890, 42,144,779 bushels.

*By Mr. Carpenter :*

Q. That includes fall and spring wheat?—A. Yes.

The average yield, putting them together, was fourteen and six-tenths bushels per acre. This does not compare well with the returns obtained by the farmers of Great Britain with 28·6 or those of Denmark with 34·4.

### WHEAT GROWING.—RESULTS OF TESTS AT THE EXPERIMENTAL FARMS.

Thirty-two varieties of spring wheat have been grown at each of the Experimental Farms in uniform plots, similar in character to those I have referred to in connection with oats, and also sown on the same day.

*At the Central Farm*, the highest yield was 30 bushels 40 lbs. per acre, and the lowest 13 bushels 40 lbs, showing a difference of 17 bushels between the variety which gave the highest and that which gave the lowest yield.

*By Mr. Carpenter :*

Q. Was that spring or fall wheat?—A. These are all spring wheats that I am referring to now, although the general statement from the census groups the spring and fall wheats together.

*At Nappan*, the highest yield was 32 bushels 20 lbs. per acre, the lowest 18 bushels, a difference of 14 bushels 20 lbs. in favour of the best yielder.

*At Brandon*, the most prolific variety gave 49 bushels per acre, while the poorest yielder gave 22 bushels 40 lbs., a difference of 26 bushels 20 lbs.

*At Indian Head*, the highest yield was 52 bushels, the lowest 28 bushels, the difference between the highest and lowest being 24 bushels.

*At Agassiz*, the best yield obtained on these plots was 33 bushels 10 lbs., the smallest 13 bushels 20 lbs., a difference of 19 bushels and 50 lbs. in favour of the best yielder.

## AVERAGE AT ALL THE EXPERIMENTAL FARMS.

The average yield of all the 32 varieties from the highest to the lowest at the different farms was as follows:—

	Bush.	Lbs.
Central Experimental Farm .....	22	38
Nappan " " .....	26	22
Brandon " " .....	40	44
Indian Head " " .....	41	9
Agassiz " " .....	18	6

or an average yield, on all the farms, of 29 bushels 48 lbs. per acre.

This you, will see goes a little above the average yield of Great Britain, of 28 bushels 6 lbs. The average difference between those varieties which gave the lowest yield on each farm and those which gave the highest, was 20 bushels 18 lbs.

## THE MOST PROLIFIC VARIETIES AT THE SEVERAL FARMS.

The 12 most prolific varieties grown at the Central Experimental Farm have yielded as follows:

	Bush.	Lbs.
Preston .....	30	40
Goose .....	28	20
Old Red River .....	26	30
Pringle's Champlain .....	26	20
Huron .....	25	40
Wellman's Fife .....	25	20
Dion's .....	24	40
White Russian .....	24	27
Red Fern .....	24	20
Monarch .....	24	..
Alpha .....	24	..
Admiral .....	24	..

I may say that Preston, the first on the list, is one of the cross-bred wheats produced on the Farm. Huron is another cross-bred. Dion's is a wheat we obtained from a farmer in Quebec. It had no name, so it has been called after his name, and it has turned out very well. The average yield of these 12 varieties has been 23 bushels 41 lbs. per acre.

The following are the 12 most prolific varieties grown at the Nappan Experimental Farm:—

	Bush.	Lbs.
Preston .....	32	20
Stanley .....	32	20
Campbell's white chaff .....	31	40
Herisson Bearded .....	31	20
Huron .....	31	..
Red fern .....	31	..
Admiral .....	30	40
Golden Drop .....	30	40
Old Red River .....	30	20
White Connel .....	29	20
Percy .....	28	20
White Russian .....	28	..

The average of these 12 varieties grown at Nappan, has been 30 bushels 35 lbs. per acre.

## Agriculture and Colonization.

The following are the 12 most prolific varieties grown at the Experimental Farm at Brandon :—

	Bush.	Lbs.
Red Fife.....	49	..
Preston .....	48	20
Old Red River.....	47	10
White Fife.....	46	40
Pringle's Champlain.....	46	30
Advance .....	46	20
White Connell.....	44	50
Stanley .....	43	30
Rideau .....	43	..
Admiral .....	42	50
Crown .....	42	50
Gelum.....	42	40

The average yield of these 12 varieties grown at Brandon is 45 bushels 18 lbs. per acre.

The 12 varieties which gave the largest yields at Indian Head, were the following :—

	Bush.	Lbs.
Beaudry .....	52	..
Huron.....	51	20
Emporium .....	48	40
Crown .....	46	40
Preston .....	45	40
Alpha .....	45	30
Red Fife .....	45	..
Herisson Bearded.....	44	40
Pringle's Champlain.....	44	30
Blenheim.....	44	..
Advance .....	43	50
Rideau.....	43	20

It will be seen that this list is headed by a wheat called Beaudry which was obtained from a man of that name. It has not been generally tested yet, as we have only a small quantity of it.

The average yield of these 12 varieties grown at Indian Head is 46 bushels 16 lbs. per acre.

The 12 best yielders at Agassiz, were as follows :—

	Bush.	Lbs.
Rio Grande.....	33	10
White Fife .....	30	55
Beaudry .....	22	40
Advance .....	21	..
Herisson Bearded.....	21	..
Admiral .....	20	..
Rideau.....	19	30
Alpha .....	19	30
Dion's .....	19	15
Campbell's White Chaff.....	19	10
Captor .....	17	50
Red Fife .....	17	25

The average yield of the 12 varieties in this case was 21 bushels 55 lbs. per acre.

LEADING VARIETIES OF SPRING WHEAT ACCORDING TO THE RETURNS OBTAINED AT ALL THE EXPERIMENTAL FARMS.

I will now give you the 12 varieties of spring wheat which have averaged the best over the whole series, taking the results obtained at all the Experimental Farms into account. I have samples with me, of these, the same as I had of the oats, which gave the highest average yield :—

	Bush.	Lbs.
Preston . . . . .	34	44
White Fife . . . . .	33	2
Old Red River . . . . .	32	48
Advance . . . . .	32	18
Red Fife . . . . .	31	49
Rio Grande . . . . .	31	40
Herisson Bearded . . . . .	31	32
Red Fern . . . . .	31	6
Stanley . . . . .	30	47
Alpha . . . . .	30	40
Admiral . . . . .	30	22
Crown . . . . .	30	8

The average yield of these 12 varieties which may, as far as our experience will guide us this year, be considered as among the best spring wheats for cultivation all over the Dominion, has been 31 bushels 46 lbs. It may be observed that among these 12 best wheats which have given the average largest return on all of the Experimental Farms, six of them are new cross-bred sorts which have been originated at the Experimental Farms. Preston which heads the list is a cross-bred between a Ladoga female and Red Fife male. It is a bearded form. The Stanley is another example of this cross which is beardless. Then there is the Advance, a bearded form, Alpha, beardless, and Crown, bearded. These are crosses between the Ladoga and White Fife, while the Admiral which is a beardless variety, also included in these 12, is a cross between Campbell's White Chaff and Red Fife. Campbell's White Chaff was used as the female in this case, and Red Fife as the male. All these cross-bred sorts, it may be remarked, are earlier in ripening than the Red Fife.

Are there any questions members of the Committee would like to ask on the subject of wheat before I pass to the next subject ?

*By Mr. Carpenter :*

Q. What proportion of the 42,000,000 bushels you spoke of, is spring wheat?—A. That information I am unable to give, for in the census returns both spring and fall wheat are as one crop. If I had with me the returns from Ontario of the fall wheat crop, I suppose that would give the figures approximately, because there is very little fall wheat grown outside Ontario.

Q. Did you make any tests whatever with fall wheat?—A. Yes, and we have succeeded very well this past year. I have not the exact figures of the results with me, but the highest yield for fall wheat obtained on the Experimental Farm was about 44 bushels to the acre.

Q. That is good?—A. That was Golden Chaff.

*By Mr. Pridham :*

Q. Have you ever tried crossing Goose wheat with any other variety?—A. Not yet. In the crosses thus far made, we have usually selected the best varieties to work with. A variety so manifestly inferior in quality as the Goose, might give something very interesting.

Q. It might bring out varieties that would astonish you?—A. It might. We do get astonished very often, and I am very much obliged for the suggestion. We may try that another year

## Agriculture and Colonization.

*By the Chairman :*

Q. I was going to ask which one of the 12 best varieties you have, you find the worst for smut?—A. We usually have very little smut here, in wheat, and what we do have is what is known as “soft” or “loose smut.”

Q. Some of them I presume you found more troubled with rust than the others?—A. This season we have not had so much trouble with rust as usual, but we find that all varieties are liable to rust, when rust is prevalent. I do not know any variety of wheat which is entirely free from rust. There are varieties of potatoes almost entirely exempt from rot, but with regard to rust, when it strikes a farm it seems to affect all varieties more or less. There will be some slight variations, but I cannot say that any of them are rust-proof.

*By Mr. Pridham :*

Q. This Goose wheat will not rust. I never saw a field of it rust once?—A. It rusts with us.

*By Mr. Carpenter :*

Q. I presume there is a good deal of difference in the varieties you mention, so far as their flouring qualities are concerned? Which do you find the better varieties?—A. We have not had the opportunity of testing these new cross-bred varieties, in that respect yet. The quantities available are small, and the varieties are in such demand that we have not felt disposed to grind any of it. But seeing that most of these crosses are one-half Red Fife I think there is not much doubt but that the quality will be good.

Q. It is very important that that should be known? What about the Goose variety that Mr. Pridham spoke of?—A. That produces a yellow flour which is regarded as inferior in quality.

*By Mr. Pridham :*

Q. I do not think it is ground for flour?—A. In Europe there is said to be a good deal of it ground for making maccaroni and pie crusts. In such cases where the flour is not needed to rise well it seems to suit fairly well. The Kubanka wheat, which is practically the same, is imported from Russia in large quantities and sold in London, England, for such purposes.

Q. The Goose wheat commands almost as large a price in the Toronto market as any other?—A. Possibly it may be put to some other use which we do not know of.

MR. PRIDHAM.—I received 73 cents a bushel for my Goose wheat this winter, a month ago?

### BARLEY CROP OF THE DOMINION.

Passing now to the subject of barley, which stands the third in importance, of the grain crops of the Dominion, the crop of the last census is given at 17,148,198 bushels. The figures are probably less than that now, as barley is said to have been decreasing in acreage, considerably, of late.

The average yield of the barley crop of Canada is given as 24.7 bushels, as against 35.1 bushels in Great Britain and 42.7 bushels in Holland. The United States stand below us with 21.4 bushels per acre, while Russia is said to average not more than 10.9 bushels per acre.

### RESULTS OBTAINED FROM TEST GROWING OF SIX-ROWED BARLEY ON THE EXPERIMENTAL FARMS.

As showing the influence of variety on the results of this crop, fourteen different sorts of six-rowed barley were grown last year in uniform test plots on all the Experimental Farms, under like conditions.

*At the Central Experimental Farm*, the highest yield was 58 bushels 6 lbs., the lowest 32 bushels 14 lbs., a difference of 25 bushels 40 lbs.

*At Nappan*, the highest yielder in the group gave 52 bushels 4 lbs., the poorest 31 bushels 32 lbs., a difference of 20 bushels 20 lbs.

*At Brandon*, the heaviest crop was 68 bushels 46 lbs., the lightest 30 bushels 10 lbs., a difference of 38 bushels 36 lbs.

*At Indian Head*, the largest yield was 62 bushels 14 lbs., the smallest 31 bushels 29 lbs., showing a difference of 30 bushels 33 lbs.

*At Agassiz*, the best yield was 36 bushels 36 lbs., the lowest 24 bushels 8 lbs., or a difference of 14 bushels 8 lbs.

The average difference of yield, putting the results obtained at all the farms together was 25 bushels 46 lbs.

#### AVERAGE YIELD AT ALL THE FARMS.

The average yield of the fourteen varieties of six-rowed barley at the several Experimental Farms was as follows:—Central Experimental Farm, 45 bushels 33 lbs.; Nappan, 40 bushels 18 lbs.; Brandon, 58 bushels 31 lbs.; Indian Head, 43 bushels 21 lbs.; Agassiz, 30 bushels 17 lbs.

*At the Central Farm*, the six best yielding varieties of six-rowed barley were the following:—

	Bush.	Lbs
Mensury.....	58	6
Petschora.....	51	42
Royal.....	51	12
Success.....	51	12
Odessa.....	47	24
Oderbruch.....	47	14

These six varieties have averaged 51 bushels 10 lbs. per acre.

*At Nappan*, the six varieties which have yielded best are:

	Bush.	Lbs.
Odessa.....	52	4
Success.....	45	40
Royal.....	45	20
Mensury.....	44	28
Trooper.....	43	16
Common.....	42	4

These give an average yield of 45 bushels 27 lbs. per acre.

*At Brandon*, the six varieties which have given the largest returns are:

	Bush.	Lbs.
Mensury.....	68	46
Nugent.....	68	26
Royal.....	65	30
Trooper.....	65	10
Surprise.....	65	10
Vanguard.....	64	8

An average yield of 66 bushels 13 lbs. per acre.

## Agriculture and Colonization.

*At Indian Head*, the six best yielders were as follows :—

	Bush.	Lbs.
Rennies' Improved.....	62	14
Odessa.....	54	28
Trooper.....	45	40
Success.....	45	40
Mensury.....	43	36
Nugent.....	42	34

The average given by these six varieties was 49 bushels 8 lbs. per acre.

*At Agassiz*, the six varieties which gave the largest yield are :—

	Bush.	Lbs.
Odessa.....	38	36
Oderbruch.....	36	27
Trooper.....	33	46
Petschora.....	33	16
Vanguard.....	32	4
Stella.....	31	12

an average of 34 bushels 16 lbs. per acre.

The six varieties of six rowed barley which have averaged best throughout, taking all the results into consideration are :—

	Bush.	Lbs.
Odessa.....	50	30
Mensury.....	48	32
Trooper.....	47	2
Royal.....	46	38
Common.....	43	36
Vanguard.....	43	28

These give an average of 46 bushels 35 lbs.

### RESULTS FROM TEST GROWING OF TWO ROWED BARLEY.

Turning now to two-rowed barley of which 13 varieties have been tested, we find the six best at the Central Farm, are the following :—

	Bush.	Lbs.
Sidney.....	43	16
Duckbill.....	37	24
Bolton.....	35	30
Beaver.....	35	..
French Chevalier.....	34	18
Newton.....	29	18

These give an average yield of 35 bushels 41 lbs. per acre.

As showing the influence of variety on the yield of two-rowed barley, 13 different sorts were grown at the several Experimental Farms in uniform test plots under like conditions. At the Central Farm, the highest yield was 43 bushels 16 lbs., the lowest 20 bushels 8 lbs., a difference of 23 bushels 8 lbs. At Nappan the largest crop was 47 bushels 44 lbs., the smallest 22 bushels 44 lbs., a difference of 25 bushels. At Brandon the best yield obtained was 62 bushels 14 lbs., the poorest was 30 bushels 20 lbs., a difference of 31 bushels 42 lbs. At Indian Head the yield was 59 bushels, the lowest 42·44, a difference of 16 bushels 4 lbs., while the heaviest crop at Agassiz, B.C., was 45 bushels, and the lightest crop 24 bushels 30 lbs., a difference of 20 bushels 18 lbs. These figures give an average difference on the whole of 23 bushels 14 lbs. per acre.

*At Nappan*, the six varieties of two-rowed barley which have yielded best are:—

	Bush.	Lbs.
French Chevalier.....	47	44
Canadian Thorpe.....	46	32
Danish Chevalier.....	42	24
Prize prolific.....	38	16
Kinver Chevalier.....	37	4
Thanet.....	35	20

These give an average yield of 41 bushels 15 lbs. per acre.

*At Brandon*, the six varieties which have given the largest crops are the following:—

	Bush.	Lbs.
French Chevalier.....	62	14
Sidney.....	60	9
Canadian Thorpe.....	58	16
California Prolific.....	57	14
Newton.....	56	2
Beaver.....	50	6

These give an average of 57 bushels 18 lbs. per acre.

*At Indian Head*, the six best yielders were:—

	Bush.	Lbs.
Prize prolific.....	59	..
Duckbill.....	57	4
Kinver Chevalier.....	56	22
Thanet.....	54	40
French Chevalier.....	54	38
Danish Chevalier.....	54	18

These give an average of 56 bushels 4 lbs. per acre.

*At Agassiz*, the six varieties which yielded best were:—

	Bush.	Lbs.
Duck-bill.....	45	..
Canadian Thorpe.....	41	32
Danish Chevalier.....	39	28
French Chevalier.....	38	16
Beaver.....	36	2
Newton.....	34	8

These give an average yield of 39 bushels 6 lbs. per acre.

The six varieties of two-rowed barley which have given the best yields throughout taking in the results of all the tests are:—

	Bush.	Lbs.
French Chevalier.....	47	26
Canadian Thorpe.....	44	25
Danish Chevalier.....	41	6
Newton.....	40	30
Sidney.....	40	15
Prize prolific.....	40	11

These give an average of 42 bushels 19 lbs. per acre.

## Agriculture and Colonization.

*By Mr. Grieve :*

Q. Are these samples bottled up just as they come from the threshing at the farm or are they hand-picked?—A. The samples have been put through the fanning mill, and anything in the shape of impurity has been picked out.

### COMPARATIVE YIELDS OF TWO-ROWED AND SIX-ROWED BARLEYS.

Comparing the two-rowed barleys with the six-rowed in these tests, we find that the six-rowed sorts have given the largest yields at the Central Farm, at Nappan and Brandon, while the two-rowed sorts have yielded best at Indian Head and Agassiz. Putting all the results together we find that the six-rowed barleys have averaged 46 bush. 35 lbs. per acre ; while the two rowed have averaged 42 bush. 19 lbs. an advantage this year in favour of the six-rowed barleys of 4 bush. 16 lbs. per acre.

*By Mr. O'Brien :*

Q. Is that Mensury variety reliable as a malting barley?—A. No. It is objected to by the brewers everywhere. They will not buy it if they know it.

Q. Why do they object to it?—A. For the reason it is said that it does not malt in the same length of time as other varieties. It takes longer to sprout, and when put on the malting floor with other barleys the germination is not uniform. By the time the Mensury is ready to dry off, the other varieties have gone past their best condition and the malt is injured. If the brewers could get all Mensury barley and malt it separately, this would no doubt work better.

*By Mr. McMillan :*

Q. At what stage do you cut barley? Were not these samples cut a little late?  
A. That is a matter which is left with the superintendents of the different branch farms to determine and at the Central Farm to the farm foreman. It is usually cut just before fore it is fully ripe—early enough to prevent shedding. That is the point aimed at.

Q. A good deal of the colour depends upon the stage when cut, does it not?—A. Yes, and upon the weather after it is cut.

### THE PEASE CROP.—YIELDS OF DIFFERENT VARIETIES.

Passing now to the pease crop, this stands next in importance to barley, the crop of the Dominion being estimated at about 15,000,000 bushels. In the census returns pease and beans are given together, so that the figures we get are probably not strictly accurate, and the yield per acre is not given in the returns. From the report of the Bureau of Industries of the returns from Ontario, where the larger portion of this crop is grown, we find that the average yield per acre, for 13 years, has been 20 bush. 2 lbs.

As showing the influence of variety on this crop the results are given of the test of 10 varieties grown at the several Experimental Farms under similar conditions.

*At the Central Farm* the highest yield was 40 bush. 10 lbs., and the lowest 30 bush. 20 lbs., a difference of 9 bush. 50 lbs. per acre.

*At Nappan* the highest yield was 55 bush. 52 lbs., the lowest 40 bush., a difference of 15 bush. 52 lbs.

*At Brandon* the highest yield was 68 bush., the lowest 39 bush., a difference of 29 bush.

*At Indian Head* after the crops were cut, a very violent wind storm occurred which so mixed the different varieties that it was impossible to separate them again and hence we have no return from that farm.

*At Agassiz*, the highest yield was 33 bush. 20 lbs., the lowest 20 bush., a difference of 13 bush. 20 lbs. per acre. The average difference of yield, putting the results obtained at all the Experimental Farms together was 17 bushels.

The average yield of the 10 varieties of pease grown at the several Experimental Farms are as follows :

	Bush.	Lbs.
Central Experimental Farm.....	34	53
Nappan " ".....	45	33
Brandon " ".....	53	43
Agassiz " ".....	24	41

Putting the returns together, the average yield is 39 bushels 35 pounds.

BEST YIELDING VARIETIES OF PEASE, AS RECORDED AT THE DIFFERENT EXPERIMENTAL FARMS.

*On the Central Farm* the six best yielding varieties of pease were the following :—

	Bush.	Lbs.
Black-eyed Marrow-fat.....	40	10
Mummy.....	39	30
Pride.....	39	..
Prince Albert.....	36	20
Centennial.....	34	40
Crown.....	33	30

These six varieties averaged 37 bushels 11 pounds per acre.

*At Nappan* the best six were :

	Bush.	Lbs.
Crown.....	55	52
Black-eyed Marrowfat.....	53	20
Golden Vine.....	47	40
New Potter.....	47	20
Pride.....	43	40
Centennial.....	42	40

These six varieties averaged 48 bushels 25 pounds.

*At Brandon* the six best yielding sorts were the following :—

	Bush.	Lbs.
Pride.....	68	..
Crown.....	60	50
New Potter.....	56	40
Mummy.....	53	10
Black-eyed Marrowfat.....	52	10
Golden Vine.....	46	20

These six varieties averaged 56 bushels 10 pounds per acre.

*At Agassiz* the following were the six best yielding sorts :—

	Bush.	Lbs.
Multiplier.....	33	20
Golden Vine.....	28	20
Crown.....	26	25
Prince Albert.....	25	5
Prussian Blue.....	24	40
Mummy.....	22	50

These varieties average in yield 26 bushels 46 pounds per acre.

## Agriculture and Colonization.

### BEST VARIETIES OF PEASE BY THE AVERAGE YIELD AT ALL THE FARMS.

The six varieties of pease which have given the best crops throughout are:—

	Bush.	Lbs.
Black-eyed Marrowfat.....	44	32
Crown.....	44	12
Pride.....	42	40
New Potter.....	39	52
Canadian Beauty.....	39	..
Mummy.....	38	52

*By Mr. Smith (Ontario):*

Q. From that it would appear that you can grow pease successfully at any of the Experimental Farms?—A. Yes, we have grown them very successfully, and the crop at Agassiz, which is the smallest this year, has usually been the largest. The crop at the Central Experimental Farm has been above the average, and it has been a little above the average at Nappan. Remembering that it is below what is usual at Agassiz, the whole may be taken as a fair average. Altogether the six varieties mentioned have averaged 41 bushels 34 lbs., which is more than double the crop given as the average for a series of years in Ontario.

### VARIETIES AND FERTILITY OF CROSS BRED PEAS.

In the evidence given before you last year, I referred to some promising sorts of cross-bred pease which had been produced at the Experimental Farms and were then under test. These have been subject to further trial during the past season and have given excellent results. I submit for your inspection samples of 12 of the best of these with the yields they have given. This variety known as the Macoun, is a cross between the black-eyed Marrowfat as male and the Mummy as female. The yield has been 51 bushels 40 lbs. per acre.

The next, here, known as Arthur, a cross between the Mummy and the Multiplier, has given a yield of 51 bushels. Bedford stands the next on the list. This was one of the varieties produced at the Brandon Farm, and is called after the superintendent there. It is a cross between the Mummy and the Multiplier, and the yield was 49 bushels 20 lbs.

The next is the Mackay, which is a cross between the Mummy as a female and the Black-eyed Marrowfat as male and was produced at Indian Head. It shows the influence of the Black-eyed Marrowfat on the progeny. The yield was 47 bushels 20 lbs. per acre.

Agnes, a cross between the Marrowfat and Pride, has produced 47 bushels. Bruce, a cross between the Black-eyed Marrowfat and Mummy, 46 bushels. Paragon, a cross between the Black-eyed Marrowfat and Mummy, 45 bushels 40 lbs.

Carleton, a cross between the Mummy and Multiplier, 45 bushels. Duke, a cross between the Mummy and Black-eyed Marrow-fat, 44 bushels, 20 lbs.

Luther, a cross between the Mummy and Black-eyed Marrowfat, 44 lbs. Victoria, a cross between the Mummy and Black-eyed Marrowfat, 43 bushels 20 lbs.

And Prince, a cross between the Mummy and Black-eyed Marrow-fat, 43 bushels 20 lbs.

These twelve varieties of cross-bred pease have yielded an average of 46 bushels 31 lbs. ; making 9 bushels and 20 lbs. per acre more than the average given by the six best croppers among the commercial sorts named.

*By Mr. Semple:*

Q. Are these varieties about equally easy to harvest?—A. Yes, but they vary in the length of their vines very much. The crosses of the Mummy, many of them, have the Mummy habit of blooming almost entirely at the top, and forming large clusters of pods.

## SEED DISTRIBUTION OF CROSS BRED CEREALS.

With regard to the distribution for general testing of the more promising sorts of cross-bred and hybrid cereals which have been produced on the Experimental Farms, I may say that the first distribution of these new sorts was made last spring, when 1899 samples of one pound each were sent out to farmers in different parts of the Dominion. We were not sending out pease at that time but wheat and barley. These were sent to some of those farmers who have shown a special interest in the testing of seeds. They were distributed as follows:—

Prince Edward Island . . . . .	86
New Brunswick . . . . .	214
Nova Scotia . . . . .	132
Quebec . . . . .	393
Ontario . . . . .	712
Manitoba . . . . .	190
North-west Territories . . . . .	110
British Columbia . . . . .	62

---

 1899

This indicates that they were distributed in fair proportions among farmers over the whole of the Dominion. Many gratifying reports of the results of the tests of these new varieties have been received of which the following will serve as examples.

D. H. Ross, of Douglas, New Brunswick, received a sample of 1 lb. of Surprise barley, a six-rowed sort produced at the Central Farm by crossing a two-rowed barley with a six-rowed, from which he raised 35 lbs. He says, "This is the finest barley I ever saw grow; it grew heavier and ripened earlier than any other sort. I had it to a show, and it took first prize away ahead of all other barley." The sample returned weighed 52 $\frac{3}{4}$  lbs. per bushel.

Mr. Cronkite, of Lower Southampton, N.B., reports a crop of 30 lbs. from 1 lb. of Huron wheat, (a cross between Ladoga and White Fife) and says, "I consider the Huron the best variety of wheat I ever grew." The sample returned weighed 62 $\frac{3}{4}$  lbs. per bushel.

Henry King, of Victoria, B.C., received a 1 lb. sample of Advance wheat, another cross between Ladoga and White Fife, from which he raised 46 lbs. He says, "I got the second prize at the Victoria Exhibition with it, it looked the prettiest grain there. I hope to do better with it next season; many thanks for sending it to me." The sample returned weighed 64 lbs. per bushel.

W. Brown, of Somenes, B.C., reports a yield of 109 lbs. from 1 lb. of seed of Advance wheat. He says, "It is the best wheat I have ever tested."

As a further evidence of the fertility of some of these cross-bred sorts, samples of five wheats were sent last spring by request to the agriculturist of the Minnesota Experimental Station, to be tested alongside of a large number of other varieties. They all did well. And in a report received a few days ago, from the agriculturist, he informs me that two of the hybrids, the Advance and Preston—which are the two that rank highest on the list, I have submitted to you—gave larger yields than any other sort under trial there, and from the list he sends there were about 60 or 70 different wheats under test.

In evidence of the relative earliness of some of these varieties, I quote from a letter received from Mr. T. Willings, of Olds, Alberta: He says:—"The frost did a great deal of damage in this neighbourhood the past season. The only sample of wheat I have seen not damaged was the Percy," (which was one of the cross-bred sorts distributed) "which was ready to cut before any other variety was filled."

By the CHAIRMAN.—Professor Saunders has a lot of other information to give the committee. Would it be your wish that we should have him another day? We have already been for an hour and a half in session, and we might adjourn and have the Professor before us another day.

## Agriculture and Colonization.

Mr. SAUNDERS.—I wanted to take up another aspect of the question on which I have been speaking, that is, the importance of the maintenance of the fertility of the soil, and I wish to give to the Committee the results of experiments which have been tried with manures, especially in regard to loss of manure in rotting, also the results of the experiments which have been tried with clovers sown with grain during the past year, and to give you these particulars in detail would occupy probably another hour.

### RELIABLE REMEDY FOR DESTRUCTION OF THE PEA-BUG.

*By Mr. Carpenter :*

Q. There is just one question in regard to experiments with pease. Our great difficulty in the Niagara Peninsula is the pea-bug. We cannot grow pease successfully on account of this insect, in fact, most of us have given it up. At the same time we look upon pease as an important crop. There is possibly no better preparation for fall wheat than, after the pease have been removed, to plough the ground with manure and put in fall wheat. It seems impossible, however, to contend against the pea-bug, but if you have had any experience in that line, we would be most happy to hear what you have to suggest as a remedy?—A. Within the last few years a very satisfactory remedy has been found for this bug, by treating the seed pease with bi-sulphide of carbon. This is now very generally done by the large seed dealers. The pease are put into large vats into which a vessel is placed, containing this bi-sulphide of carbon, this vapourizes, and the vapour being very heavy, it settles down in the vat which is closely covered for about 24 hours. As this vapour is very penetrating and poisonous, it effectually kills the pea-bugs, and you can then sow these pease without running the risk of propagating the insect. If your people have discontinued growing pease for several years, it is probably that the supply of pea-bugs will have died out, as they do not live for more than one year, and by getting clean seed, free from the insect, and sowing again, you would probably be comparatively, if not altogether, free from this trouble. The bug seems to thrive very well in all the warmer parts of Canada, but in the colder sections of the country, the pea weevil does not occur to any extent, and for that reason, in many of the northern parts of Ontario, about Barry, Lindsay, and east and north of that, and about Pembroke, the pea crop is a large one and is usually uninjured by pea-bugs. The United States seed dealers come over every year and engage farmers to grow seed for them, and many hundreds of acres of fancy pease are grown for them in the districts referred to, where they can be produced free from pea-bugs. In the Niagara district, I know that pease have not succeeded very well, but the treatment of the seed which I have referred to, does much towards getting rid of this trouble.

*By the Chairman :*

Q. How much of the bisulphide of carbon would be used to 100 bushels of peas.—A. I should think that about one pound would be sufficient for this quantity, provided the vessel into which they were put was quite tight. The same poison is being used for poisoning gophers in the North-west. A teaspoonful of it is put on a little cotton batting and pushed down the hole of the gopher. Then enough earth is kicked over the surface of the hole to cover it up and prevent evaporation. The poison vapourizes and gradually goes down and kills all the gophers, both young and old. I mention this to show you how heavy and penetrating this gas is.

Q. Would you just spread it over the top of the pease?—A. It is usually put into a vessel and placed on the top of the pease in the vat or other inclosure, being very volatile it soon gives off a quantity of vapour which finds its way all through the pease and destroys the insects. It is well to bear in mind that it is an inflammable vapour, and if a light is brought near it an explosion is liable to occur. Of course the dealers who treat the seed are cautious in that particular. The liquid has a very unpleasant odour, and on account of its inflammable character must be used under proper precautions.

I am greatly obliged to the Committee for the kind and patient hearing which you have given me. I have made use of a great mass of details, but the great object I had in view was to make them more impressive and show the great importance of the best variety of seed.

## COMMITTEE ROOM 46,

HOUSE OF COMMONS,

THURSDAY, 15th March, 1896.

The Select Standing Committee on Agriculture and Colonization met this day at 10.30 o'clock a.m., Mr. Sproule, Chairman, presiding.

Mr. SAUNDERS, Director of Experimental Farms, was present by recall, and addressed the Committee as follows:—

Mr. Chairman and Gentlemen,—When I was with you last week, I endeavoured to present to you some features of that aspect of the Experimental Farm work which referred to the inherent vigor and fertility of certain varieties of seed, and endeavoured to show the important bearing which good seed has on farm work in this country. This morning, I desire to bring before you another aspect of this subject, namely, better farming, such as will result in the maintenance of the fertility of the soil.

In the annual reports of the Experimental Farms will be found in detail what experience has shown to be the best practices as to cultivation and treatment of soil in the different climates of the Dominion, and the results obtained from the successive sowings of grain at regular intervals for five or six years past have shown with a considerable degree of certainty the best times for seeding in the several climates of the Dominion represented by the Central and Branch Experimental Farms. The aspect of the question to which I desire to refer now more particularly, is that which relates to the maintenance of the fertility of the soil by the use of manures and the ploughing under of green crops.

In connection with this work barn-yard manure is an important factor, since it is almost the only fertilizer which many farmers use. Much has been said and written about the proper methods of treating and storing manure, in regard to which there are great differences of opinion.

## COMPARISON OF RESULTS OBTAINED FROM FRESH AND ROTTED MANURES.

The results obtained on crops by the use of manure on the permanent fertilizer plots at the Central Farm—experiments which have been in progress for seven or eight years—furnish evidence of the usefulness of fresh manure, and seem to show that, ton for ton, it is fully equal in effect to manure which has been rotted. In proof of this I might cite that in these experiments in the growing of oats with fresh manure, continued for seven years, the plots so treated have given an average of 44 bushels 2 $\frac{7}{8}$  lbs. as against 37 bushels, 29 $\frac{1}{4}$  lbs. for the same weight of rotted manure, which is an average of 6 bushels and 7 lbs. in favour of the rotted manure.

Barley, in the course of seven years' tests has given an average of 1 bushel 26 lbs. in favour of the fresh manure.

With wheat the results have been slightly, but very slightly in favour of the rotted manure, 10 pounds only per acre being the advantage of the rotted over the fresh manure in an average of eight years' tests.

With Indian corn one series of crops have given an average of two tons 1181 lbs. per acre, in favour of the fresh manure, while another series gives 926 lbs. per acre in favour of the rotted manure. These are the averages from 8 years' tests.

Mangels have given a slightly larger crops from rotted manure, an average gain of 843 lbs. per acre during 7 or 8 years' tests.

With turnips the results have been in favour of the fresh manure by 1 ton 16 lbs. per acre, the test being continued for 7 years.

The fresh manure has also given the best results with carrots, by an average of 2 tons 282 lbs. per acre, during five years' tests.

With potatoes also the advantage has been with fresh manure during the one or two years in which the experiment has been tried on this crop.

## Agriculture and Colonization.

### LOSS IN WEIGHT OF MANURE DURING THE ROTTING PROCESS.

Since, however, it is not always practicable to apply barn-yard manure fresh to the soil, some experiments have been conducted on the Central Farm, during the past year, to ascertain the loss in weight which takes place during the rotting of manure under favourable conditions.

On the 7th March, 1894, two tons (4,000 lbs.) of horse manure and two tons, (4,000 lbs.) of cow manure were taken fresh from the barn-yard and placed in a shed on boards laid close together on the ground. It was thus preserved from leaching by exposure to rain. This manure was turned and weighed once a month, and the pile carefully watched to see that proper conditions of moisture were preserved. The following is the result of the several weighings:—

	Weight of manure in lbs.
March 7, when test was begun.....	8,000
April 6, reduced in weight to.....	5,530
May 7,                   “           “ .....	4,278
June 7,                   “           “ .....	3,947
July 6,                   “           “ .....	3,480
August 7,               “           “ .....	3,142
September 7,          “           “ .....	3,053
October 7,             “           “ .....	2,812
November 7,          “           “ .....	2,685
December 7,          “           “ .....	2,600

On the 6th of July, that is at the end of 4 months when the 8,000 lbs. of fresh manure originally placed in the shed was reduced to 3,480 lbs. the manure was then in what would be considered first-class condition, having that pasty character which would admit of its being cut easily with a spade and mixed readily with the soil. Subsequently it became more friable, and when weighed on Sept. 7th, it was found to break up easily, almost like soil. By December 7, it had frozen quite solid and had to be broken up with a pick. It is proposed to continue these monthly weighings to the end of the year and to repeat the experiment again with similar quantities next season. The results of the test of nine months has been to reduce the weight of the manure under experiment from 8,000 lbs. to 2,600 lbs. showing a loss of more than two-thirds of the original weight.

The question of the best and most economical methods of handling barn-yard manure is one of the greatest importance to farmers everywhere, since animal manures form one of their most valuable assets. As a result of many analyses, it is estimated that 20 tons of good barnyard manure contain about 196 lbs. of nitrogen, 128 lbs. of phosphoric acid and 172 lbs. of potash, elements which if estimated by their cost as obtainable from the cheapest artificial sources, represent a sum of not less than \$45. When we consider that there are in the Dominion over four millions of horned cattle, and nearly 1½ millions of horses, besides sheep and swine, it is of the highest importance that the manure which is given by this vast number of animals, should be economically handled so that the best possible use may be made of the fertilizers it contains.

*By Mr. McMillan:*

Q. Did you make any tests of the amount of nitrogen, phosphoric acid and potash in the manure at the time it was put away?—A. We did not at the time of its being put away. At the end of the eight months a sample was taken, which our chemist has in process of analysis, and he will be able to give the result as soon as he has completed the work.

Q. We should know what were the amounts of nitrogen, phosphoric acid and potash in the manure at the time it was put away, in order to compare them with the proportions at every date down to the time when it got to the smallest quantity, so as

to know what amount of these constituents it had retained?—A. I may say that these experiments were undertaken a year ago to ascertain much in the same way as a farmer might do, what the loss of weight was, and the experiments this coming year will cover the points suggested. The chemist will take samples as it goes into the pile, and also analyse the samples at the close of each month. The results we have had from the use of fresh barn-yard manure and of rotted manure on crops actually grown, which is of course the most practical test, throw a great deal of light on this subject, but we cannot be too careful in regard to this matter, and should get all the information possible. It must, however, be borne in mind that barn-yard manure is so variable a material that you could not get two samples even from the same barn-yard, that would give exactly the same results when analysed, and after all the practical test of the growing of crops from the manure, both in the fresh and rotted state, may prove of the most value.

Q. Was this manure that was not applied fresh to the different crops rotted in the barn-yard or in the field?—A. It was rotted in piles either in the barn-yard or in the fields, mostly in piles not far from the barn-yard. We have selected each year from the piles made during the winter, when we could not spread the manure on the ground, that which was most completely rotted and the best available for our purpose. When we have found that the manure on the farm was not completely rotted, we have obtained manure which has been well rotted, from the city.

Q. I think in rotting the manure it would be well to take a portion of the same manure as near as possible and have it rotted outside and another portion rotted inside under cover where the water will not affect it, to see what the difference will be?—A. That would be very easily done. I am very glad of the suggestion. We are going to begin these experiments shortly, and I will see that this idea is carried out.

*By the Chairman :*

Q. If I understood you correctly, you said that a ton of fresh barn-yard manure contained chemical elements estimated to be worth \$45?—A. I said that 20 tons, which we consider a good dressing for an acre of land, contained elements which would cost that sum if obtained from any other source.

*By Mr. Smith (Ontario) :*

Q. Would there be as great a loss in a large heap of manure, such as a farmer would be likely to keep, as in the small heap with which you made this test?—A. I think so. There was some protection afforded to this manure by the shed. There was no leaching or waste, and it was not allowed to fire fang or become too dry. The conditions were most favourable for the avoiding of unnecessary loss.

*By Mr. McMillan :*

Q. Did you find it necessary to apply any water?—A. We did not. We should no doubt have been obliged to do so if it had been all horse manure, but as it was composed of equal parts of cow manure and horse manure, this was not necessary.

*By Mr. Sanborn :*

Q. A ton of fresh manure would be about equal to a ton of this rotted pile which had wasted so much away?—A. That seems to be borne out by the results of our experiments with the crops produced on the plots referred to during the past seven or eight years. The test for one year would not be of much value but when you have them continued for eight years, the results are much more reliable.

Q. What about the growth of straw?—Do you think it would make the same differences?—A. The weight of straw as well as the crops of grain will be found in the annual report. I did not bring these details with me. The weight of straw produced varies with the different fertilizers used, but I do not think there is very much difference in this respect, between barn-yard manure fresh and rotted.

## Agriculture and Colonization.

*By Mr. Pridham :*

Q. Is what you term "fresh manure" kept in the barn-yard for a few days or does it go on to the fields direct?—A. It is manure taken fresh from the stable, not more than a day or two at the most from the time that it was made.

*By Mr. Sanborn :*

Q. It is spread right on the land?—Yes, it is spread without delay.

*By Mr. McMillan :*

Q. You have not experimented with long-bedding or bedding short cut?—A. We generally use bedding cut short, long bedding is more difficult to cover when ploughing.

*By Mr. O'Brien :*

Q. Does it make much difference if the quantity of snow on the ground is large?—A. This fresh manure is taken from the barn in winter time.

*By Mr. Dyer :*

Q. Have you at the time of seeding anything except the manure that was just drawn out?—Did you get manure from elsewhere?—A. No, not for these experiments. In every instance, the manure has been of our own making at the farm. It is understood in all these cases that it is equal parts of cow and horse manure that we use, and we could not be certain if we got it from any other source that we had it just in the right proportion.

Q. The quantity of manure our farmers get at that season is very small. It would be interesting if you could ascertain by test, if the manure taken out in early spring when there is not too much snow on the ground and spread then, would give better results than the rotted manure?—A. That has been the practice at the Experimental farm as far as possible for the reason that we are convinced from the results obtained from these carefully conducted experiments with known quantities of manure, that the sooner the manure can be got on the ground and turned under, the more profitable it is for the farmer.

*By Mr. Edwards.*

Q. You think it is best to put the fresh manure straight on the ground under all circumstances, no matter what the nature of the soil?—A. Every farmer must use his own brain—judgment in such case, and no hard and fast rules can be laid down for the application of manure, which will apply to all circumstances. It would be absurd for a farmer to spread his manure on a hill-top, where the first rainfall would leach it and cause the soluble portions to wash, it may, however, be said that it is best to do it wherever the land is suitable for the purpose, the farmer using his own judgment, but it may be better for a man to run the risk of the loss that would result from the partial rotting of the manure in the barn-yard, rather than put the manure out under unfavourable circumstances, where it would be liable to be leached and wasted.

*By the Chairman :*

Q. When you say that 20 tons of barn-yard manure is worth \$45—do you mean that as an estimate of the commercial value of the chemical elements they contain?—A. Yes.

Q. Do you consider that the other elements contained in the manure have any value for the land outside of that, and if so, how much?—A. Certainly they have, but it is not a value that is easily determined, because it is a relative value dependent upon the needs of the soil. We know that the humus and other materials contained in the manure which help to improve the mechanical condition, the tilth and general character of the soil, are of very great importance, as they help the soil to hold more moisture

during the dry season, and also help to make it more porous, so that it becomes better aerated, and the sun and the atmosphere can, under those conditions, produce more readily the changes which are required to convert the insoluble plant food it contains into available forms. While these elements cannot be accurately valued in dollars, there is no doubt, that they are, under some circumstances, of very considerable value, and under other circumstances where the soil does not need the additions they bring, they are of less value. But the three special fertilizing ingredients that I have named, are the three elements which all crops take in considerable quantities from the land, and add to the soil from time to time to maintain its fertility. All other ingredients, except in some special cases, are found in the soil in sufficient quantities, so that it is rarely that you need to add them.

*By Mr. McNeill :*

Q. Would you mind saying again what the three ingredients you have referred to, are?—A. Nitrogen, phosphoric acid, and potash. The chairman was just asking a question with reference to a statement I made a little while ago, as to the average result of the analyses of a very large number of samples of barn-yard manure made in different parts of the world, as contained in a handbook recently published by the United States Department of Agriculture, which shows that the average quantities of these three ingredients found in 20 tons of barn-yard manure would cost about \$45, if obtained from the cheapest commercial sources for those elements.

*By Mr. McMillan :*

Q. Would you give me the name of that book?—A. It is called a "Handbook of Experiment Station Work."

#### FERTILIZING THE SOIL BY MEANS OF GREEN CROPS.

Another method by which the soil may be enriched is by the ploughing under of green crops. The different varieties of clover have long been held in high esteem for this purpose, but greater interest has attached to this subject since it has been shown that in common with most other leguminous plants, clovers have the power of taking nitrogen, the most expensive of all fertilizers to buy, directly from the air and storing it in their tissues. Some experiments have recently been made at the Experimental Farm, to determine approximately the quantity of nitrogen which may be added to the soil per acre, by ploughing under a crop of green clover.

A field which was sown with two-rowed barley (Canadian Thorpe) in the spring of 1894, was at the same time seeded down with Mammoth Red clover. After the barley was harvested, the clover grew rapidly and made a good stand before winter. By the third week in May, 1895, about the time when such a crop should be ploughed under for corn or potatoes, the clover was quite heavy. On the 25th May, two boxes, each a foot square inside, and 4 feet deep, were sunk to their full depth in a field crop, and by lifting them carefully fair samples of the clover with roots to the depth named, was obtained. On washing away the earth, some roots were found to extend down, fully 4 feet, and had thus been able to feed on stores of fertility in the lower depths of the sub-soil not reached by other crops with a less extensive root system, and to transfer these to their roots, leaves and stalks.

*By Mr. McGregor :*

Q. What kind of clover was that?—A. Mammoth Red Clover. This is a sample from one of the boxes referred to. The roots are now brittle, and are continually breaking off and becoming less, as the sample is handled, but this will give you some idea of the length and general character of the root system of this clover of one year's growth.

*By Mr. McMillan :*

Q. You spoke of clover drawing nitrogen from the air. Does it draw through the root or the leaf?—A. It draws the nitrogen by means of little—small microbes or

## Agriculture and Colonization.

bacteria which are located in little tubercles or swellings on the roots. There, these micro-organisms reside, and they have the power of taking nitrogen from the air in such manner that it can be stored in the tissues of the plant. This has been proven by any experiments, such as the growing of clover plants in pure sand containing no nitrogen and then analysing them, when it has been found that a considerable quantity of nitrogen has been taken in and assimilated, although there was none contained in the sand in which the plants were grown.

Q. Is it necessary in order to have the best results to have the land thoroughly drained, so that it would be porous?—A. Yes, draining the land is very important, very few crops will thrive in a wet soil.

*By Mr. McNeill :*

Q. Would the root of the common red clover be as large as this (pointing to sample produced)?—A. This is what is known as the Mammoth Red Clover. It is a variety of the common red clover, which is more vigorous in growth than the ordinary form.

In each of the samples referred to the leaves and stems were separated from the partly decayed leaves about the base and also separated from the roots, and each of these was weighed, and analysed by the chemist of the experimental farms. The proportion of nitrogen, in pounds per acre, found in these different parts of the crop was as follows :—

Green leaves and stems . . . . .	101·3 lbs. per acre.
Semi-decayed material on surface . . . . .	22·5 “
Roots to a depth of 4 feet . . . . .	48·5 “
Total . . . . .	172·3

A similar test was also made on a crop of 2 years' growth, on 25th May, with the following results :—

Green leaves and stems . . . . .	50·0 lbs. per acre.
Semi-decayed material on surface . . . . .	5·1 “
Roots to a depth of 4 feet . . . . .	61·5 “
Total . . . . .	116·6

In both these fields timothy had been sown with the clover in the proportion of 12 lbs. of the former to 8 lbs. of the latter. In the field of one year's growth the timothy plants were quite small and formed a very small percentage of the whole, but in the crop of the second year, the timothy plants were much stronger and formed a much larger proportion of the green growth. The fact that the timothy plants formed so large a part of the crop explains why the total quantity of nitrogen was so much less in the crop of the second year than it was in that of the first. The green leaves and stems from the field of two years' growth showed 50 lbs. of nitrogen per acre, as against 101·3 lbs. in the first year. In the semi-decayed material on the surface the amount was 5·1 lbs. per acre as against 22·5, and in roots to a depth of 4 feet, 61·5 as against 48·5 in the one year old, showing that while the tops had diminished, the roots had increased and hence there was still laid up in the two year old crop a very considerable proportion of nitrogen, equal to 116·6 lbs. per acre as compared with 172·3 lbs. in the one year old clover.

*By Mr. McNeill :*

Q. What amount of nitrogen would there be in 20 tons of barnyard manure?—A. There are about 196 lbs. of nitrogen, 128 lbs of phosphoric acid and 172 lbs. of potash. These figures represent the average of a large number of analyses.

Experiments have been carried on with clover and other legumes for some years past at the Connecticut Experiment station at Storrs, and the following figures give

the results of four analyses made there of red clover in which the proportions of the other two important fertilizing constituents, phosphoric acid and potash are given, in pounds per acre. I cite this for the sake of making this statement more complete, since in the analysis made at the farm, the nitrogen only was determined. The figures are :

	Nitrogen	Phos. acid.	Potash.
Green leaves and stems . . . . .	114·0	23·0	123·0
Stubble and roots . . . . .	44·3	12·5	32·2
Total . . . . .	158·3	35·5	155·2

While some of the nitrogen thus stored up is no doubt taken from the soil, a large proportion of it is gathered from the air in which unlimited stores exist. It should be borne in mind that the phosphoric acid and potash taken up by clovers are derived entirely from the soil, but as the root system of these plants extends deep and wide, stores are gathered which other plants do not reach, and these are laid up in the tissues, and when ploughed under are soon converted into plant food available for succeeding crops.

The question naturally arises in this connection: "How does a crop of green clover with such weight of roots and stems as those referred to, compare with a dressing of barn-yard manure?" Manure from the barnyard as already stated varies so much in quality, that it is not possible to give exact information in reply to this question, but calculated on the basis of the one year old crop grown at the Experimental Farm or the crop grown at the Connecticut Experiment Station—such a crop would provide more nitrogen and potash than 15 tons of barn-yard manure and more phosphoric acid than there are in 5 tons of such manure.

*By Mr. Carpenter :*

Q. When you are contrasting the value of the manure with the value of the clover crop, are we to understand that the clover crop is ploughed under or pastured off?—A. Ploughed under in this case, although in pasturing off, it may be broadly stated, that the crop would be almost as valuable, because the droppings from the animals feeding on it would probably contain 90 per cent of all the valuable fertilizing constituents contained in the food consumed.

Q. Ploughed under early in June?—A. Yes, ploughed under early in June. The object in view in these experiments was to have the crop of clover so far advanced that it could be ploughed under in time to get a corn crop or a potato crop in that year. If it was pastured in June, you could not get any other crop off the land that season.

*By Mr. McGregor :*

Q. Where is that work to which you referred published?—A. By the United States Department of Agriculture at Washington.

*By Mr. Carpenter :*

Q. I gather from what you say that a crop of clover would be the cheapest method to adopt for enriching the land?—A. Yes. By far the cheapest.

*By Mr. McGregor :*

Q. It would be better to turn it under than to feed it for the reason that the cattle would not distribute the droppings as regularly as would be the case with a crop of the clover?—A. Yes, probably that would be the best, but every farmer has to consider the circumstances of his own case, and should adopt the course likely to give him the most profit. No doubt, the fertilizing ingredients would be more evenly distributed by ploughing under.

## Agriculture and Colonization.

*By Mr. McMillan :*

Q. You mentioned 95 per cent as the proportion of fertility restored to the soil in the droppings of animals?—A. I said, about 90 per cent which I meant as an approximate average. It is admitted to be 95 per cent with animals that are full grown, but the percentage is from 45 to 90 if your cows are milking.

*By Mr. McGregor :*

Q. Does clover grow better with rye than any other crop?—A. We have found it do exceedingly well with rye. I could not say whether it is any better than it is with two-rowed barley. We find that rye and wheat and barley are all favourable crops for seeding with.

Q. Would that be fall wheat?—A. No. Spring wheat.

*By Mr. Giourard :*

Q. Have you estimated the value in dollars and cents of the fertilizers found in clover?—A. Yes, and I have already given the figures. The value of the nitrogen is put at 17 cents per pound, as it takes about 6 or  $6\frac{1}{2}$  of nitrate of soda to give a pound of nitrogen and that is one of the cheapest artificial sources of nitrogen we have at the present time.

*By Mr. Smith :*

Q. Are the results as satisfactory from the second growth?—A. From the second year, do you mean.

Q. After we cut our pastures and then plough them. Say in September or August?—A. That we have not thoroughly tested. As I have already explained, the growing of timothy with clover is very prejudicial to the clover after the first year. For this reason, when the clover is sown for the purpose of ploughing under as a manure, it should be sown alone, and in that case the crop of the second year might be just as good as that of the first.

Q. When the clover has grown a year and has been cut or pastured and is then ploughed under in August or the early part of September. Did you ever try that?—A. Not exactly in that way. In one of the experiments of which I have given you the results, the clover was allowed to grow for two seasons and was cut twice during the second season, and the analysis of the roots and tops made in May following.

*By Mr. Carpenter :*

Q. You were speaking of the quantity of seed used per acre?—A. Twelve pounds of timothy and eight pounds of clover.

*By Mr. McGregor :*

Q. Sowing with clover, alone, how many pounds would you use?—A. I was coming to that presently ; some experiments we have been trying will, I think, throw some light on that point. Before referring to these I want to try and answer another question, viz., "Does clover sown with grain lessen the yield of grain?" and can clover be grown to advantage, from year to year, with grain, without materially lessening the crop of the latter? If this can be done the clover will serve as an excellent catch crop, absorbing and appropriating the nitrogenous fertilizers which are brought down by the rain during the late months of autumn, and may be ploughed under at the close of the season, with great advantage to the land. Should this course be adopted what quantity of clover seed should be sown per acre, and what kinds of clover are best adapted for the purpose?

### SOWING CLOVER WITH BARLEY.

A course of experiments has been planned and carried out during the past season to gain information on these points. A field of nearly two acres was selected for this

purpose. The soil was a sandy loam which appeared to be fairly uniform, but was of poor quality. It was sown with wheat in 1894, and gave a light crop. It was ploughed in the autumn of 1894, and received a dressing of wood ashes, about 150 bushels per acre, during the following winter, applied when the surface was bare. The land was gang-ploughed in the spring of 1895, and harrowed with the smoothing harrow before sowing. This area was divided into 18 plots of one-tenth acre each, with three feet of space all round each plot and the whole sown on 3rd May, with two-rowed barley (Canadian Thorpe), two bushels per acre. This came up on the 8th May and was harvested 5th August, and it ripened evenly, all standing well. On the 9th of May, six days after the barley was got in, the clover was sown, and the land rolled. The quantity of clover seed used in the different plots and the yields of barley were as follows:—

	Yields of Barley.	
	Bush.	Lbs.
No. 1.—2 lbs. Mammoth Red Clover per acre . . .	16	37
“ 2.—Was a check plot, had no clover . . . . .	19	18
“ 3.—4 lbs. Mammoth Red Clover per acre . . .	19	23
“ 4.—6 “ “ “ . . . . .	19	8
“ 5.—8 “ “ “ . . . . .	18	21
“ 6.—10 “ “ “ . . . . .	18	41
“ 7.—A check plot, no clover sown . . . . .	19	8
“ 8.—12 lbs. Mammoth Red Clover per acre . .	21	7
“ 9.—14 “ “ “ . . . . .	26	22
“ 10.—16 “ “ “ . . . . .	22	14
“ 11.—A check plot, no clover sown . . . . .	19	13
“ 12.—8 lbs. Lucerne Clover . . . . .	18	21
“ 13.—8 lbs. Alsike Clover . . . . .	23	16
“ 14.—8 lbs. Crimson Clover . . . . .	16	2
“ 15.—8 lbs. Cow grass (perennial clover) . . . .	15	30
“ 16.—8 lbs. Mammoth Red Clover . . . . .	16	22
“ 17.—A check plot, no clover sown . . . . .	18	26
“ 18.—8 lbs. Mammoth Red Clover . . . . .	16	32

In most instances the plots which show the lesser yields of grain were situated a little lower than the others which as there was an unusual rainfall at Ottawa during the growing season may account for this falling off in yield. Taking the results off all the plots into consideration, it does not appear that the yield of barley was materially influenced by the growing of the clover with it.

On the 5th October this land was ploughed 8 inches deep, and a piece cut out of the furrow in each plot, 6 x 6 and examined to show the growth of the clovers. Here is a sample of the roots and tops in a piece of the furrow 6 x 6 where the Mammoth Red Clover seed was sown at the rate of 16 lbs. to the acre; here is another sample where 12 lbs. to the acre was used. I have brought these to show how extensively the root system of clovers is developed in a short time. Here is a sample of Alsike clover sown 8 lbs. to the acre, and this is a sample of Crimson Clover sown also 8 lbs. to the acre. It will be seen that the root system of that variety is comparatively weak.

*By Mr. Girouard:*

Q. According to the samples which you have shown here are those varieties which produce many fibrous roots good for heavy soils?—A. Yes, because they help to loosen the soil. The Mammoth Red Clover has a large proportion of fibrous roots, while the Alfalfa has coarser roots.

#### EXPERIMENTS WITH VARIETIES OF CLOVER SEEDS.

On a careful examination of the seeds of the different varieties of clover used in these experiments, it was found that they varied in size more than was at first anti-

## Agriculture and Colonization.

culated. In order to ascertain the approximate number of seeds in each pound, 20 grains of each sort was accurately weighed on a chemical balance and the seeds counted. Taking 7,000 grains as equal to 1 lb. avordupois, we find the number of seeds of each of the varieties referred to in each pound to be as follows :—

	Number of seeds per lb.
Alsike clover . . . . .	693,350
Common Red Clover . . . . .	282,800
Mammoth Red Clover . . . . .	281,400
Cow Grass (Perennial Red Clover) . . . . .	227,150
Lucerne or Alfalfa . . . . .	194,600
Crimson Clover . . . . .	115,850
Timothy . . . . .	1,020,950

Presuming these seeds all to have the same percentage of vitality, or germinating power, it will be seen that 1 lb. of Alsike would produce nearly as many plants as 2½ lbs. of Red Clover, and more than 3½ lbs. of Lucerne or Alfalfa, and more than would be produced by 5 lbs. of Crimson Clover. It would appear that in sowing clovers the quantity of seed used should be proportionate to the size of the seed in each case. On this basis, presuming that 10 lbs. of Red Clover per acre would be a proper quantity to sow with grain to produce a good mat of foliage to plough under in the autumn or following spring. Five pounds of Alsike should be sufficient for a similar area, whereas sufficient seed to produce the same number of plants of Lucerne or Alfalfa would require about 14 lbs., and of Crimson Clover about 24 lbs. This subject is worthy of more general attention and careful test by farmers in all parts of the country.

It is proposed to continue these experiments at all the experimental farms next year.

It is evident that the general statement is usually given by seedsmen in their catalogues, that a certain number of pounds to the acre of clover seed should be sown, does not apply equally well to all classes.

*By Mr. Carpenter :*

Q. When you speak of 10 lbs. of seed to the acre you have reference to the common red clover.—A. Yes, or to the Mammoth Red, which is a strong growing variety of the same.

Q. Do you consider Mammoth clover as valuable for feed purposes as common red clover?—A. I do not think there is very much difference in that respect. The Mammoth red clover is a strong growing variety of the common red clover and is somewhat coarser. In New Jersey, Crimson clover has been found very useful for enriching the land. A common practice has been to sow crimson clover with a corn crop, scattering the seed after the last hoeing of the corn. It soon germinates and after the corn is cut the clover grows rapidly. This is permitted to occupy the land until the following spring, by which time a heavy mat of growth is produced, which is ploughed under in time for a crop of potatoes. From experiments conducted in Ontario and the Maritime provinces, it does not appear that this variety of clover is hardy enough to endure the Canadian winter, even in the milder portions of the country. Hence its general use with us is out of the question. We have, however, in the Mammoth clover a fertilizer which is believed to be equally good.

*By Mr. McGregor :*

Q. Do you find any insects attacking the red clover?—A. There is an insect which attacks the seeds of the red clover and there are several which feed on the leaves. We have had no trouble to any extent that would interfere with the usefulness of the plant for the purposes I have indicated.

Q. In Michigan and in my section (Essex county) there is an insect which injures the seed and is bothering our farmers very much.—A. Our entomologist, Mr. Fletcher, has given in the reports of the Experimental Farm, excellent remedies for that pest, which if farmers would carry out according to Mr. Fletcher's instructions, they would soon get rid of it.

*By Mr. McNeill :*

Q. What is the best time to sow red clover ; with the spring wheat or with the fall wheat?—A. I should say that the best time to sow it would be with the spring wheat, sowing it a day or two after the wheat has been sown. From the experience we have had and what we know now of the usefulness of clovers as fertilizing agents for the soil, it is of the greatest importance that our farmers all over the Dominion should sow clover with more or less of their grain crops every year. I do not believe, from the experience we have had, that it would in any case materially affect the crop of grain. The additional cost of 10 lbs. per acre of clover seed is not heavy, and the clover crop ploughed under late in October will give to the soil a quantity of nitrogen equal to from 5 to 10 tons of manure per acre and at the same time bring up from the lower strata of the soil, potash and phosphoric acid which crops with a less extensive root system do not reach.

Q. You planted your clover a few days after sowing the grain?—A. Yes, in the plots referred to it was sown several days after the barley.

*By Mr. O'Brien :*

Q. But is it not a common practice to sow clover seed with the grain?—A. It is very commonly done, but in these tests plots we have found it more convenient to sow it after the barley.

*By Mr. McGregor :*

Q. Then do you harrow again?—A. Not usually, but we often drag brush over it. In sowing, we use one of those little seeders, which blow the seed about, scattering it evenly in all directions—we find this better than if we sowed the clover seed with the grain.

*By Mr. Carpenter :*

Q. My practice has been to sow the clover at the same time as the grain?—A. Yes ; that is done by many, but you don't want to cover it much as the seeds are so small.

*By the Chairman :*

Q. Don't you find rolling the land sufficient.—A. Sometimes we roll it and sometimes we drag brush over it. Much depends on the condition and character of the land. We have to use our judgment. In most cases harrowing would bury it too deeply.

*By Mr. McMillan :*

Q. Would it not be a most profitable system to take the first cut of clover and make hay of it and then plough the second crop under? We have tried that with very good results?—A. That would no doubt be a very good plan.

*By Mr. O'Brien :*

Q. Have you tried Lucerne?—A. Yes, several times, but only in plots. It succeeds fairly well with us.

#### THE BRANCH EXPERIMENTAL FARMS.

I shall now endeavour to give you a brief sketch of the progress of some sections of the work at the Branch Experimental farms. I have already given you the results of the experiments with the leading sorts of grain at all these farms, so I need not touch again on that part of the subject.

## Agriculture and Colonization.

*Nappan.*—Referring first to the Experimental Farm at Nappan, I may say that the climate is well adapted for the growing of roots. Turnips have averaged at Nappan during the past season, grown in plots, 1028 bushels per acre, the best yielder having given at the rate of 1,224 bushels 10 lbs. per acre. Four acres gave an average of 982 bushels per acre, and an average per acre of five years sowings has given in the case of the best yielder 961 bushels, 30 lbs. per acre.

Mangeles have also yielded well, the average of five years tests being 752 bushels per acre. Carrots have given an average of 695 bushels, 29 lbs. per acre for the past 5 years.

Where these roots succeed so well and form so important an element in stock feeding, it is very desirable that farmers should be informed as to the varieties which succeed best. This information is now available from the experience had at the farm.

### POTATO CULTURE.

Many experiments have been tried with potatoes including comparative tests of a large number of varieties, also tests as to the best methods of cutting potatoes for seed. The most successful method, there, has been to use the larger tubers for seed and to plant pieces containing 2 to 3 eyes.

*By Mr. Carpenter.*

Q. Do you plant the potatoes whole?—A. We have tried them whole, but the best results have been obtained from large tubers containing from 2 to 3 eyes.

Corn is not so successful a crop on this farm as it is in Ontario; the weather is not usually warm enough to give it its full development. Hence in dairying and stock feeding, roots are likely to hold relatively a more important place in the Maritime provinces than with us.

Potatoes in that climate are subject to rot, and many experiments have shown that by thoroughly spraying the tops at the proper season, with Bordeaux mixture, the loss from this disease may be greatly reduced.

Q. You speak of "spraying the tops at the proper season." At what stage of growth would that be?—A. When the vines are about a foot high. That is before they have attained their full growth.

A large number of varieties of fruits are also under trial at Nappan, including in all nearly 300 varieties. Most of these are doing well. There are also in the plantations of ornamental trees and shrubs 279 varieties.

These collections of fruit and ornamental trees are being increased from year to year, and are assisting in awakening much interest in horticulture in that section of the Dominion.

Very useful experiments have been made in the draining of land, both uplands and marsh, and the results in crops are showing marked advantage as the outcome of this treatment. Many experiments are also in progress in testing promising varieties of grasses and clovers.

At *Brandon*, much useful work has been done in testing the best methods of treatment of land to prepare it for crop. These all show the great advantage of a summer fallow, and both at this farm and at Indian Head it has been shown that the results obtained from spring ploughing are better than from fall ploughing.

The question of the best method of sowing of grain is also an important one, the difference in the crop when sown with the drill as compared with the use of the broadcast machine, showed during the past season in the case of wheat, nine bushels per acre in favour of the drill; and taking into consideration the tests of the past five years, they show an average of five bushels per acre in favour of sowing with the drill.

### TREATMENT FOR SMUT IN WHEAT.

Experiments for the prevention of smut in wheat have also been of great service to the farmers on the plains, where smut is very common. The best results have been

had from the use of blue stone (copper sulphate) dissolved in water in the proportion of 1 lb. to 1½ pails full of water, and sprinkling this fluid on 5 to 10 bushels of wheat spread on the barn floor or in a tight wagon box.

It is the "stinking" or "bunt" smut which is so troublesome in the North-west, and which wherever it occurs depreciates the value of the grain so much. In the experiments which have been carried on for several years, very smutty wheat has been treated and used for seed, and the crop in every instance has been almost free from smut. Where reasonably good seed is used and treated in the manner directed, there is no likelihood of any trouble occurring from the presence of smut.

#### FLAX GROWING.

The cultivation of flax is increasing very much in Manitoba. In 1894, the area under this crop was 30,000 acres, in 1895 it was increased to 82,500 acres. Experiments have been conducted at Brandon as to the best methods of treatment of this crop, also in growing wheat, oats and barley after flax, to see whether such grain crops were much less under such circumstances than those grown after wheat. The results of these experiments seem to show that flax is not a specially exhaustive crop.

#### GREEN CROPS, FODDER-CORN AND ROOTS.

In view of the large increase in stock in Manitoba and the scarcity of native hay in some districts, crops of mixed grain have been grown, cut green and used as hay, with much success. The mixture which gave the heaviest yield at Brandon, in 1895, was one bushel each per acre of Banner oats, Red Fife wheat and Golden Vine pease. This gave the remarkably large yield of 5 tons of cured hay per acre. Millets also have been grown with success at Brandon for the same purpose. The Golden Millet gave the largest yield last year, having produced 3 tons, 1,500 lbs. of cured hay per acre when grown after potatoes.

Some of the earlier maturing varieties of fodder—corn have also given good crops at Brandon for several years past. These have been cut green and placed in a silo and have supplied an excellent succulent ration for cattle during the winter months.

The season of 1895 had a heavier rainfall than usual and most root crops did well. The heaviest yield of turnips was 23 tons 464 lbs. per acre; of mangels 36 tons 18-64 lbs.; of sugar beets, 21 tons, 296 lbs.; and of carrots 18 tons, 1840 lbs. per acre.

#### LIVE STOCK.

Good bulls are kept at this farm for the improvement of stock and their services are available to farmers. The breeds thus represented are Durham, Ayrshire, Holstein and Polled Angus.

Experiments have been conducted in the feeding of milch cows and steers so as to determine the most economical methods of producing milk and beef out of the materials most abundant and most generally available there.

Some experiments have also been begun with swine and good boars and sows have been sent to this farm, of Berkshire, improved large Yorkshire and Tamworth. Different breeds of poultry are also being tested to find out which are best adapted to that climate.

#### FRUIT GROWING.

Here there are climatic difficulties to contend with which interfere with the successful cultivation of most of the large fruits. For this reason the experimental tests have been mainly confined to the hardiest sorts. Since the establishment of this farm, 241

## Agriculture and Colonization.

varieties of large fruits have been tried, including all the hardiest forms obtainable from Siberia and other parts of Russia, and from other cold climates in Northern Europe.

These have consisted of,—

Apples . . . . .	175
Pears . . . . .	14
Plums . . . . .	22
Cherries . . . . .	18
Crab-apples . . . . .	12
	241

Nearly all of these have died.

Small fruits (mostly living except grapes),—

Grapes . . . . .	26
Strawberries . . . . .	18
Raspberries . . . . .	29
Blackberries . . . . .	9
Black Currants . . . . .	22
R. & W. Currants . . . . .	18
Gooseberries . . . . .	24
	146
Total . . . . .	387

The tests with fruit trees have been several times repeated during the last six years, with the object of testing them under various conditions of shelter, but up to the present time very little success has attended the efforts made.

We have succeeded in fruiting several varieties of the wild plum which is native in some parts of Manitoba and is perfectly hardy. Much attention has of late been given to the securing of such improved varieties of the wild plum as have been originated in the North-western States, especially in Minnesota.

It is believed that in a short time an orchard consisting of these improved forms of the wild type can be successfully established and that these varieties of fruit will be very acceptable and useful to the people.

No success worthy of mention has yet attended in the testing at Brandon of any of the hardy varieties of apples, nor of any of the crab-apples grown in the east. There is, however, one wild crab, a very small one with fruit about the size of a cherry, which was obtained from the northern part of Siberia, which has stood the climate perfectly for the four or five years, and during the last two seasons has borne some fruit. Experiments are now being conducted with the object of improving this fruit, and in 1893, this Siberian variety known as the Berried *Pyrus* (*Pyrus Baccata*) was cross-fertilized with pollen from some of the hardiest varieties of apples such as Duchess, Tetofsky, Wealthy, Yellow Transparent, and Anis, also with pollen from the Hyslop and Transcendant Crabs. The seeds obtained from these various crosses were sown and we now have about one hundred and fifty one-year old trees as the result of this work. It is hoped that in four or five years when these young trees come to fruit, that there will be found amongst them some improved forms such as will be serviceable to the people of Manitoba. This is slow work, but it is being prosecuted with as much haste as nature will admit of.

Sand cherries also promise well, and some forms of this fruit are found in different sections of the country which are of good size and fair quality.

A fair measure of success has attended the experiments with some of the small fruits of which 147 different sorts have been tested,—the most success has been had with currants, red, white, black, and gooseberries; also the hardier sorts of rasp-

berries. Strawberries have been a partial success, but all attempts to grow our Eastern varieties of grapes have thus far failed. Examples of the wild frost grape found growing in the Red River Valley have been secured and planted, and it is hoped that eventually some improved forms of this fruit may be obtained from that source.

A much larger measure of success has attended the experiments with ornamental trees and shrubs and with forest trees. Of these about 100 species and varieties have proven hardy and every year some additions are made to this list which will no doubt assume goodly proportions as time goes on and give to the people of Manitoba sufficient material for the beautifying of their homes, not only in the towns and cities, but also on the prairie farms.

*Indian Head.*—A journey of 183 miles brings us to the next experimental farm at Indian Head in Eastern Assiniboia. Many similar lines of work to those carried on at Brandon have been conducted also at Indian Head, there, however, the climate, as a rule, is drier and the season most favourable for growth appears to be shorter.

Experiments in the treatment of land in preparing it for crop, in methods of sowing grain, and in treatment of seed grain for smut, have been carried on here, the results confirming the conclusions which have been reached at Brandon.

Owing to the relatively drier climate, a complete summer-fallow is here most important, not for the purpose of giving the land a rest, for the stores of fertilizing material in the soil are too abundant to require this. The main object of summer-fallow here is to conserve moisture. As a rule the heaviest rainfall for the year takes place in June, and if the surface moisture is then turned under with a plough the capillary structure of the soil is broken up, and by this means, and subsequent surface cultivation, the moisture is prevented from drying out. This moisture is further increased by the melting of the snow in the following spring, and the soil left in splendid condition for a seed bed. The moisture from the rainfall of the current year, added to what has been preserved from the previous season, usually carries the grain crops through in good shape, and results in an abundant crop.

Many experiments have been carried on with fodder crops on this farm. Corn has not succeeded well, but mixed grain crops cut green and cured as hay, have been grown very successfully. Spring rye cut soon after it comes into head has been found to give good crops of excellent hay, and usually a second crop of considerable value can be got from spring rye later in the season. Probably one of the most important of all the results gained by tests on this farm has been those in connection with the awnless brome grass,—*Bromus Inermis*.

#### VARIETIES OF GRASSES TESTED.

Nine years ago when the experimental farms were first established, an order was sent to a seed dealer in Northern Russia who supplied the Ladoga wheat, for 2 lbs each of such of the grasses as were held in high esteem in that country, when among others a package was received of the awnless brome grass. A portion of this was sent for test to the Indian Head farm where it proved so promising that a further and larger supply of northern grown seed was subsequently obtained from Germany, and from these early sowings sufficient seed has been raised to sow a considerable area on the farm and to distribute for test many hundreds of samples among farmers in all parts of that country. This grass is very hardy and endures the climate of the North-west well. It is a strong grower, stands drought, producing a very early growth in the spring and yielding fine crops of excellent hay which is much relished by cattle.

At Indian Head, where the growth of many other hardy sorts of grass has been light, this has given as much as 3 tons 1200 lbs. to the acre and the average yield of 5 acres during the past season has been 2 tons 1600 lbs. per acre.

The probability of obtaining through the cultivation of this grass not only good fields of hay at each settler's home, but good pasture fields, hitherto a great want in the North-west, has awakened a very great interest in this subject and the requests for samples of seed for test have been very numerous. To meet the demand commercially, some of the seed dealers have imported large quantities and rapid progress may now be

## Agriculture and Colonization.

looked for in the cultivation of this useful grass. At the Indian Head farm, last year, more than a ton of the seed was saved and this has been distributed in sample bags to every farmer in the North-west Territories who has applied for it and to those who wanted larger quantities, as far as they could be supplied the seed has been sold at 20 cents a pound.

It is less than 200 years since timothy was introduced, and it was many years before its great value was fully determined. It seems now highly probable that the awnless brome grass will become as valuable to the farmer of the west and as reliable a crop as timothy is to the farmer of the east. This grass is also now being tested in a large way in many of the droughty districts in the north-western parts of the United States, and good reports are coming in concerning it from all quarters.

While the Indian Head district is one of the finest for grain producing in the whole north-west, the conditions of climate which prevail there during winter and early spring are, I think, less favourable to tree growth than those of Manitoba.

The experience gained in the testing of fruits at Indian Head has been much the same as at Brandon. While many of the small fruits have been grown with fair success, no encouragement has yet attended the efforts to grow the cultivated forms of large fruits. There have been brought together at this farm as at Brandon all the hardier forms from Eastern Canada, the Eastern and North-western States and Northern Europe, and tested there. These tests have included 203 varieties of large fruits and 127 of small fruits. The large fruits have not been limited to single trees but 5, 10, 20 and sometimes more of a single variety has been sent and these have been planted in all sorts of conditions as to exposure and shelter, so as to make the tests thorough and complete, but none have been found hardy enough to endure the climate. We have now fallen back there, as at Brandon, on the small wild Siberian crab, the wild plum of Manitoba and the sand cherry, and it is hoped that the efforts which are being made to improve these fruits will be attended with much success, and that they will thus become more valuable and better adapted to the needs of the people.

The experience gained at the experimental farms in the very thorough efforts which have been made to grow fruits, although in many respects discouraging, have become widely known and have been the means of stopping to a very considerable extent a large and useless annual expenditure by the settlers themselves, in buying at eastern nurseries many tender varieties of trees which, after being carefully nursed through the summer have been killed, root and branches, by the following spring.

In the cultivation of trees and shrubs for shelter and windbreaks as well as for ornamental purposes, a large measure of gratifying success has been obtained at both Brandon and Indian Head. About 70,000 trees are now growing on the farm at Brandon and more than 100,000 on the farm at Indian Head. These are arranged in large shelter belts and windbreaks, also in clumps, blocks and avenues, to break the monotony of the flat prairie land. These large plantations are now beginning to produce seed and from henceforth large and increasing quantities of tree seed can be gathered from the trees and shrubs on the experimental farms to extend this good work.

The influence of these shelter belts on the root crops has been very marked during the past few years; perhaps not so much for the actual shelter they afford, although that is considerable; but they gather the snow for a long distance and add very much to the moisture of the land, and that is given to the crop at the very season when it is needed for the germinating of the seed. These favourable conditions have added much to the crop of roots, and have prevented the seeds, which are small, from being dislodged by the force of the winds.

*Agassiz.*—The branch experimental farm at Agassiz is located in the coast climate of British Columbia, 70 miles east of Vancouver, where none of the climatic difficulties to which I have been referring are found.

There most sorts of fruits thrive wonderfully well, and the tests being made at this farm for the benefit of present and prospective settlers are of the most thorough and comprehensive character. All varieties of the apple, pear, plum and cherry thrive well and bear abundantly at Agassiz.

The number of varieties of fruit under test in the experimental orchards of Agassiz, at the close of 1895, were as follows :—

Apples .....	508
Crab apples .....	28
Pears .....	154
Piums .....	176
Cherries .....	86
Peaches .....	159
Apricots .....	22
Nectarines .....	15
Figs .....	15
Quinces .....	5
Medlars .....	3
Mulberries .....	8
Nuts .....	25
	<hr/>
Large fruits .....	1,204
Small " .....	393
	<hr/>
	1,597
	<hr/>

Number of varieties of small fruits at Agassiz, B.C., close of 1895 :

Grapes .....	101
Strawberries .....	98
Raspberries, red and white .....	41
"    black .....	18
Blackberries .....	29
Black currants .....	23
Gooseberries .....	42
Miscellaneous .....	4
	<hr/>
Small fruits .....	393
Large " .....	1,204
	<hr/>
	1,597
	<hr/>

When the new varieties now on the way from Europe are added, the number will exceed 2,200 in all.

Peaches, apricots and nectarines have not yet given satisfactory results, although the trees usually come through the winter well and bear more or less fruit. Quinces and medlars have been tried for several years without much returns, the trees, however, are young, yet. The larger mulberries have produced excellent crops. Many varieties of nuts are under test, and most of them are doing well.

Some of the filberts have borne good crops for the past two years. The English and Japanese walnuts, the Spanish and improved varieties of American chestnut and a number of varieties of almonds are all making good progress and promise well for the future.

Orchards have been established on the bench lands up the sides of the mountain in rear of the farm at heights of 150, 500, 800 and 1,050 feet above the valley, all of which are doing well, and such locations promise to be better for fruit growing than the valley lands as they are not liable to become overflowed, and other conditions are more favourable at the elevations referred to.

## Agriculture and Colonization.

*By Mr. Carpenter :*

Q. What is your experience with regard to the people there? Are they taking advantage of your experiments and planting the hardier varieties?—A. You mean in British Columbia?

Q. Yes?—A. They are planting fruits very largely, but they do not need the hardier varieties there.

Q. In the North-west?—A. In the North-west the people are taking advantage of the knowledge they get from our experiments. They are saving their money and not trying to grow these large fruits, but are confining their attention to the small fruits which we have shown can be grown with advantage.

A large collection of useful and ornamental trees and shrubs are also under test at Agassiz, in forest clumps to determine their value for timber, and in ornamental groups to show their value in beautifying the landscape. More than 600 species and varieties are thus under trial.

In some of the interior districts of British Columbia the climate is much less favourable than it is on the coast. To such localities sample packages of young fruit and forest trees have been forwarded for test, so as to encourage settlers in this work and at the same time gain useful information as to the hardiness of the different varieties in the various climates which prevail in different parts of that province.

As at all the other farms useful lines of experimental work are carried on in connection with the cultivation of all sorts of cereals, roots and fodder crops, also with breeds of cattle and swine. At all the farms many experiments are conducted every year with different sorts of vegetables and flowers and thus we are helping every branch of agriculture, horticulture and arboriculture.

### THE DOMINION EXPERIMENTAL FARMS AS REGARDED IN EUROPE.

In other parts of the world, the useful and practical work which is being done at the Experimental Farms in Canada is attracting attention. Not long since I received a letter from a Russian count in Moscow, who is president of the Imperial Agricultural Society there, asking for all particulars concerning our Experimental Farm system in Canada, which were furnished him. Last summer we had a visit from one of the Imperial Councillors of Russia, who inquired very carefully into the work of the farms here. Yesterday I received a communication from this gentleman, Mr. Niemitz, in which he desired to know when these Experimental Farms were established, the cost of the buildings, fencing, etc., how much the Government paid annually to keep the farms going, how many officials and employees there are, etc. He wants to get plans of the farms, and says, "I am intending to give a full description and illustration of these institutions in my report, as we likely will establish Experimental Farms in Russia, after the pattern of yours."

I thank you, gentlemen, for the very kind hearing given me to-day during the presentation of the facts which I have had the honour to bring before you, and I hope the information given will be found useful to the country.

Before sitting down I desire to call your attention to preserved samples I have with me of two or three new cross-bred varieties of raspberries which fruited last year at the Central Farm.

*By Mr. Carpenter :*

Q. I was unavoidably absent when you commenced your address in which you dealt more particularly with barn-yard manure. Possibly I will find the answer in your report, but at the risk of repeating it, I would like to ask what has been your experience as to the better methods of applying. Will I find it in the report?—A. Yes, but I may briefly state, we have found that if applied to the land fresh from the barn-yard, we get on the whole the best results, and ton for ton this appears to be equal in effect to rotted manure.

Q. Scattered on the land?—A. Yes. Scattered on the land and ploughed under immediately.

Q. But you cannot do that during the winter season?—A. In the winter season we spread as much as we can. If the conditions are not favourable for scattering on the land, it is carted out and left in small heaps, so that it will not undergo fermentation to any extent, and the sooner it can be spread and turned under the better the results are. That seems to be the more economical method of handling barn-yard manure. I was pleased to learn to day that Mr. McMillan has tried some experiments in that way, which corroborated the results we have had at the Experimental Farms.

Having examined the preceding transcripts of my evidence on the 27th February and 5th March respectively, I find them correct.

WM. SAUNDERS,  
*Director Dominion Experimental Farms.*

---

COMMITTEE ROOM 46, HOUSE OF COMMONS,  
Tuesday, 10th March, 1896.

The Select Standing Committee on Agriculture and Colonization met this day at 10.30 o'clock a.m., Dr. Sproule, Chairman, presiding.

Mr. A. G. GILBERT, Manager of the Poultry Branch at the Central Experimental Farm, was present by request, and on invitation addressed the Committee as follows:—

PROGRESS IN POULTRY RAISING.

Mr. Chairman and Gentlemen of the Committee:—Let me express the very great pleasure I have in again meeting you and in telling you that the poultry interests of the country have made marked progress since I last had the honour of appearing before you. I have with me a number of letters, which have been tabulated and I ask you to allow me to read them to you in order to show the rapid development that has taken place in this industry. With your kind permission then, I will lay the following facts, in connection with the development of the poultry interest, before you this morning, giving the causes which have to a great extent led, and are leading, to that development. You may say, if the poultry interests are of such paramount importance to the farmer that it is strange the fact has not forced itself upon the attention of the agricultural community ere this. But the same may be said of the Dairy Department, for it is only of recent date that the value of the cow as a winter, as well as a summer, money-maker, has been realized. It is no doubt yet fresh in the memory of the many practical gentlemen present, when the cow went into winter quarters dry, and remained a non-productive agent until the warm spring weather started the growth of the succulent grasses, which in turn created a flow of milk. But by means of silos, green food is now artificially preserved and fed to the cow in winter, and in combination with comparatively comfortable quarters and intelligent management, that animal has been made a mighty revenue producer. The hen, in most cases, is the same neglected agent that the cow was, but her merits as a great winter revenue producer are being recognized, and it will be part of my very pleasing duty to-day, briefly to prove to you from practical sources that wherever she has been properly housed, fed and managed, that she has richly rewarded, in egg production, the proper treatment received.

In recent years, we have been told that grain can be made more valuable by feeding it to live stock, because in so doing you fatten the medium to be sold at a profit, while you enrich the soil with the manure, so making money in both ways. We claim there is no better way of making cheap grain valuable than by feeding it to poultry. (Hear, hear.) Let me prove that to you by reading a letter from Mr. W. B. Steele, of Calgary,

## Agriculture and Colonization.

dated 19th November, 1894. He says:—"I received one of your pamphlets the other day, and found it just what is wanted by any one keeping poultry \* \* \* \* Where can I purchase a mill for cutting green bones and what is the cost of them? I am wintering 65 hens \* \* \* \* I feed barley. I wintered about the same number last year and fed barley altogether, and have never been without some eggs since this time last year. My barley netted me \$1.50 per bushel, feeding to the hens when the price in town was 35 cents per bushel. This, notwithstanding that eggs were cheaper last winter and spring than I ever knew them to be here. At present they are worth 35 to 40 cents per dozen. I always browned the barley in the oven before feeding."

Now this is certainly strong evidence. Here is a gentleman in Calgary who says that barley was worth in that town 35 cents a bushel, and he made it worth \$1.50 a bushel by feeding it to his hens.

*By Mr. McGregor :*

Q. Why would he brown the barley?—A. Well, I think it is very good to do so. I think it is better in the case of grain to brown it in cold weather, as it takes the very cold chill off, and I think it is also rendered more digestible.

*By Mr. Carpenter :*

Q. I think Mr. Steele ought to have stated the number of eggs produced, the quantity of barley consumed and the price the eggs sold for at the different seasons of the year. That would be very much more satisfactory to this committee. I cannot say that I approve of that letter altogether?—A. I give you the letter just as written by himself. You can put your own value upon it. At any rate, I am warranted in saying, according to his statement, that when barley was worth 35 cents a bushel, he made it worth, by feeding it to his poultry, a great deal more. If he has put on an exaggerated figure, you can reduce it and still have a very fair margin of profit.

*By Mr. Sanborn :*

Q. One of our farmers said he fed barley and his hens starved to death.—A. We would not feed barley at the Experimental Farm poultry house, as a straight ration. We might feed it occasionally varied with other grain, but we do not consider barley the best egg producing grain we have.

*By Mr. Wilson :*

Q. Can you tell us what your eggs cost you per dozen at the farm? Have you ever kept track so that you would know?—A. We can tell you what the egg production at the close of the season cost.

Q. Well, you can easily put that into dozens?—A. But we have many different experiments going on at the same time. It is a matter of importance to find out wherein some breeds fail to produce as much as others. Let me explain it in this way: take the Asiatic breeds, viz., the Brahmas, the Cochins, the Langshans and the American breeds, the Plymouth Rocks, and Wyandottes, in comparison. The food which would go into eggs in the case of the Wyandottes might make the Brahmas so fat that they would not lay at all, and so the Brahmas would be non-productive while the others would pay well. It would be very hard to arrive at a conclusion as to the price of eggs per dozen in cases of that kind. And while it is certainly very valuable to find out the difference—the egg producing difference in the different breeds, there are other differences just as valuable to find out. For instance, I find out that certain grains will go into flesh in the case of the Wyandottes, which will go into fat in the case of the Plymouth Rocks, and that is a very important difference. It does not matter so much to the man who is selling what he gets his weight in, but it is a matter of some moment to the buyer whether he gets his weight in flesh or fat. Fat would be so much waste. There is a point we have to look at in the matter of difference in

breeds. It is what they thoroughly understand in England and France, where they rear and fatten poultry for market. It is important to ascertain, if possible, which is the best flesh-producing ration, rather than a fat-producing one.

PROFITS FROM WINTER LAID EGGS.

A moment ago, I mentioned as an inducement to the farmers the wide margin of profit to be had in feeding cheap grain to poultry. Let us look at another inducement in the high prices paid in our large cities for new laid eggs in winter. The gentlemen of the Committee may remember my quoting, last year, some high prices which were obtained at certain points, so I produce the following proof, on the present occasion of the correctness of my statements, with all the greater satisfaction.

On December 4th of last year I received a letter from Duncan Paul, a farmer of Lachute, in the province of Quebec, near the city of Montreal, saying that he was getting at that time—in November—40 cents per doz. for new laid eggs. It may be remembered that the winter opened in that section with very severe weather. Now, here was a farmer obtaining 40 cents per dozen for new laid eggs, at that early season, because he had read up and studied the best methods of getting eggs at that time. If you asked him how he managed to get the eggs, for which he received the high price, so early, he would probably tell you that he had weeded out all his old hens; that he had carefully attended to his layers—probably yearling hens—during the months of August and September, so as to have them over their moult at an early season; that his pullets were all of early hatch, so that they would make early layers; that he knew what were the cheapest rations best calculated to make the egg and egg shell. As a result, he began to reap the high prices of the November city market.

Why, you ask, did not other farmers in his locality do likewise?—Because they probably lacked the knowledge of the proper methods how to get the eggs. Perhaps they lacked the necessary information or it may be they were not enterprising enough.

You ask me then, “How can you best convey instruction to the farmers?” I answer, by disseminating knowledge of the latest methods of management and the best egg-producing rations, in the shape of short reports, bulletins and circulars. I find, when I go among the farmers, that the bulky blue books are not generally read by them. Here is a circular that I got out last spring, at the request of the Directors of the Montreal Exposition. It is short and in concise form, and entitled: “How to get eggs in winter. Information for farmers.” It was in great demand and was extensively circulated. It is the gist taken from my Experimental Farm reports for some years.

*By Mr. Girouard:*

Q. Was it translated into French?—A. Yes. And the demand for the French copies was very great indeed, so much so that I think the whole edition in that language was run out. The circular was not only short but it was also valuable, because it gave to the farmers nothing but what they could begin at once to put into operation and carry out beyond any doubt of success.

I have also found that while the distribution of literature has done much to interest and instruct the farmers, that the greatest good has directly followed addresses delivered in person, at different points in the country. Some of these addresses have been given in the presence of several of the honourable gentlemen now present who heard the instructions given, saw how they were attentively listened to and what effect they had.

When I say that a large trade in new laid eggs in winter at high prices was the immediate and direct result of many of these addresses, you may think I speak strongly, but I will give you proof for what I state, in the following letters from the parties themselves. I do not wish you to think that I am blowing my own trumpet, but I want the committee to see the results of the experimental work carried on by myself at the Experimental Farm for some years, and the direct results of the experience gained and conveyed in the addresses given in different constituencies.

## Agriculture and Colonization.

I begin near home, by stating that about a year ago last February, I had the honour of addressing largely attended meetings of farmers in Pakenham, North Lanark, at which the honourable representative of the county, Mr. Bennett Rosamond, was present, and who presided at the evening gathering. The result of the information given at the two meetings was that I was met at the railway station next morning, as I was waiting for the train, by Mr. McArthur, a farmer, who said he was convinced from what I had stated that there was money in eggs, both in winter and summer, and he asked me if I could get him a customer for new laid, non-fertilized eggs during the summer in Ottawa? I said I doubtless could, if he would call on me when next in the city. He came to Ottawa, and I introduced him to Mr. Bate, of H. N. Bate & Co., one of our leading grocery firms of the city, in the following way: "Mr. Bate, you have a superior class of customers, who, no doubt, desire and are willing to pay for a superior article. Allow me to introduce to you a farmer, Mr. McArthur, who has the superior article and after he has so proved it to you, I think you will give him a superior price." They made an arrangement and the following letter, at the conclusion of the summer's business, from Mr. McArthur, tells its own story. I think it is well to add these proofs because, coming from the farmers themselves, they are stronger evidence than a mere statement from myself. I may say that I had written to Mr. McArthur to ask him how the business had progressed, as it was of some importance to me to find out whether or not my statements had been borne out.

His reply is as follows,—“Pakenham, November, 11th, 1895. Our dealing with Bate & Co., has been very satisfactory. They gave us more than the market price. Mr. Bate said he was well satisfied with the quality of the eggs we sent.”

The price he received, I was afterwards told, was 16 cents per dozen, being 4 to 5 cents per dozen higher than the market price, because his eggs were non-fertilized, new laid, and had a superior flavour.

As another result of these meetings, Mr. David Moir, a director of the North Lanark Agricultural Association, went into the business of collecting new laid eggs in winter, from the farmers of the districts surrounding Almonte and Pakenham. He shipped them to a dealer, whose name I had sent him. This dealer had told me that he could handle any quantity of new laid eggs guaranteed by me as such, and make ready sale of them. The immediate result was the development of a large winter trade in new laid eggs. Another result was that farmers got money directly into their pockets. Following the instructions given in my addresses, their hens produced at a time when heretofore they were non-revenue producing.

I let Mr. Moir tell his own story as follows:—“Almonte, December 26, 1895. I take this opportunity of informing you that since you addressed the Farmers' Institute meeting in Carleton Place and later in Pakenham, about a year ago, you have awakened the lively interest of the farmers as to the better care of their poultry, and the getting of eggs in winter. There has been more money spent in lumber and felt paper, this fall, for improving poultry houses than there has been for the last five years. Your visit to Almonte and Pakenham this winter, has also started them up to greater vigour. Your remarks set them thinking, and very often lively discussions are carried on at threshing bees and other similar gatherings. Mostly all agree that this is a part of farm work that has been neglected. As I go my rounds gathering eggs, I am requested on all sides to try and procure some literature treating of the management of poultry so as to get eggs. I would take it as a great kindness, if you would send me some literature on poultry that I could distribute among the farmers in this section. I think it would be a great boon to this country if the Government could see fit to appoint a man over the poultry department with the same privileges to develop it as the Dairy Commissioner has over his department. The hen is to-day where the cow was 15 years ago, and that should not be. We should be able to put our poultry and eggs on the English market in the same condition as our cheese. It can be done, but we farmers must be educated on the subject before we can accomplish it.

“Yours truly,

“DAVID MOIR.”

I may state that Mr. Moir was started in this work of collecting eggs, as the result of the meetings which I held, and he has been able to work up a large business by shipping eggs in winter and getting paying prices for them in the markets of Ottawa and subsequently of Montreal.

You will see by his letter that the demand for literature, as to the care, feed and management of poultry followed the meetings, showing that the addresses stirred up an interest in and caused a demand for literature hitherto unappreciated. The farmers were also started thinking, then discussing the merits of the question and acting. The cost to the country of these meetings was about \$4.50. At that small expenditure I attended three or four meetings, with the result that thousands of dollars are now being put into the pockets of the farmers, which did not go there before. I may say, that Mr. Moir developed such a new laid egg trade that he supplied two or three retailers in Ottawa and then shipped to Montreal. He follows the plan of having the farmers from whom he obtains the eggs stamp their names on them, so that if there is a bad egg in the lot, he can trace the person from whom he got it without any difficulty. I have here samples of the eggs produced in that district, and which he ships to Ottawa and Montreal.

In addition to what I have just stated, let me show what another address did. Previous to the North Lanark meetings, I was invited to address the Ontario Poultry Association, a large and important body, upon the occasion of their great annual show and meeting, at New Hamburg, Ontario. I gave a short address in the afternoon and another in the evening. The account of the meeting was published, in the official report of the association, some time after and widely circulated. Later on I received the following letter :—

“OSHAWA, 19th December, 1895.

“SIR,—I have been reading the annual report of the Ontario Poultry Association, and see your name there and what you say. I thought that by writing you, you might be able to inform me where I could make a good sale of fresh eggs, guaranteed not to be over six days old, when shipped. I have a good number of fowls, and all good layers. The eggs will be of various sizes, as I have White and Brown Leghorns, White Rocks and Golden Wyandottes. I would be able by the end of the first week in January to supply a case of 30 dozen a week. I attend to them myself, and every egg is brought in each day, and often I gather two or three times a day during cold weather. If I could find a person who would take them all the season at a set price, say from April to the end of laying time, can you, therefore, give me the name of a good reliable person who would remit every two or three weeks, and I would be pleased to ship either to Ottawa or Montreal.  
“J. W. SMITH.”

In response, I told Mr. Smith to ship to a certain firm in Ottawa who paid him 30 cents per doz. As he had more eggs than this merchant could take, I told him to ship to another party. He did so with the following satisfactory results as told by Mr. Smith.

“Bate & Co. want me to ship them weekly and at the end of the month to send in my account.” And so Mr. Smith secured a steady customer, and no wonder, when he could ship such eggs as these (sample of eggs shown). Meanwhile the first party had wired him to send 30 dozen eggs instead of 15 dozen. Here was an Oshawa man put in the way of a large business, the direct result of my address at New Hamburg, before the Ontario Poultry Association. And now, at the risk of wearying the Committee, let me draw your attention to another result of the same address.

It is a letter from Mr. J. B. Griffiths, as follows :—

“THORNDALE, ONT., 9th December, 1895.

“DEAR SIR,—I have read your paper given before the Ontario Poultry and Pet Stock Association and from it judge you can give information regarding paying markets for absolutely fresh winter eggs. About 40 or 50 dozen per week, possibly more. Eggs of the very best quality. No cocks running with hens.

“Be pleased to hear from you soon.

“J. B. GRIFFITHS.”

## Agriculture and Colonization.

In reply, I suggested trying Toronto firms, as he was so much nearer to that market. But on the 6th January, after, I received the following:—

“THORNDALE, 6th January, 1896.

“DEAR SIR,—Your kind favour of 14th ult. received. I have made several inquiries in Toronto and find the best I can do is 30 cents per dozen. I see by *Montreal Witness* that fresh eggs are quoted in Montreal at 55 to 60 cents per doz. Montreal prices are double Toronto and the difference in shipping would not be five cents per doz. more to Montreal than to Toronto.

“J. B. GRIFFITHS.”

Mr. Griffiths then asks for the names of reliable Montreal firms who pay a fair price for a first-class article. Having thus received a request for the names of Montreal dealers I thought it best to find them out. I knew high figures were paid in Montreal, but I wanted to be able to name the people to ship to and the prices to be received by my correspondents. As a matter of fact, I had to make my statement as to high prices good. So I went to Prof. Robertson, and I asked him if he could tell me of some good man in Montreal, who could furnish me with the names of the best family grocers. He mentioned the name of Mr. Thomas Shaw, commission merchant, Montreal. I wrote to that gentleman, and he answered that if I communicated with Messrs. John Robertson & Son, George Graham, Walter Paul, B. J. Smith, &c., they were likely to handle any quantity of new laid eggs that I could get for them and give good prices. I at once wrote to them, and in reply I received letters which I will read to the Committee just to show the prices that were, and are paid.

The first is from Mr. George Graham, family grocer, 2448 St. Catherine Street and 79 Drummond Street, Montreal. He says:—

“Re yours of 14th inst., am not in a position at present to receive a supply of new eggs, as I have on hand more than I can handle, beside it is rather late in the season to guarantee high prices. The scarcity of eggs is during the months of November, December and January, when, apparently I cannot buy at 40 cents and 50 cents per doz. enough to meet my demands. A greater quantity on the market during the above months would certainly be most beneficial.”—George Graham (per B. J.)”

\* The next is from Mr. Walter Paul, family grocer, 2355 St. Catherine Street, Montreal. He says:—

“In reply to your favour of 14th inst., I may say that I sell a quantity of real fresh eggs. I have arrangements made with a number of the best henneries and farmers in the country for supply. I am paying at present from 25 cents to 30 cents per dozen for the best. Earlier in the winter I was paying as high as 50 cents per dozen. Would be glad to see some of the best eggs your friends can produce.”

Now, here is a retail merchant paying the farmer 50 cents a dozen for winter eggs, and he had to make a profit afterwards, so that the price quoted in the Montreal papers as 50 or 60 cents per dozen, was none too high.

I had a third letter from Messrs. John Robertson & Son saying:—

“In answer to yours of 14th inst. We thank you for taking the trouble to give our name to your friends. We are at present paying twenty-five (25) cents per dozen for new laid eggs delivered here.”

Having received such undisputed authority, I was in a position to inform my correspondents of the great market for a good article, which Messrs. Walter Paul, John Robertson & Son, George Graham and B. J. Smith, of Montreal, afforded them. I at the same time impressed upon them the fact that their goods must be of the very best quality and thus they must exercise the greatest care in order to secure as permanent customers the merchants named, who were giving the highest prices. I told them plainly that before I would guarantee their goods to be of the quality desired, I would require their promise that they would do their best to have them so, by carrying out my instructions; and they did. The results proved that the statements I had made as to markets and high prices were not exaggerated.

I subsequently delivered an address at Cobourg, which was followed, as in other cases mentioned, by inquirers as to markets. The inquirers were referred by me to the Montreal merchants. The following letter from Mr. H. W. Laird, of Cobourg, shows the result of his sending a shipment of eggs to Mr. W. Paul, of Montreal. The letter is addressed to me and says:—

“DEAR SIR,—In pursuance of your request I have this day sent Walter Paul, half a case of eggs, the production of my own poultry yard, which I am sure will give satisfaction. I write him to-day stating I will send him a weekly shipment if he does not object, and will leave it to him to give me the highest price he can. I guarantee the eggs are unfertilized, fresh eggs.

“I had a letter from him stating that 30 cents was the highest he was now paying. His letter virtually stated he was open to purchase, so I sent them on.”

“H. WILLOUGHLY LAIRD.”

Thirty cents per doz. on the 25th February, nearly the first of March, is a very good price for eggs. I also wrote to the Thorndale man and told him of the Montreal market. He replied that he had written to Fraser, Viger & Company, of Montreal, according to my instruction, and received word that they were getting all the new laid eggs they could at 25 cents. His own words are:—

“I have been shipping to Fraser, Viger & Co., and received word from them that at present they could give 25 cents for new laid eggs. I have been shipping to Macshillie Bros., Toronto, but I believe the Montreal market is enough better to pay well the extra express rates. I shall make further inquiries of the other merchants you speak of.”

“J. B. GRIFFITHS.”

Here is another result of the Cobourg address in the shape of a letter from Mrs. Allan, of Cobourg. She says:—“We are shipping to Montreal at the rate of 15 dozen per week, but could ship double that quantity if we had a customer,” I referred Mrs. Allan to I. G. Robertson & Son of Montreal.

Now what do these letters prove? That the result of the Cobourg address was the opening up of another large egg trade direct with the Montreal market. I have other letters to further show what the address at New Hamburg and other addresses in different parts of the country have done in developing trade, but I will not encroach on your patience by reading them. Suffice it to say that since I last had the pleasure of appearing before you last year, that a large new laid winter egg trade has been opened between certain districts in the country and the Montreal and Ottawa markets. The districts, I may say, where I have been able to reach the farmers. As a result of instruction and information, I can say that the farmers in the districts surrounding this city (of Ottawa) and I may say in the Ottawa valley also, are beginning to realize that their mission is to supply the large cities with new laid eggs in winter, the season when high prices are to be obtained.

#### POULTRY PRODUCTS IN THE MARITIME PROVINCES.

I also had the honour of appearing before the Farmers and Dairymen's Convention in Fredericton, New Brunswick, not very long ago, and I found there was a great demand for new laid eggs in St. John city at high prices. Here is an extract from a letter written to the *Co-operative Farmer*, of Sussex, by Ernest H. Turnbull, of Aldershott, and what he states is well worthy of attention. He heads his letter, “Home market,” and he says:—“Eight years' experience as a farmer striving to produce the best eggs and best cream, and to market them in the most profitable way, together with nearly a year's experience in running a dairy store in St. John city, has led me to believe that for years to come the home market will be a good one for every farmer who produces the best and puts it on the market at the right season. This last

## Agriculture and Colonization.

week (third of January) I have paid 30 cents per dozen for eggs guaranteed laid during the week, and my own eggs for a number of years past have brought 40 cents a dozen from November to January."

I also had the honour of appearing before the St. John Board of Trade about the same time, and I found that the question of poultry and egg development in New Brunswick, for export, was receiving the attention of the merchants of that city, and that they considered the instruction of the farmers, in connection with the subject, one of very great importance and which should be attended to immediately.

In Nova Scotia the winter price of eggs was from 30 to 35 cents per dozen. Major Clarke, of Dartmouth, writes that, "they look upon the development of the poultry and egg trade of Nova Nova as a means of making money for the farmers, who have too long neglected that branch of agriculture."

In British Columbia I find that prices are high. A lady correspondent writes in December last saying, "New laid eggs (I mean local eggs) have been 50 cents per dozen for the last six weeks."

In Manitoba the price was about the same. The *North-west Farmer* of last February says, "A great interest is now being taken in poultry farming. Hundreds of our people in Manitoba and the North-west have decided to raise a flock of turkeys the coming season." Egg production is now receiving a great deal more attention than heretofore.

In Western Ontario the price of 25 cents per dozen retail prevails. I have shown you what the winter prices are in Eastern Ontario and Quebec.

I have attempted to show you what I have been doing in the way of developing the poultry interests, in a very limited way I have tried to show you how with systematic effort, a little assistance and the proper means, that trade can be developed to an enormous extent without going outside of our home markets. What I have stated are facts that I have collected, and I have taken the liberty of laying them before you, in order to show you the possibilities of this field of enterprise. I think that last year I impressed this fact upon you, as one of the great inducements to the farmers to go into egg production, in order to make money out of their poultry; I do not ask the farmers to invest much capital in putting up expensive buildings, or in tearing down this or that building, I simply say to them, "make your non-productive agents, running about your barn doors, pay." They say, "How?" I tell them. And by following my instructions, I have shown you where thousands of dollars are now going into the pockets of the farmers—in the districts I have mentioned—which never went there before from the same source. You ask, "Did the farmers not know of this before?" I think I can say that in most cases they had given no practical attention to the subject, until I had spoken to them about it, and in so doing told them nothing but the truth as to markets and prices.

I find that one practical address from a practical man to practical men has more effect than scores of blue books. When I relate what I have done, in a comparatively limited way, in developing a large new laid winter egg trade, I do not wish you to think that I am blowing my own trumpet. I have simply been amazed at the wealth to our farmers there is in the development of this particular branch of farming. Surely I have given you, practical gentlemen as you are, enough evidence to convince you of the fact. I have read you a number of letters, some I have left unread, as I have stated, for fear of wearying you. It may have been going out of the common, in my so doing, but I had so many evidences of the rapid development of this branch of agriculture in my possession, that I considered it my duty to lay a few before you. I would like to see this industry pushed as it deserves, and as I am sure it will be, and it can only be successfully done by putting the farmer in possession of the necessary knowledge as to how and when to produce. I succeeded as I did, because I told the farmers nothing but what I knew to be facts. When farmers, after a meeting, came to me and asked, "can we really get such prices as you quote?" I replied, "produce your eggs and I will get you a market." And what will be the result of the comparatively little that has been accomplished? Instead of the few, there will probably be hundreds of farmers in this section alone

engaged next winter in the production of eggs. When eggs go up to 50 cents a dozen you cannot overstock the market in a hurry. I believe there would be a lot of profit in eggs at half that price.

*By Mr. McGregor :*

Q. Are you going on to speak about chickens or are you going to bring your remarks to a close?—A. I was about to glance over the experimental work of the past year, for 10 or 15 minutes if the committee thought it worth while.

Q. That is right?—A. Perhaps we have never had a more successful year in the poultry department at the Experimental Farm than during the last 12 months, and the reasons for this success are that the points I have been investigating have proved themselves to be facts.

#### HOW TO TREAT HENS TO OBTAIN EGGS IN WINTER.

I may mention some of them. First, to obtain eggs in winter you have to begin to properly treat the fowls in the months of June, July and August. How? say you. I reply that I have found that the hens must be so treated that they will get over their moult early, that is get their new feathers as quickly as possible. To attain that, you must treat the laying stock during the months of July and August in the same manner as you treat them when you are stimulating them to lay eggs in winter. Instead of the food going into eggs, as it will in winter, it will go into new feathers. The first symptom of the coming of the new, will be the liberal shedding of the old feathers. The next point to be remembered is that when your fowls do get their new feathers, they must not go into winter quarters over-fat. If a hen goes into winter quarters over-fat you will not get a satisfactory yield of eggs. You frequently hear persons say, "I cannot get eggs from my Brahmas, Cochins or Langshans." The reason is that they have been fed too generously in the fall and they have gone into winter quarters too fat. The same careful treatment must be extended to the Plymouth Rock, a fowl which is very liable to put on fat.

*By Mr. McGregor :*

Q. While on that point would you tell us what you would feed them with?—In July and August they run into green pasture, usually speaking, do they not?—A. I was going to touch on that a little later on.

#### EARLY HATCHING AND MOULTING.

*By Mr. McMillan :*

Q. Have you any statement to make with respect to the time your chickens are brought out?—A. I intended mentioning that also. If you want to have your pullets early layers, you must hatch them out early. You will get better results from pullets hatched out in April, if it is possible to do so, than from pullets hatched out at the end of May; in fact, if the chickens of some breeds are hatched out late in May, they will not lay until the winter is half over. The farmers should hatch their chickens so early that it will be possible to get eggs from the pullets when the old hens are moulting, and thus secure a supply of eggs all the year round.

When the hens are moulting, if handled properly, it will probably be at a period when eggs are worth as little as at any time during the whole year. What we do at the Experimental Farm in order to bring on an early moult, is this. At the end of June, as soon as the season for selling eggs for breeding purposes is over, we remove the male birds into a building by themselves, open the doors of the breeding pens and let the hens run into a field, so as to get the benefit of the grasses and the clover, which is a very important point. We let them run amongst the grass and clover for probably three weeks, and then we begin gently stimulating food. Meanwhile we have dropped all the generous food given during the laying season.

## Agriculture and Colonization.

Towards the end of July they are given soft feed three times a week and cut bone twice a week, taking care all the time not to feed them too much, in order to prevent fat. If your hens are not too old the response will be made in the shedding of the old feathers and the appearance of the new.

As soon as the hens have their new feathers, keep on with the same food, until they are shut in for winter quarters. Then begin to stimulate them still more, by feeding the cut green bone in small quantity every day, and dropping the soft ration to twice a week.

### BEST RATION FOR PRODUCTION OF EGGS.

We find that the best rations for egg production are the following:—Morning rations, —Warm mash, composed of ground wheat, ground oats, ground barley or ground rye and bran. A little of all sometimes, and again only three of the ground grains. Enough of this fed to *satisfy* but not to *gorge* the hens. Noon—A little grain of some kind to keep the hens busy scratching. Afternoon—A liberal ration of wheat or buckwheat, mostly the former. Then varied so as to sometimes feed the cut green bone in the morning and immediately throw some grain into the litter to start the layers scratching.

At other times we feed the cut bone in the afternoon, with grain afterwards so as to fill the crop completely. Then again we vary so as to feed the grain ration at noon the object being to keep the hens busy, for the important point at all times is to keep the fowls actively searching for their food from the time of the morning ration until they go to roost at night. The philosophy of keeping the hen busy is this. She should fill up her crop in the natural way, or, as she would do when at large. Let me illustrate what I mean in this way. Say, a hen is running at large and there is a ton of wheat before her at a certain point. She won't fill her crop with the wheat at once. She will pick up a few grains, leave it and run to probably catch a grasshopper; then she takes a ramble into your neighbour's flower-garden and nothing will apparently please her better than to scratch up all the flowers, in her search for worms. Then she will take three or four more kernels of wheat and a large amount of green stuff, then pieces of grit, lime, &c., and in this way she will fill up her crop gradually with all the essentials to make egg and eggshell. Now, it is our object at the Experimental Farms to imitate the action of the hen, while at large, in our winter treatment of her. We try to keep her busy from the time of the morning to the afternoon ration and allow her to fill up her crop gradually.

*By Mr. Semple :*

Q. Is corn a good ration for fowl?—A. Yes, for the Mediterranean or Black Spanish class.

*By Mr. McMillan :*

Q. Do you ever feed your fowls with boiled roots? A. Sometimes we do. That is a very important point. Nothing will conduce to the health of the fowl so much as a boiled vegetable ration occasionally. In fact the practice should be to reduce the more expensive grain rations and give more green stuff. We have sometimes boiled small potatoes and turnips. We have given mangels in quantity.

*By Mr. McGregor :*

Q. Did you supply them with cabbages also?—A. Certainly, as long as we had them. We suspend them from the ceiling by a string and make the hens exercise in jumping for the cabbage. The response to the rations I have mentioned was the laying of 934 eggs in December.

Q. From how many fowls?—A. There were perhaps 120 to 160, but amongst that number there were old hens that we had to keep for sitters, and others that we had to keep for breeding stock.

Q. Can you give us the results from some good farmer, who has experimented on the lines that you have laid down?—A. I can, if the committee will allow me to read a letter from a farmer on this very point.

Q. That is just what we want; the evidence of some thoroughly practical man?—A. I make it a point to write to people I know to be successful producers on our lines of feed and management, with a view of finding out what they are doing.

This is a letter from Mr. Henry Lathe, of Lacolle, P.Q., under date December 24, 1894. He says:—

“I have shipped eggs continuously every week, or oftener, for four years, commencing November 28, 1890, to one man in Montreal, receiving from 15 cents to 40 cents per dozen, and in some instances as high as 45 cents. I have sent him since January 1st, 1894 to the present time (Dec. 24), 8,092 dozen of eggs, about half of which I have produced on my two places, and the rest have purchased from reliable farmers, weekly. I received 30 cents per dozen during October, and my customer wrote me, about the middle of November, that he had advanced the price to 40 cents for that month. It cost me about 22 cents per 30 dozen crate to express them and that is all the deduction.” I may say that he has two places at which there are 350 at one, and 300 fowls in the other, or between 600 and 700. What eggs he is not able to produce he purchases from reliable farmers. He goes on to say:—“As the year is yet incomplete I send my account for 1893. My 1894 showing will not be quite as good, though fairly satisfactory. January 1st, 1893, I started with 285 hens including about 100 pullets of the previous spring's hatch. The result was

2,634 dozen eggs sold for.....	\$570 61
100 cockerels sold for.....	22 55
85 pullets raised, at 40 cts. each.....	34 00
Total .....	\$627 16

Or a fraction above \$2.20 per hen. In addition to this no account was made of eggs used in my family of four, and we occasionally killed a bird and lost a few, so that our average number was not likely over 270 or 275 at most. My showing on the other place was not quite as good, the man carrying it on not having had much experience.”

It appears that he had the same experience with his man that a good many of us have had. We often come across a man who after a little experience knows more than the old hand about the business and it is the hardest work in the world to get such a man to do what you want. The less he knows the more he thinks he knows. As a result it is difficult to get him to see the necessity for the little essentials which are all important in the production of eggs. Mr. Lathe goes on to say, “At present I am caring for about 350 hens and there are on my other place about 300. We have Black Min. rcas from eggs set May 30, now laying.” That was on the 24th December.

I was not exactly satisfied, so I wrote to him asking what he calculated was the cost of a hen per year.

In reply he says: “After repeated tests I am quite satisfied that 90 cents is the maximum where there is no needless waste and by purchasing your stuff in large quantity. By the free use of vegetables, the cost may be reduced to 80 cents or perhaps to 75 cents.” Now, I have always put the cost of a hen per year when I have made such a calculation before the Committee at \$1, but here is the statement of a practical man, who is making lots of money out of his hens, and he puts down the lowest cost at 75 cents per head per year. He continues: “I am feeding daily eight cabbages and more than a bushel of carrots,” and he adds a postscript. “just after closing this, my boys, who were with me at the farm, came in with 82 eggs, and urged that I report, so to please them I do, 34 of the number were from two flocks of pullets. Since writing you before I have received for eggs sent in November a cheque for \$108. Eggs sent 270 dozen, 129 dozen purchased, the rest produced. I shipped 90 dozen last week. Who can say poultry does not pay?”

I do not suppose he ever intended his letter to be read before you, but as Mr. McGregor asked for some information from a practical source, I am glad to have the letter with me in order to comply with his request.

## Agriculture and Colonization.

*By Mr. McMillan :*

Q. I would suggest that you take a flock of hens, 70 or 80, and treat them in such a manner as a farmer would treat his. In this way you would have the opportunity of giving us, at the end of the year, the result in the amount of feed used, the amount of pullets raised, and the number of eggs produced, &c. You could breed from the same class of hens as a farmer has to use in keeping up his stock. That would be a good experiment?—A. Certainly.

### COMPARATIVE MERITS OF DIFFERENT BREEDS.

*By Mr. McGregor :*

Q. What kind of hens would you recommend for the general farmer?—A. I would certainly recommend as the most satisfactory fowls for the farmer, White Plymouth Rocks, Silver laced Wyandottes, White Javas, the Langshans, and it may be the Brahmas, when they are under two years of age.

*By Mr. Sanborn :*

Q. Do you consider the White Plymouth Rock better than the Barred?—A. It has this advantage, that when the cockerels are plucked for market, the white pin feathers do not show as much as the dark pin feathers do in the Barred variety, and I would give the preference for that reason to a white fowl; I think a farmer will have a better market for a white bird dressed. The tendency of the age is to give a better price for a better article, but the article must be inviting in appearance.

Q. Are they about the same in making weight?—A. Yes, the cockerels make about the same development. Of course, when we talk of a fowl bred for farm purposes, as Mr. McMillan has mentioned, I do not mean one bred for show purposes. The ambition of the showman, while he has certainly to breed up to standard weight, is rather to breed true to a certain type and feather at the risk of inbreeding. What the farmer wants is a breed that will lay the most eggs and make the largest chickens. I do not mean to insinuate that some types of thoroughbreds do not make good fowls for the farmer, for I have just recommended certain breeds of thoroughbreds.

*By the Chairman :*

Q. Does not the Plymouth Rock lay a small egg?—A. That depends upon the strain and condition the fowl is in. I intended to draw your attention to some of these eggs that are exhibited on the table. Perhaps you will allow me to do so now. Here are the Barred Plymouth Rock eggs, and here are the White. I have eggs here from all the different breeds of fowl we have on the farm.

*By Mr. Semple :*

Q. What are these?—A. These are Black Minorca's eggs.

Q. Are the Black Minorcas good layers?—A. They lay a large egg and a number of them. I brought into the city two years ago for exhibition 5 dozen Black Minorcas' eggs, many of which made 6 to a pound and all of them went 7 to a pound. These go 6 to a pound except one-quarter of an ounce. There is no reason why the farmers' fowls should not produce just as large eggs for the market, if they will only keep the breeds which lay them.

*By Mr. Boyd :*

Q. Have you any record of the average number of eggs the different breeds yield in a year?—A. We have our record for every day and month of the year.

When you ask me which are the best breeds for the farmer, I base my statements on calculation made from our records. The Black Minorcas are one of the greatest layers in the world. Under favourable conditions, they lay two hundred eggs per year, and it is characteristic of the breed to lay large eggs.

Q. Are they better layers than the white Plymouth Rock?—A. Yes, but they are not the same table fowl. They are essentially egg producers. You have a like difficulty in getting the general purpose cow. It is hard to get a good milcher and beef animal combined, and so it is very hard to get a good egg layer and a good table fowl in one. But we get very near it in the Wyandotte, though the Wyandotte does not lay as large an egg as the Black Minorca.

*By Mr. Wilson :*

Q. Are these a fair sample of the eggs you produce at the farm, or have they been specially selected?—A. They are representative of what the fowls have been producing all winter.

Q. Then your production is good all along?—A. Yes, they are all good eggs. I aim to tell you nothing but what I do.

Now, here are the Silver laced Wyandottes' eggs and you see how they compare with the Minorcas. Probably it would take 8 of these eggs to go to a pound, but I had eggs from a strain of Silver Laced Wyandottes, owned and bred by a farmer near this city, that went seven to a pound. They were very fine large eggs and the fowls which laid them were large and vigorous. Here are eggs from the White Javas, 7 of which make a pound. The White Javas are among our very best layers.

*By Mr. McGregor :*

Q. Nine to the pound is the common egg weight, is it not?—A. Yes, nine to the pound is about the common weight. The Black Minorcas go 6 and 7 to the pound and the White Java 7 to the pound.

*By Mr. Cochrane :*

Q. What about the Plymouth Rock eggs?—A. They go about 7 or 8 to the pound. Here are eggs from another breed of the Black Spanish family, the Blue Andalusians. They lay a large white egg, but they are not a good table fowl.

*By Mr. Girouard :*

Q. Why?—A. Because they are egg machines. They are small and do not put on the flesh. Here are eggs from the Light Brahma. You see they are not nearly as large as you would think. Here are eggs from the White Leghorn, another egg machine. Perhaps the most important phase of this exhibit are the eggs which show what the farmers are producing for shipment. Here are eggs sent from Oshawa by J. W. Smith, one of the men who has gone in for developing an egg trade from his town with Ottawa. He is sending to Messrs. Bate & Co., and C. Moreland, of this city. I went into Moreland's on my way here and asked for a dozen eggs sent by J. W. Smith, in order to show the kind he is sending in. I got the eggs I am now showing to you. Here are eggs sent to Edgar of this city by Mr. David Moir, of Almonte. You will notice that the eggs are all stamped with the names of the farmers from whom they were bought. Mr. Moir purchased a large number of stamps and supplied his patrons with them. Every farmer puts his name on the eggs sold by him so that a stale or bad egg can be traced. The plan has taken immensely in the city where "stamped" eggs are now in great demand. Mr. Moir is working up an immense egg trade, owing to the superior quality of his goods.

*By Mr. Carpenter :*

Q. You were referring to some breeds or some kinds of fowl that were regular egg machines?—A. Egg machines; yes. By that I mean great layers.

Q. Are we to understand that they will produce a greater number of eggs during the year, and that they are of very little use for the table?—A. Yes, they are greater egg layers than what we call the flesh-forming breeds.

## Agriculture and Colonization.

Q. But they are no use for the table?—A. The eggs are larger and more numerous than those laid by the flesh formers, but they are not good table fowls.

Q. The eggs are larger?—A. Yes, the eggs are larger than those of the general purpose fowl.

*By Mr. Wilson :*

Q. I think you ought to be able to tell us what eggs can be produced for, by the dozen, all the year round, by hens kept as you have described and properly cared for?—A. That can be done by dividing up the figures of what it cost per year for each breed. We have every pound of food given and the number of eggs laid recorded every day in a book ruled off for the purpose. Will you let me go back again to the subject of the rations and I will try to explain. Egg-laying at the farm commenced in December, at which time we had 943 eggs, a very fair number. The hens were then all over their moult and the price of eggs was from 35 to 40 cents per dozen.

*By Mr. McGregor :*

Q. How many hens would there be?—A. There were 132 hens and 93 pullets, but many of these pullets were useless because they were late hatched, and as I said a little while ago, many of the hens were kept as breeders and sitters. I have not time to go into the whole of the details of management, but if incubators were used there would be no sitting hens required. In looking over my report you will see that a number of cross-bred fowls and a number of old hens were kept over for sitters. We used the cross-bred and the old hens as sitters, rather than the thoroughbreds. From the latter we sold in April, May and June a large number of eggs to farmers for hatching at \$1 per setting. In this way the thoroughbreds were made more valuable than by having them sitting. Another object was to have them produce at the time their eggs were worth \$1 per sitting. Returning to my figures I find in six months, from January to June, that the seven Silver Laced Wyandotte pullets gave 474 eggs, eleven Barred Plymouth Rocks 607, and 430 from eleven White Plymouth Rock hens. Some of the latter became broody. I will not weary you by going over all the figures, perhaps you will allow me to give the total for the year, viz. : 10,109 eggs.

*By the Chairman :*

Q. From how many hens?—A. From the number I have read to you. The above figures are not given to show what was done by the number named or the best that could be done under more favourable conditions.

I may explain what is meant by more favourable conditions in this way. In the number of layers given are included about 24 old hens and the mixed hens kept for sitters. As the warm weather approached the sitters became broody, and they were given eggs. At one time there were 40 hens, either with chickens or sitting on eggs. Other hens would become broody, and some time would elapse before they would be broken up and begin egg-laying again. Thus, the number of eggs was considerably reduced.

*By Mr. Carpenter :*

Q. I understand you to say that the 285 fowl, that is, 192 hens and 93 pullets produced 10,109 eggs for the whole year?—A. Yes.

Q. That is scarcely 40 eggs each?—A. But you must recollect many of these hens were useless for a large portion of the year.

Q. You see that would be a very light return.—A. I gave you the total number of stock I had on my premises but that does not say all were layers.

Q. You see according to my calculation there would be about 3 dozen eggs for each fowl and you estimate the cost at \$1 a year, so that that would scarcely pay their expenses. It is better you should clear up those points?—A. The above figures do not show what could be done under conditions more favourable. You must bear in mind

that mine is experimental work in which I have to meet with a number of failures, as well as successes, and sometimes the failures are as valuable and more so than the successes. If I am able to tell you how to avoid failure, that is very important. Let me try to explain.

In the number of layers given are included about 24 old hens and the mixed hens kept for sitters. As the warmer weather approached, the sitters became broody, and they were given eggs. At one time there were 40 hens, either with chickens or sitting on eggs. Other hens would become broody and some time would elapse before they would be broken up and begin egg-laying again. Thus the number of layers was considerably reduced. What would a farmer do under the circumstances? This is a very important point. He would keep a sharp watch on his hens and kill off the non-productive ones, or else they would certainly reduce the profit made by the active layers. If he had a non-sitting breed, he would have to keep a few of the sitting variety to hatch out his chickens, or he might have a small incubator and brooder. A farmer, you see, would be in a very much better position to get favourable results than I am. I have 14 breeds for experimental purposes, and have actually to find out their vices as well as their virtues. They are side by side and treated the very same. If the Black Minorcas develop feather picking, and a brood of Langshans, under the same conditions, does not, I make a note of the fact. Let me further explain. For instance, during winter I had in a pen 11 Brahma hens, which did not lay at all well. Alongside of them I had 10 Silver Laced Wyandotte pullets, which frequently layed 8 eggs *per diem*, most satisfactory results. Now, what was the cause of the difference in the two breeds? Could it be that the same food which went into eggs in the Wyandottes made the Brahma hens too fat? It certainly did so. And the Brahmas, being old hens, were predisposed to do so. Two important points are so made plain, viz.: that old Brahma hens do not lay—under the same conditions—as well as yearling and two year old Wyandotte hens, and that the food which went into eggs in the Wyandottes went into fat in the old Brahmas. While that valuable experience was being gained, yet the Brahmas counted in the number of laying stock. They were actually eating up much of the profit made by the Wyandottes.

It is the opinion of the majority of farmers that they can keep their hens until they are a very respectable age. We find it doesn't pay. Hens for laying purposes should not, we have reason to say, be kept over two years.

*By Mr. Cochrane :*

Q. I think it would be very satisfactory if you were to take a number of hens, say 150 or 200, put them by themselves, and treat them as a farmer would treat his hens. Show us how you would make money out of those hens, and you will have accomplished a valuable experiment?—A. I could certainly do so. All I want is the means. I have demonstrated what I am doing with the means at my command, and I have read letters to prove what practical farmers have done and are doing by following my instructions; and let me say at this stage, that the men who are collecting the eggs to sell, such as Mr. Lathe, Mr. Moir, and others, are practically developing an interest in poultry among our farmers, and are putting them in a way to get better prices than they ever got before. Each of these men as he goes his rounds is doing good work in his particular locality. It would be an easy matter for a farmer to put aside 50 or 100 hens and find out what they would produce from his standpoint. I am differently situated. For instance our buildings at the farm are so large that we have to use a stove, and I don't believe in stove heat at all for poultry. In my judgment it is enervating. Mr. Rosamond put up a house after the plan in my report of two years ago, and I understand it has been eminently successful.

MR. ROSAMOND.—I can testify as to the excellent results which have followed the building of the poultry house as planned by Mr. Gilbert.

*By Mr. Campbell :*

Q. What is the plan?—A. You will find it given in the report of the poultry department for the year 1893.

# Agriculture and Colonization.

## HOUSING SPACE AND YARD ROOM.

*By Mr. McGregor :*

Q. How many hens would you put together in one lot?—A. I would not keep more than 25 together in one pen.

Q. What size of pen?—A. I would put 25 hens in no less space than 15x12. I advise in my plan that the farmers utilize a part of the barn. The roosting room might be 5 or 6 feet high. Perhaps, not as much as that. The object is to conserve the animal heat of the fowls during the night, and at a time when the temperature is generally lowest.

Q. But close to the roof it is cold?—A. Not if the roof is low. The ceiling of the living or scratching room would, of course, be higher. An object aimed at in this house, besides economy, convenience and egg production, is the prevention of feather-picking and egg-eating.

Q. How much yard room would you give them?—A. I would give them not less than 20x50.

*By Mr. Boyd :*

Q. Referring to the answer given to Mr. Cochrane's question, do you mean that you have not at your command sufficient money to enable you to make the experiment which has been suggested?—A. No, not exactly, but I ought to have the conditions different from what they are now. I should, perhaps, have the fowls put into a house such as a farmer would have.

Q. What I asked you is, have you the means to carry out this experiment?—A. Yes.

Q. In that respect you are not lacking any funds to enable you to make experiments?—A. No, but still I do not think the poultry interests of the country receive that attention at the hands of the Government or of the Experimental Farm that they should.

*By Mr. Cochrane :*

Q. But if you made the experiment and demonstrated that the farmers could make money out of poultry you would receive recognition?—A. There is not a farmer who has followed out my instructions but who has found such a course to his interests. By experimental work we get results, and the Committee will well understand that it is no easy matter to carry on experimental work by which to find out the best and worst paying breeds of poultry, without means and assistance. Special preparations have to be made for certain lines of experiment, and due allowance must be made for failures as well as for success. I have a large amount of ground to cover throughout the year in the poultry department. Only those gentlemen who keep fowls can understand what has to be done in caring for, feeding and handling 300 or 400 birds, hatching out chickens, looking after them, &c., &c.

*By Mr. Boyd :*

Q. Do not misunderstand me. I am not finding any fault. I am merely asking for information.—A. I quite understand that, but I certainly require more assistance in developing the poultry interests of the country and in carrying on experimental work. If one man can do so much in the way of developing an egg trade in only certain sections, it stands to reason that a great deal more could be done with more help. I certainly need it and I want money also.

*By Mr. Cochrane :*

Q. Do you want more money to do the work we have been talking about?—A. I want more money to develop the egg trade of the country and more help in the

line of experimental work. What I mean to say in regard to experimental work is this, that if you are going to put 50 hens under conditions such as the farmer would have them, and obtain like results, you must put me in exactly the same position as the farmer in order to find out whether the experiment would pay or not.

Q. Then you would starve out?—A. Not at all. You cannot have been here at the early part of the meeting, when I laid before the committee facts and figures to show the money farmers are making out of eggs. There is not the slightest doubt about it, that a farmer can make money out of poultry, but I would not have a farmer keep more hens than he could attend to properly and with ease. If he has 50 hens let him make \$1 per hen profit. He will so make \$50 per year. The idea is to benefit the country rather than the individual. Now, according to the census return of 1891, there are 650,000 farmers in Canada. This is the way I would like you to look at it. If each of these 650,000 farmers were to make fifty hens pay one dollar profit per annum, that would mean \$32,500,000 to the farmers.

*By Mr. Sanborn :*

Q. Would not that be over-production?—A. There is no danger of that. The supply would regulate itself to the demand. As soon as the farmers found they were producing what they could not get profit in, they would drop it. I have been showing you that prices in Montreal go up to 45 and 50 cents per dozen in winter. The farmers could make money out of eggs at half that figure and it will take a large supply to affect such a market.

Mr. MCGREGOR.—After hearing Prof. Gilbert some time ago I got several dozen eggs and sent them to five different farmers. I asked them to make the same experiments that the professor was suggesting, and deduct the cost of the hens' feed from the profit. One man made 73 cts. during the year, another \$1.04 and another \$1.12 over and above the cost of the food per hen in a year. The next man only made 53 cents, but the average was somewhere about 78 or 80 cents per hen according to their figures, that is of these five farmers.

Mr. ROSAMOND.—I keep about 12 hens, 6 of them Silver Laced Wyandottes and I got in January between 150 and 160 eggs, and in February between 160 and 170.

Mr. MCGREGOR.—That is a good result, and I should like it to appear in the committee's report. Was that experiment carried out under the instructions of the Professor?

Mr. ROSAMOND.—Yes.

Mr. McMILLAN.—Are your fowls all of one age?

Mr. ROSAMOND.—No, some of them are pullets, some of them are one year, and some two years old. When they get two years old I kill them off.

Mr. SEMPLE.—Is there a stove in your building?

Mr. ROSAMOND.—No, there is no stove. It is built on the plan recommended by Mr. Gilbert.

Mr. CARGILL.—The figures you give are monthly?

Mr. ROSAMOND.—Yes.

Mr. CARGILL.—That is five to six per month.

Mr. ROSAMOND.—No—15 to 16.

*By Mr. Gillmor :*

Q. How long should a hen be kept, Mr. Gilbert?—A. The Asiatics such as the Langshans and the Brahmas and those of a kindred nature should never be kept over two years. The Mediterranean class should not be kept longer than 3 years. No fowl should be kept over 3 years. There is no profit in them after that age, as layers.

Q. That is where I made a mistake. I have over 50 hens, and we never get enough eggs to eat, but I have kept them for 20 years.—A. There is no profit, as I have said, in keeping any hen of any breed over two years.

And now, gentlemen, I have to thank you for your kind attention and your sympathy with my work. I have gone this morning perhaps a little out of the ordinary

## Agriculture and Colonization.

routine, but I was anxious, as I have said, to show you the development that has occurred through my unaided efforts in turning on a supply of eggs from certain sections to a large market. If any of you, gentlemen, have farmers in your constituencies who wish to get the price that Mr. Smith and others are now getting, if you let me know I will put them in the way of good customers.

*By Mr. McGregor :*

Q. Some farmers are troubled with hens wanting to sit too much. How do you do with them?—A. We put them in a room by themselves where there is no nest for them to sit on.

*By Mr. Rosamond :*

Q. You put her in a coop by herself?—A. Yes.

*By Mr. Carpenter :*

Q. I think there is a good deal in the experiment suggested by Mr. Cochrane and Mr. McMillan of putting 50 to 75 hens apart and keeping an account of the food and the returns from them. After all, that is the test the farmer wants. He wants to know what he would make if he had 50 fowl and he could look after them. Mr. Gilbert said he could not establish the conditions. Let him take the conditions as they are and give us the result of the experiments at the end of the year. I think it would be of great importance to our people if it can be done?—A. It can be done, certainly.

Q. I want you to do better than my friend Mr. Gillmor?—A. But he keeps his hens till they are 20 years old.

*By Mr. McGregor :*

Q. These men who are collecting the eggs from a number of farmers might get a certified report from them, the same as we do from the different collecting factories with cheese. The men who are collecting the eggs could soon put you in possession of what the real cost of production of the eggs is per hen, and what it costs to keep the hen per annum.—A. I have no doubt of it but I have some testimony from farmers at different points. I did not bring it with me, but there is no doubt that the writers of the letters make money out of their poultry. In one case, a man tells me that his wife made more money out of 200 hens than he did out of ten cows. Another man tells me that he made more money out of his hens than out of any other branch of his farm. I have a letter from Mrs. Allan, of Cobourg, in which she says that no department of their farm paid so well as poultry. The result was that they sold their farm and moved near the town where they have a regular poultry establishment for the production of eggs in winter, and early broilers.

*By Mr. Carpenter :*

Q. I gather that you attach great importance to the feeding of cut bone. How do you feed it? Is it green or dry?—A. It is cut up while green.

Q. As you get it from the butcher?—A. Yes, and what is, comparatively speaking, waste.

Q. What is the quantity to feed?—A. Five pounds to one hundred hens, or one pound to 15 hens.

Q. I suppose that is set forth in your report?—A. Yes, all necessary particulars are given.

*By Mr. Sanborn :*

Q. We are feeding with dry bone and oyster shells?—A. Dry bone is useful. It serves the purpose of grit as well as supplying a certain quantity of lime for egg shell material.

*By Mr. McNeill :*

Q. What is the cost of a bone cutting machine?—A. They are sold for \$5 to \$7 and upwards.

*By Mr. Carpenter :*

Q. I would like to ask Mr. Gilbert if he is restricted in any way when he is sent to attend meetings? I suppose it is only a matter of attending meetings when sent for?—A. I have gone where I was asked to go.

*By Mr. McGregor :*

Q. Have you made any experiments in cold storage with eggs?—A. No.

Q. No experiments as to the keeping of eggs and whether they are inclined to mould or anything of that kind?—A. Any experiments we have made with eggs have been in a cool cellar. It was rather damp and we found that it would not do as the eggs got mouldy. We have never had any cold storage experiments.

Q. Is there any cold storage at the Experimental Farm, where experiments might be tried as to the length of time eggs could be kept and whether they would be inclined to mould or not?—A. It might be done in the dairy, in a cold room there.

Q. I would like to ask Prof. Saunders if some experiments could not be made at the farm as to the length of time eggs could be kept in a small quantity, by means of cold storage. The egg industry is of very great value to the country and it is very essential to the farmer that these points be brought out.

PROF. SAUNDERS.—I may say one of the points I have been urging upon Mr. Gilbert during the last two or three years has been to carry out experiments with eggs. Some three years ago we did carry on a series of experiments that showed some very remarkable results and I have been very anxious to have them continued. They have not been continued, but we have in the dairy accommodation at the farm a cold room, and any suggestions that Mr. Gilbert could make in keeping eggs that way, I should be very glad to see carried out.

*By Mr. McMillan :*

Q. I would like to ask Prof. Saunders if he can tell us anything about the result of the experiment made with eggs preserved by a new process sent out from the High Commissioner's office?—A. A dozen eggs sent out as an experiment from the High Commissioner's office, sometime early in the year and said to have been preserved by a preservative solution, which was guaranteed to keep the eggs perfectly sound, were received. When the eggs arrived Mr. Gilbert happened to be away. I got one or two of the other officers together and we began to break the eggs. Every one of them was of that character that is very well described as ill-flavoured. One had been broken en route. The others all proved to be of the same character when they reached the Experimental Farm. I simply sent a short report to the High Commissioner's office, saying that the eggs had all been found to be bad and I could not say anything in favour of the new preservative under these circumstances.

MR. GILBERT.—Allow me to say one word on behalf of my department. It is one of our objects to make the farmers produce the new laid article, so that there will be a supply all the year round. If that production is general, there will be no necessity of attempting to preserve eggs on an expensive scale and no necessity to offer the public a second-class article.

Having examined the preceding transcript of my evidence, of the date of the 10th March, I find it correct.

A. G. GILBERT,  
*Manager, Poultry Branch, Central Dominion Farm.*

## Agriculture and Colonization.

COMMITTEE ROOM 46,  
HOUSE OF COMMONS,  
WEDNESDAY, 18TH MARCH, 1896.

The Standing Committee on Agriculture and Colonization met this day at 10.30 o'clock, a.m., Mr. Sproule, Chairman, presiding.

Mr. JOHN CRAIG, Horticulturist at the Central Experimental Farm, was present by invitation, and addressed the committee as follows:—

Mr. Chairman and Gentlemen,—I am very glad indeed to meet the members of the committee this morning, and I trust that I shall be able to interest you. It will be well at the outset, perhaps, to give you a brief outline of the points I intend to cover in the course of my remarks, so that if I do not reach all of them in the time allotted to me, I shall, at your desire, be glad to take up any particular one for which any members may have a preference. I may say that I intend to first give you a resumé of the information gained at the close of the fruit year we have just passed through. Then I would like to look with you at the progress which horticulture has made in the different provinces of the Dominion. Then I propose to touch somewhat briefly on the cold storage question, as related to the carriage and shipment of our fruits. I would also like to draw the Committee's attention to some of the results we have obtained at Ottawa, in the progress of our horticultural work during the past six years, and be allowed to give some of the successes achieved in our fruit-testing experiments. In connection with new work which I have taken up during the year, outside of the general routine of my duties, I wish to draw your attention to some investigations regarding the blossoming period of fruit trees in different portions of Canada. On this subject the information which I have to give will be of interest and importance to fruit growers. Further, if time admits, I propose to speak on the cultivation of cranberries in Canada. There are many portions of the Dominion which are well adapted to the cultivation of this fruit, which to-day are practically wasted, being unfit for other purposes. I would, in conclusion, like to draw your attention again to the progress and results obtained in carrying on the work of spraying for the prevention of fungous diseases and insects during the last year. You will see from this outline that I have quite an extensive field to cover, and if I should not deal with the different topics as fully as honourable members would desire, I would like you to call my attention to them.

In the annual report of the Experimental Farm, under the division of horticulture, I have discussed at some length the subject of apple culture. In that article, intended for orchardists, will be found information on the propagation of apples and all other subjects from this point up to the shipment of the fruit. This essay contains information which I deem of much value to beginners in fruit culture. Following that article, are descriptive notes on hardy and desirable varieties of apples. The subject of the blossoming period of the fruit trees is then dealt with. Following this, I have given the results of some investigations regarding the cooking qualities of native plums. As I have pointed out in past years, we have in Canada a class of plums particularly suitable to the northern portions of the continent, which are very productive, but which in point of quality do not reach the excellence of the blue plums of western Europe. During the past year I have made some investigations with regard to the cooking qualities of these fruits, with reference to the relative amount of flesh and stone of each variety. In the annual report I have given the results of these investigations. In studying native fruits, the dwarf Juneberry has been described and illustrated from fruit grown on the Experimental Farm here. The Dwarf Juneberry I regard as of considerable value to the northern portions of our country, as a substitute for some of the other small fruits which are too tender to be grown with success in those localities.

Continuing the annual report there are the tabulated results of experiments with blackberries, raspberries and strawberries, with notes on hardiness, vigour and productiveness. There is also a resumé of the results of our work in the treatment of fungous diseases during the year. In addition to the above, the division of horticulture has done a good deal of work during past years in testing vegetables. Farmers, as a rule, pay too little attention to this branch of horticulture, namely, the growing to the best advantage of healthful vegetables. For the past five years I have taken a portion of the appropriation allowed to my branch—an appropriation by the way which will not allow me to carry on very extensive work—and have used it to carry on vegetable experimental work. Each year one class or other is taken up and studied. In my report I have given the results of these investigations. Last year tests of squashes occupied a prominent place in the work of the season. I may add as a guarantee of the interest which the public are taking in horticultural work, and in the work which I have charge of at the Experimental Farm, that the correspondence in this branch has increased from 500 letters received during the first year of my incumbency of this office, to about 2,500 letters during the past year. This increase is, proportionally, larger in my branch than in any other on the farm with the exception of agriculture. These letters are not usually short queries bearing upon practical topics, but frequently contain half a dozen or more questions which require lengthy answers that, I think I am safe in saying, are exceedingly interesting and useful to those who ask for the information. Frequently requests for special information involving considerable research are received from secretaries of fruit growers' associations and other organizations. The answers which we send are carefully prepared, are as full as possible and are read to the associations of which these gentlemen are representatives.

#### THE FRUIT CROP OF 1895.

The fruit year that is just past has been a somewhat peculiar one. In the first place, I do not know of any season for perhaps 10 years back in which we have had fruit of such fine quality. In Western Ontario, the Greenings have been a better class as a whole and of a better quality than I have ever seen.

During the middle of May, Ontario, and certain portions of Quebec, were visited with a heavy frost. In Ontario the peach crop was almost entirely destroyed with the exception of that in the western peninsula, the county of Essex, particularly the district of Leamington, where the crop was quite up to the average, if not in excess. The quantity of apples was less, but as I remarked the quality was better than usual. I think, however, that the receipts on the whole will show that the crop harvested is quite equal in point of returns to the grower, to those of past years. A curious effect of the frost was noticed on the fruit of the variety of apple known as the Wealthy, grown on the Experimental Farm. I have a photograph which illustrates the effect. The frost occurred just after fertilization had taken place, the ovales were fertilized, so that fruit was assured for the year. Yet the flower was injured to a certain extent, particularly the receptacle or that part of the blossom on which rest the sexual organs. This was injured more or less, and in the effort to repair the injury when the fruit developed this curious malformation took place, brought about by a deposition of corky tissue.

I have received many samples of pears which show a rusted appearance. A number of my correspondents thought this appearance was due to a fungous disease but it was undoubtedly owing to the effect of the frost occurring just at that period.

If the frost had occurred at an earlier period the blossom would have been entirely killed. If it had occurred at a somewhat later period than that mentioned there would have been no effect at all.

#### PROVINCIAL ASSOCIATIONS.

We have in Canada, I am glad to say, several powerful factors all working towards the greater development of our fruit interest, and I may say that none exercise a stronger influence than do our provincial societies.

## Agriculture and Colonization.

*Nova Scotia.* If you will allow me I will draw your attention for a moment to the good work of the Provincial Fruit Growers' Association of Nova Scotia. I have had the privilege of knowing something of its history. Five years ago I visited that association at its annual meeting. It met in a small hall and had about forty members in attendance. The rate of progress since that time up to the present has been very rapid, and without going over it step by step, I may say that its membership, for 1896, is over 500, and it has during that period established a school of horticulture in the province, the only one of its kind in Canada, in fact in America, in addition to doing excellent work in developing provincial fruit interests in all its branches. Apple culture in the past was the principal horticultural line pursued in Nova Scotia. But now, they are rapidly extending the area devoted to plums, pears and peaches.

*New Brunswick.* The Farmers' and Dairymen's Association is doing excellent work. I don't think New Brunswick will ever be noted as a fruit producing country, but there are certain sections in which when they have obtained knowledge of the right varieties to grow, they will be able to produce fruit at least in sufficient quantities to supply their home markets. New Brunswick has a noted fruit grower in the person of Mr. Sharpe, of Woodstock, who grows plums in a very large way in a rather unique manner, that is by laying the trees down in the winter. The climate is so severe that if they are not protected in the winter the fruit buds of such varieties as the Lombard are killed. He finds it profitable to plant this variety and Moores Arctic in such a manner as to lay the trees down with their heads on the ground, in the autumn, so that they catch the snow which protects the fruit buds. He does not do it on a small scale. He has a large orchard of 15,000 or 20,000 trees. I mention this as an instance of what energy and enterprise can do in the face of unfavourable climatic conditions.

*Quebec* has two provincial societies. One of them was organized a number of years ago and has done grand work but it has gradually restricted its scope and now devotes itself mainly to the development of the gardeners' and florists' interests of the city of Montreal. For that reason another society has been organized during the last two years, which has for its object the development of the purely pomological interests, the apple and pear growing interests of the province. That society has a board of directors representing different parts of the province which is divided up into fruit districts in the same manner as followed by the Ontario society. We have been able to assist each of these societies, in the past, by giving them information and varieties of plants for testing, which have been originated at the Central Farm.

*Ontario.* The Ontario Fruit Growers' Association is an organization which I am particularly proud to refer to, because of its reputation and good work, also on account of the fact that it is the largest fruit growers' association in the world, as well as being one of the liveliest organizations of the kind in existence. It publishes as you know a monthly horticultural journal, besides the annual report. It is truly a Canadian society, because its members are not restricted to the province of Ontario but are scattered throughout the Dominion. When we consider that in Ontario we have 225,000 acres devoted to fruit growing, it is only reasonable to expect that we should have a good strong healthy organization representing these interests. In the matter of peaches alone we have a capital of about \$3,000,000 invested, and that capital increasing each year with the growth of the trees. I may say that this society is carrying on, the present year, the work which was commenced by the Central Farm some three years ago, in spraying for the prevention of fungous diseases. We began experimental work at Grimsby, St. Catharines and Winona in co-operation with the society, and I am glad to say that the provincial government has recognized the value of spraying, and the desirability of carrying it on in different localities. Last year, under Mr. A. H. Pettit's direction, it was carried on quite thoroughly, covering the province from one end to the other. This year the same line of work is being continued, but more extensively.

It is my privilege to travel through the province considerably, and I would like to show you a couple of photographs which I took last year, "snap-shots," as it were, at a

little railway station in Mr. Carpenter's constituency, Winona. Plate 1, the first photograph, shows the station and platform as it appears just before a fruit train arrives, with the fruit packages piled up on the platform awaiting transportation. There is a special fruit train running between Niagara Falls and Hamilton to take the fruit from this district. The photograph was taken very early in the season, when little else than plums and the earliest grapes were going out, but the scene represented there is characteristic of what goes on for at least six weeks, I should think, in that vicinity in the autumn of each year, and I may say that that station is characteristic of what occurs every day in the shipping season all along that line from Niagara Falls to Hamilton. Coming eastward we find in Prince Edward County last year the fruit shipped out represented the sum of \$100,000.

*British Columbia.* I will only say a word about British Columbia. There they have a good working society, and we are in close connection with them, and helping them in various ways by information and advice. I have just one little photograph here which is not much in itself, but which shows you what kind of apples they can grow there by irrigation in the dry districts. Mr. Earle, of Lytton, sent me the collection of apples last fall which this photograph represents. Mr. Earle lives in one of the driest sections of British Columbia where fruit culture is entirely dependent upon irrigation.

In speaking of fruit growing in British Columbia we should not forget that our honoured Governor General is the leading horticulturist of the province. The work His Excellency is doing there is of great present and future value.

#### INJURY TO PEACH BUDS.

Various reports have come to me within the last month or six weeks regarding the injury to the prospective peach crop by the severe cold of the past winter, and I thought possibly you would be interested in knowing just about what condition the buds are in at the present time. In order to do this I secured scions from the different peach districts of Ontario. After a close examination of these peach twigs, I fear that the crop next year will be very small, and in some districts entirely lost.

*By Mr. Pridham :*

Q. For what reason?—A. Because of the exceptionally cold weather. We have had unusually severe weather this winter with rapid changes, giving conditions most injurious to peach buds.

I find that the blossom buds of the Alexander peach at Burlington are entirely killed. Of the Early Crawford, about 90 per cent of the buds are killed, of the Old Nixon about 50 per cent, Fitzgerald about 80 per cent, Honest John about 75 per cent.

In South Niagara the percentage of injury is something less ; I will not read all the figures.

At St. Catharines the injury sustained is very severe indeed.

At Winona the amount of injury to peaches runs from 75 to 90 per cent. Hill's Chili, which is a hardy variety known to most of you, is the least injured.

Of plums, the varieties known as Orleans and the Shipper's Pride, all show an injury of from 5 to 10 per cent ; that is from 5 to 10 per cent of the buds are killed.

Of pears I have not been able to discover they have been injured, but the Early Richmond Cherry shows injury to a slight extent.

At Leamington the injury seems to be relatively less than at the other points mentioned, yet the general indications are that the peach crop in Ontario will be light this season.

#### FRUIT TESTING AT OTTAWA.

I would like to draw your attention briefly to some of the results we have obtained in testing fruits at the Central Farm, covering a period of six years. As you know, and as I hardly need point out, our climatic conditions here are such that we are unable to test as large a variety of fruits as we might if we were further south. At the same



PLATE I.—SHIPPING FRUIT, WINONA, ONT.

## Agriculture and Colonization.

time, it renders our work of greater value to those portions of the country lying north of us. We have here also a climate of extremes. We have already recorded this winter on two different occasions a temperature 31 degrees below zero, and in summer, as most of you who have been here during that time are aware, we have a tropical heat. So that the fruits that I shall draw your attention to here, are those which commend themselves principally on account of their hardiness, although I have not included in these lists any varieties which do not bear good fruit or are not sufficiently desirable to allow them to be recommended to the public. Our apple orchard has not been pampered in any way; but it has been cultivated thoroughly, pruned and manured lightly. I say it has not been pampered, meaning that it has not been over-manured; it has, however, been cultivated, manured and pruned, according to common sense, combined with scientific principles. I am now able to give you some details of the returns from a single acre of that orchard, although, as you will understand, growing, as we do a great many varieties—I might say that up to the present time we have tested 450 varieties of apples—growing as many kinds as that in an orchard, it is rather difficult to arrive at accurate ideas as to the cost of production and of the returns. But there is one section of it which is made up of three or four leading varieties, and I have kept a fairly accurate debit and credit account covering that section, and I am able to give you at the present time, after six years, the cost up to date of that acre with the returns thus far. Then I shall give you an estimate of what I think the returns will be for the next ten years. So that it will give us an approximately correct idea of what we may expect from an acre of apples for the first fifteen years after planting.

*By Mr. Cochrane :*

Q. Are you going to give us before you proceed any further, the particulars respecting your method of cultivation and what manure you used.—A. Yes. I had not intended going into that, but I can give it to you now if you desire it. I might say that up to the present time the trees have not had the ground all to themselves. We have cultivated the ground each year by growing another crop on it, but neither has that other crop occupied the whole of the ground. We have kept a space of 6 feet clear on each side of each row of apple trees for the purpose of giving frequent cultivation. The trees are planted 30 feet apart, and with the exception of this six foot strip the ground is occupied by some crop which can be cultivated and which is usually taken off the ground about the middle of summer—such a crop as early potatoes or early vegetables. I believe these are the best kind of crops to grow, because I do not think the ground should be cultivated late in the season, as cultivation tends to increase or encourage growth. We should get our trees well ripened—here especially, and it is a good rule to keep in mind in all portions of the country—before the cold weather of autumn comes on, so that they will pass through the winter without injury. This ripening up process, if I may digress for a moment, means a translation of the liquid matter in the tissues of the plants into solids. These solids take the form of starches and sugars. So that if the trees are well stored with starches and sugars, or other forms of that character, and have a small quantity of liquids in their tissues, they are not likely to be injured by frost during the winter.

Q. You mean the ripening of the wood?—A. Going through the winter safely is dependent on the thorough ripening of the wood. Where you cultivate throughout the summer and grow a late crop it is unreasonable to expect this.

Now with regard to manuring the ground. The manure up to the present time on that acre has consisted of 50 bushels of wood ashes and 75 loads of barnyard manure.

Q. Altogether?—A. Altogether. Those of you who have seen our soil know it is not heavy.

Q. How many trees are there?—A. On that acre; about 30.

*By Mr. Stubbs :*

Q. Is that for each year?—A. That covers the six years.

Q. Oh, the six years?—A. Yes. So that it gives us 50 bushels of ashes at 12 cents, which is \$6, and the cost of the manure amounts to about \$30, so that the manuring or fertilizing of this area for the six years cost us \$36.

*By Mr. Cochrane :*

Q. Have your trees been bearing all that time?—A. The orchard was planted seven years ago, but I have the records of the past six years, only since I have had charge of it myself. The trees began bearing two years ago. Although they bore a few apples previous to that time I have no record of them. My first record of the yield was made two years ago. Now, we will suppose that the value of that land was \$75—it was cultivated land to begin with—that its preparation for this particular crop cost \$5; that forty trees at 25 cents, amounted to \$10; that the planting of those forty trees cost us \$5. The wood ashes and the manure for the six years cost us \$36, and the spraying and pruning for that period cost us \$10. Now, I have not allowed anything for rent on the land during that period because the other crops which were grown on it at the same time would more than pay for the rent.

Q. Would it pay for more than the rent and the labour?—A. The labour is included in the different details submitted.

Q. That is the labour in cultivating the vegetables?—A. Oh, certainly. Any crop should be at least self-sustaining. The interest on the amount of capital we will say—calling the capital \$100—would be \$30 for the period of six years. This would give us an invested amount of \$171. Now, I think, a fair estimate of the value of that land at the present time, considering the increased value of the trees and the better condition of the soil, would be \$300.

*Returns.* We have received from it in 1894, 34 baskets of apples which were sold net at 43 cents per basket in the Ottawa market, giving us a return of \$14.62, and 20 baskets which we sold at 40 cents, giving us a return of \$8. In 1895 we sold 100 baskets at 52 cents, making \$52, and 35 baskets at 35 cents, amounting to \$12.25. Total receipts \$86.87.

*By Mr. McMillan :*

Q. How many baskets are there in the barrel?—A. These baskets hold 20 lbs. It takes about  $2\frac{1}{2}$  to make a bushel. The apple barrel holds 2 bushels and 3 pecks. If we add the cost of these apples we find it amounts to \$171, we find they cost \$1.82 per bushel. The returns from the crop at 92 cents per bushel, gross receipts give us \$86.87 then allowing for the increase in the value of the land we have a net profit of 60 per cent on the money invested.

#### CULTIVATION OF ORCHARDS.

*By Mr. Cochrane :*

Q. Now that you have got that orchard into fair bearing condition,—what would be the best cultivation of the orchard from this out?—A. For the next 10 years I would cultivate thoroughly and manure it much more heavily than in the past. The results obtained by Mr. Shutt in analysing the leaves, the fruit and the wood of the apple, show that the tree draws more potash from the soil after reaching bearing age, than nitrogen. Consequently it will be necessary and wise to increase the amount of potash proportionately to the other constituents. My colleague, Mr. Shutt, will doubtless deal with this question more fully when he addresses the Committee and I shall not deal with it at length. His analyses show that potash more than nitrogen or phosphorous will be the constituent which will be wanted for these fruit trees, and to supply this, muriate of potash and wood ashes will be used.

*By Mr. McGregor :*

Q. How do you manure it?—A. By spreading it all over the ground, harrowing or ploughing it lightly in.

*By Mr. Roome :*

Q. Why do you advise potash?—Because, as I stated, our analyses shows that the potash is drawn from the soil in greater proportion than any other constituent, by bear-

## Agriculture and Colonization.

ing trees. This is mainly stored in the seed. The production of seed is the main object in life of all plants. By this means its kind is reproduced and multiplied. In doing so the plant simply follows out one of nature's laws.

*By Mr. Cochrane :*

Q. Why do you say the seed is the primary object?—A. Because it is the object of every plant to reproduce itself, and this in the main is accomplished by the production of seed.

*By Mr. Roome :*

Q. What object would there be in feeding the seed with potash?—A. If the apple draws potash from the soil in its development we must put the potash back in the soil or we cannot expect to get fruit. We should maintain in well-balanced proportion these principal food elements by giving back to the soil that constituent which is mostly drawn from it.

*By Mr. McGregor :*

Q. The healthiest apple has the most seeds?—A. It is not always so. A small crab or apple may have large and numerous seeds. You will remember that in the case of naval oranges there are no seeds at all.

*By Mr. Roome :*

Q. Therefore they would not draw upon the potash. Might that not apply to apples as well as to oranges?—A. No. All the fruits do not draw upon potash in the same proportion. For instance, our stone fruits draw more heavily on the phosphoric acid of the soil than the pomaceous fruits. My remarks apply to apples particularly. We have much to learn on this subject in its relation to other fruits.

*By Mr. Cochrane :*

Q. If you starve the seed out what effect would that have on the apple?—A. If you starve the seed you would probably also go without the apple. You must get the blossom before you can get the apple, and you won't get the blossom unless the tree has vigour enough to store up food to produce the fruit bud. Our policy in the orchard referred to for the next ten years will be to increase the food ration containing the potash.

Q. What about cultivation?—A. The cultivation will be thorough.

*By Mr. Burnham :*

Q. In what way?—A. By ploughing deep in the early spring.

Q. Why deep?—A. In order to loosen up the soil to enable the air to permeate it more thoroughly. By permitting the entrance of the air, we also allow the moisture with the air to act upon the food materials in the soil, loosen them—or, in other words, render them available to the plant. The cultivation afterwards should be shallow throughout the season, and it should close about August 1st.

*By Mr. McGregor :*

Q. How near do you plough to the tree?—A. You will have to use your judgment in that. Each variety has its characteristic habit of growth. Some run their roots straight down, so that you can plough right up to the stem. Others are surface feeders and spread their roots out in pretty close to the surface, rendering it necessary to run the plough very lightly. One can readily understand that if the manure is placed on the surface the roots will come to the surface where the most food is. A heavy coating of nitrogenous manure will in a few years bring the roots to the surface in a marked manner.

*By Mr. Carpenter :*

Q. Do you recommend one ploughing each year?—A. Yes, one will have to do this in the spring, being guided by his judgment. If it can be managed without injuring

the roots of the trees all right, but one may have such varieties planted in such a manner as it will be impossible to plough at all. In that case, I would use some form of a harrow so that the surface of the soil can be well pulverised. The soil should be well worked up in the early part of the summer at any rate. A harrow will do good work in early spring when the sod is comparatively tender, where a plough cannot be used to advantage.

*By Mr. McGregor :*

Q. Will you have anything growing between the trees?—A. Yes. We will have early summer crops.

Q. What kind?—A. Such crops as I have indicated. I grew squashes last year.

*By Mr. Carpenter :*

Q. Would you suggest a hoed crop?—A. Yes, something that will allow you to cultivate the soil.

I may say just while we are on this subject that if it is desired to give that valuable food constituent, nitrogen, to orchard trees you may be able very often to do it in a convenient and effective way by growing a clover or other leguminous crop and ploughing it under. Last year I began some experiments in this line with the object of finding the most suitable kind of cover crop to grow for that purpose. All the clovers were tried in addition to various mixtures of them with some grasses and pease. Crimson clover, of which we have heard so much during the last two years, was also included. I may say that crimson clover does not commend itself to my judgment as a suitable plant for this locality, although I have seen it make an excellent cover crop in milder portions of the country. Further west, in Essex County for instance, I believe it will give a satisfactory crop, but here it kills down during the winter, and does not make sufficient growth during the autumn to form a good cover for the soil.

*By Mr. Cochrane :*

Q. Have not your fruit trees at the farm got too much wood in them?—A. Some of them have. I have refrained from pruning here as much as I would if the orchard were in a milder part of the country, because trees in cold climates are peculiarly sensitive; we have, therefore, to be very careful in that respect. I am pruning them this year rather more heavily than I have done in the past, but I have possibly erred in previous years on the side of too little pruning rather than too much.

Q. Don't you think on general principles that it is a mistake to let the trees grow too much wood; should not they be trimmed when they are smaller than your trees are now?—A. On general principles, yes. It is a mistake to allow the trees to grow too much wood, or get very bushy tops when they are young, because that means that a severe pruning will have to take place some time, and a severe pruning means a considerable check to, and reduction of the vitality of the tree.

*By Mr. McMillan :*

Q. What should be the distance of the trees apart?—A. It depends upon the variety. If you are planting Duchess or Wealthy, I would say that 30 feet is quite far enough apart; for Northern Spy, King, Baldwin and Newton Pippin, I would say 40 feet, and perhaps 45; but the Wealthy, Duchess and Yellow Transparent are young and heavy annual bearers, consequently make less wood, and therefore do not live very long. For this reason I would not plant them more than 30 feet apart.

*By Mr. Cochrane :*

Q. Would you recommend, if you had an orchard in full bearing, growing other crop in it?—A. Not if in full bearing, because that means that the trees are 20 to 30 years of age. After the trees reach 20 years of age you cannot advantageously grow other crops between the rows. I have seen raspberries and strawberries cultivated with some success with trees of that size, but it is the exception. Up to 20 years of age you

## Agriculture and Colonization.

can grow other crops, but we must remember that we are growing two crops on the same soil each year, consequently they draw very heavily on the food constituents. It is a mistake to think that apple trees do not draw as much from the soil as a wheat crop, for instance, a bulletin issued by Professor Roberts, of Cornell University, shows that an acre of apples in 20 years draws about 30 per cent more of nitrogen, phosphoric acid and potash from the soil than the same area under wheat for the same length of time.

Q. Did you ever try lime?—A. We have not used it at the Central Farm, as our soil does not seem to need it. While lime itself is not a direct fertilizer, yet it is a very valuable agent to use in bringing in other constituents in the soil into available condition for the plant. It sets up nitrification, by which the food constituents are acted upon and brought into a condition so that the roots of the plants can get hold of and make use of them. I would like to relate to you some facts given by Mr. Bigelow, President of the Nova Scotia Fruit Growers' Association, in the report of that society for 1893. It will interest a good many of you to read this address in full. I shall not go into it at length, but shall give you a brief epitome of his interesting presidential address, the truth of which he is prepared to prove. He has taken ten fruit farms, and, with a view of obtaining the profits of orcharding in the Annapolis Valley, has given the number of trees, the number of acres, the number of trees when planted, the first cost of land, the number of barrels of apples in the last ten years, the net amount of sales of apples, the total cost of cultivation for 10 years, the value of other crops grown on the soil for that length of time, and finally, the net profit in the last ten years, together with an estimate of the present value of these orchards.

*By Mr. McShane :*

Q. Does he give the amount?—A. Yes. As a result, he says: "We have a profit of \$52,065 from 77 acres of orchard in 10 years from an original investment of \$7,820 and a permanent value remaining in the orchard of \$42,400."

Q. That is the net?—A. Yes, that is the net profit, as shown in Table I.

*By Mr. Cochrane :*

Q. Where is that?—A. I am simply giving these figures as applicable to the best fruit districts of Nova Scotia.

Q. The Annapolis Valley?—A. Yes.

TABLE I.

OWNER OF ORCHARD.	No. of Acres.	No. of Trees. When planted.	First Cost of Land.	No of barrels of Apples last 10 years.	Net amount of Sales of Apples.	Total cost of cultivation, 10 years.	Value of other Crops besides Apples.	Net profit last 10 years.	Present Value of Orchard.	REMARKS.	
			\$		\$	\$	\$	\$	\$		
A. D. DeWolf...	8	350	1870	400	3,200	5,750	960	840	5,630	8,000	Sold at that price.
Lewis Johnson...	2½	100	1837	250	1,800	3,600	400	100	3,500	1,500	Old neglected orchard.
Charles Fitch...	5	200	1869	1,000	1,500	2,800	800	1,000	3,000	3,000	
J. S. Dodd.....	5½	240	1870	200	4,200	9,000	2,500	1,500	8,000	5,000	Sold at that price. Well cultivated.
R. Harris.....	18	900	1857	1,800	5,500	12,875	4,000	4,200	12,675	9,000	Sold at that price.
J. W. Bigelow...	4	160	1871	400	1,500	2,800	1,100	850	2,650	3,000	Orchard neglected.
Leander Eaton...	11	440	1868	1,000	4,000	6,000	1,500	4,000	8,000	5,500	Orchard well cultivated.
S. Sheffield...	4	200	1871	470	2,300	4,075	715	1,200	4,560	4,000	Well cultivated.
R. W. Starr.....	11	500	1871	1,000	3,498	6,120	2,610	3,300	6,810	6,600	Well cultivated. Kept in potatoes.
Fred. Johnson...	8	300	1870	1,200	1,685	3,370	1,200	700	2,870	4,800	Well cultivated.
	77	3390	.....	7,820	26,183	56,390	15,785	17,690	52,065	42,400	

It is not wise to make general rules from an instance like this in Nova Scotia, and say that they can be applied to Quebec or elsewhere; but for those who are interested in the Annapolis Valley, I draw their attention to these facts, because I am personally acquainted with Mr. Bigelow, and am assured that he knows whereof he speaks.

He also gives the cost of land and trees, and all expenses connected with the growing of an apple orchard for the first five years in another tabular statement. He proves that from an outlay of \$5,285 in five years, the orchard is made worth the sum of \$15,915. That is, you see, about the same ratio of increase which I applied to the acre of land here at the Central Farm. I think it is not an extravagant estimate.

TABLE II.

COST OF LAND, TREES, AND ALL EXPENSES ON AN APPLE ORCHARD, FIRST FIVE YEARS.

Owner of Orchard.	Number of Acres.	Number of Trees.	When Planted.	Cost of Land.	Cost of Trees and all other expenses, five years.	Value of all other crops.	Present value of Orchard.	Remarks.
Johnson Brothers, Grand Pre	26	1086	1887	\$1560	\$1250	\$1100	\$4000	Good cultivated land.
F. W. Borden, M.P., Can- ning	25	1000	1888	75	700	None.	2200	Wild land.
Ralph Eaton, Cornwallis.	59	2000	1888	500	1000	300	10000	New land.
J. W. Bigelow, Wolfville.	35	1400	1888	700	900	None.	5000	New land.
	136	5486		2835	3850	1400	21200	

*By Mr. Carpenter :*

Q. He is referring to the first five years?—A. The first five years in the life of an apple orchard after planting.

*By Mr. Cochrane :*

Q. How many acres?—A. The number of acres here is 136, and it takes in four orchards.

Q. Yes, but what was the increase of the value in the young orchard?—A. In that young orchard?

Q. Yes, that you were just speaking about?—A. In the young orchard the original outlay was \$5,835. This capital increased to \$15,915 in five years.

*By Mr. McShane :*

Q. Does he base that upon the increase of apple trees?—A. He bases that upon the increased value of the land owing to the present value of the apple trees, and the better cultivation of the soil. In some of these cases wild land was selected. Here is an instance of an orchard which sold for \$8,000, though the original cost of the land was only \$400. This was after it came well into bearing.

*By Mr. Livingstone :*

Q. Was that after deducting all the expense that had gone into it?—A. No, \$400 was the original cost, and \$8,000, the gross return.

Now, I have given you the estimated value of this acre of land at the Farm at the present time. I will now give you an estimate of the cost of maintaining that acre for the next ten years with the probable or expected returns.

## Agriculture and Colonization.

*Estimate.* For pruning and spraying I would put down the sum of \$100, for cultivating and manuring \$150, for fruit packages \$125, for picking \$40, being a total of \$415 the expense of growing that acre of apples for the next ten years. Then, if we take an estimate of 40 barrels of apples a year at \$2 a barrel, we have \$800 and we have a cost of the apples to us of 52 cents a barrel, leaving a profit of over a dollar per barrel with a liberal balance to cover possible loss.

*By Mr. Cochrane :*

Q. You have got your apples too high?—A. I am basing my figures on the actual returns of the past two years of the apples from that area, and please remember I am talking of our own acre, and of this district.

*By Mr. Carpenter :*

Q. I suppose the very early varieties would command a big price in this market?—A. The Duchess and Wealthy were the two varieties. The figures I previously quoted are what they were sold for.

*By Mr. Cochrane :*

Q. Yes, but I would draw your attention to the fact that apples may not be worth that in all parts of the country.—A. Yes. I want to make that clear, and I want you to keep in mind, that I am speaking of a particular acre and of a particular section. I spoke of the actual figures in the past and by means of those figures estimated what the returns are likely to be in the future.

The lessons that we have learned are simply those that I have already drawn your attention to, viz.: That it is necessary to manure fairly, and that in order to get good fruits we must cultivate, prune, spray and handle the product intelligently.

### THINNING THE FRUIT.

*By Mr. Semple :*

Q. How often would you put on manure during the 10 years?—A. At least every second year. I have a photograph illustrating the benefits to be derived from thinning the fruit on the tree, but failed to bring it this morning. Two plum trees of a very heavy bearing variety in the Farm orchard were selected three years ago. One tree was thinned of half its fruit each year; the other tree I allowed to bear at will. When the third year arrived the tree which had not been thinned was not quite dead, but it only had one or two lively branches on it, while the other tree was in very good health. The fruit on the thinned tree was much larger every year than that on the unthinned.

*By Mr. Carpenter :*

Q. At what stage of growth do you perform your thinning?—A. The thinning? Just after the fruit has formed.

Q. It is rather difficult to do that with large trees?—A. It is rather difficult, but just at that time of the year you can sometimes do with advantage a considerable amount of light pruning, and in going over the tree to thin the branches you can thin out the blossoms at the same time.

Q. But do you not think, so far as pruning is concerned, that the better time is after the fruit has just formed?—A. Yes. I think the best time to do pruning is at that period when the wood will heal over most quickly. This is about the time the leaves are beginning to form. I find that the best time to do it—although I am pruning now; I am taking advantage of the snow, which is about four feet high and is strong enough to carry the men, so that they can walk around and get into the tops of the trees without very much difficulty. The cut surfaces made by removing all large branches are carefully painted over. We have to use our judgment in this work and prune judiciously. They will bear heavier pruning now than in spring.

I have placed on this chart the varieties which, during the past six years, have proved of value, first on account of hardiness and second on account of quality of fruit; you will notice, however, that some of them are old varieties, these were included in order to draw your attention to others which were not so well known. Beginning with summer varieties the Yellow Transparent I regard as peculiarly valuable, because it is the very earliest commercial apple which ripens. We can place it upon the market between the 25th of July and the 1st of August. It is, however, a very delicate apple, that is, it won't bear rough handling, therefore, it should be marketed in baskets. Put up in this way it is attractive and will bring the highest prices. The Red Astrachan is another hardy variety to which I invite your attention. That is a variety which should be picked over at least twice or three times, in marketing the fruit, and I might say it is a rule which holds good with all kinds of early summer apples. In marketing you can get much better returns by running over the tree and picking first the largest and best coloured specimens, and repeating the operation again in a week's time.

*By the Chairman :*

Q. I suppose there would be a benefit in thinning this kind?—A. The Astrachan, undoubtedly, is benefited by thinning, as is the Yellow Transparent. The Yellow Transparent will increase considerably in size if the fruit is judiciously thinned early in the season.

The Grandmother, a Russian variety, is an apple of the Duchess type, but about a week later, it is also a very hardy tree. The fruit is equally attractive and as good as the Duchess. I put it in simply because it differs a little in time of maturing.

*By Mr. Carpenter :*

Q. What is the period of ripening of the Duchess?—A. The Duchess ripens with us from about the 15th of August to the 20th, and the Grandmother soon after the 1st of September.

The Blushed Colville is also a very hardy tree of the Yellow Transparent type. The Peach is a handsome yellow apple with a beautiful golden blush. The others that you see on the chart I shall not refer to.

Q. How about the Pewaukee?—A. I think I have included Pewaukee among the valuable winter sorts.

Q. Is it a prolific bearer?—A. In some sections on heavy soils,—rather heavy clay soils,—it bears very well.

Q. Will the fruit hang on well?—A. No; that is one of its weak points. It drops early in the season if the winds are strong. In Simcoe County and about Orillia they grow very fine specimens of the Pewaukee, well coloured and very handsome in appearance. About Niagara and in the peach-growing district of the province, I do not think the Pewaukee will compare favourably with other varieties. It drops early in the season and at any rate they can grow other classes of fruit bringing larger returns.

*By Mr. Burnham :*

Q. What about the Tetofsky variety?—A. It resembles in growth of tree and season, the Yellow Transparent, but is not as good in quality. It is quite as productive, but not as handsome, and has not as many good points to commend it for commercial purposes as the Yellow Transparent.

*By Mr. Cochrane :*

Q. What about the Ben Davis?—A. It is one of those apples which, if recommended at a fruit growers' meeting you will have one man jump up here and say it is not worth anything, and another will jump up over there and maintain it is the finest apple that grows. It is poor in quality, but it has so many other strong points that, while those who grow apples for quality condemn it entirely, those who grow for money say there is nothing like it.

## Agriculture and Colonization.

Q. What about the Northern Spy?—A. It is one of the old standard varieties which does not succeed here, it is not sufficiently hardy. It is slow in coming into bearing. When productive it is very profitable.

If I were to select from this list four or five varieties I would draw attention to the Yellow Transparent, the Duchess, and the McMahan White. This latter variety has been figured once or twice in my annual report. It is a most vigorous tree bearing a handsome yellow apple of large size which will keep until Christmas without much trouble if placed in a cold cellar.

We have in Winter St. Lawrence and Canada Red two valuable kinds for eastern Ontario and Quebec. Winter St. Lawrence originated in Quebec and resembles the old St. Lawrence in general appearance. It is, however, more regular in form and keeps until midwinter without any difficulty. The Canada Red originated, I believe, in Michigan. It is of medium size, round and regular, handsome in appearance, and its great point is its keeping quality. For Quebec I know of no better variety than this.

*By Mr. Carpenter :*

Q. The quality is not very good?—A. It is not high. The Lawver is a variety which bears heavily like the Wagner, but soon destroys its vitality by this overbearing. I think, however, that by topgrafting it on a vigorous stock, we should be able to grow it with profit.

Q. Will you be able to experiment with standard winter varieties here?—A. Yes, to a limited extent.

Q. Have you done anything with Baldwins, Greenings and Russets?—A. We have grown the first two, but with only moderate success.

Q. They are the staple varieties with us. Your experiments here in these varieties would not be of much benefit to us in Southern and Western Ontario?—A. We have to make our experiments valuable to the different portions of the country, as far as climatic conditions permit us.

*By Mr. McMillan :*

Q. Would you advise any farmer to grow early varieties? With us they are almost useless, we cannot dispose of them?—A. I would not advise farmers who are distant from good markets, or those who have not good market communications, to grow many early varieties. There is more money, I think, for farmers in growing early varieties if they are located near a good city market or on a line of railway, than in growing fall varieties. If I were to choose between the summer and autumn apples, I would certainly choose the earliest in preference to those ripening in the middle of the season.

Q. We have a large number of good fall varieties, but there are some years that we cannot sell them. Buyers won't even take them to the market?—A. It is not easy to dispose of them unless there is a good home market available. I think we should emphasize the point that, under present conditions, fall varieties in certain localities are not profitable, but I do not think that is any reason why we should give up growing them, because we shall be able, by the assistance of cold storage hereafter to handle these apples much more profitably than in the past.

### HOW TO PERFORM TOP-GRAFTING.

While on this matter, I would like to draw attention to the value of top-grafting to those who have these fall varieties already in their orchards. There is no reason why we should lose time and labour expended in growing them by rooting up the whole orchard as is being done in some of the best fruit-growing districts of Canada. I have seen fine orchards of Northern Spies 25 or 30 years old being dug out, and other varieties more frequently. It seems to me that if our farmers, instead of digging them out, would top-graft those trees with other desirable varieties, wherever the stocks are healthy and vigorous, in four or five years at the outside, we should get our orchard completely changed, and thus obtain the varieties that we want. If, on the other hand,

we go to the expense of rooting up the trees, we shall have to wait seven or eight years before the young trees will bear, and in addition to that we shall have all the labour and expense of manuring and cultivating, to bear over again. I have a model here illustrating a simple method of top-grafting. I am sending out this spring a large number of scions of some of the varieties best suited to this locality, to those who ask for them. With each bundle of scions, I send an illustrated circular giving information as to how the work should be done. The operation itself is very simple. All that it is necessary to do is to split the stock, then place the wedge-shaped scion in the slit with the growing parts (the inner bark) of the two brought directly opposite to each other. Then place some material round the two tightly, in order to exclude the air while the process of growth making the union is going on. The branch having been cut off, the whole force of the strength of the stock is directed to the new scion which makes a strong growth the first year.

*By Mr. McGregor :*

Q. You cover the union with wax, do you not?—A. Yes, a mixture of resin, bees-wax and tallow is used to cover the wound, in order to keep the air out.

*By Mr. Carpenter :*

Q. You put one scion only in each stock?—A. Where the branches are large we may put a scion on each side. In that way it gives you a double chance of success.

*By Mr. Cochrane :*

Q. How old a tree?—A. I do not think the age need necessarily deter one if the tree is healthy and vigorous.

Q. If the top was large, it would require a good many grafts?—A. It would, I am glad you mentioned that, because it brings me to a very important point in connection with the work. It would be very dangerous to remove the whole top of the tree in one year, and, therefore, it is advisable to use your judgment and remove, say, a third of the top each year till the work of retopping is completed.

Q. When you come to cut off some of the large limbs, which you have to do, I find that the balance of the tree is likely to die?—A. That is in the case where in grafting you go down too close to the main stem, which is of course unwise. I do not think it would be wise to graft branches larger than two and a half inches in diameter. If you are careful, by grafting some of the lateral and inside branches, you will get the top pretty well balanced in a short time. This matter of extending the work over three years is a very important one, because when you take the whole top of a tree off in one year, it allows the same amount of root to exercise its influence on the top, which very often results in the heating or fermentation of the sap, because there are not enough leaves to evaporate the moisture. Fermentation then takes place, the bark scalds, and the tree dies or is very much injured.

*By Mr. Semple :*

Q. Would it do to put an apple graft on a crab stock?—A. They will grow for a few years—perhaps for a number of years—but the union is not usually satisfactory, because the top has a tendency to outgrow the stock. There is quite a difference in the texture of the crab and the apple wood. They belong to two different species. The texture of the crab wood is finer than that of the apple, and the nature of the tree is not to grow as large as the apple, therefore, the top will outgrow the stock. I should choose the Hyslop crab for top grafting in preference to others. It has a feature of usefulness not generally known. The Hyslop will grow on heavy soils, of a clayey nature, better than most apples—for instance, the blue clays of Quebec. For that reason it is quite a useful stock to plant on soil of that character for the purpose of top-grafting later. This plan is only useful to an amateur, however, and is not of commercial importance.

## Agriculture and Colonization.

*By the Chairman :*

Q. What is the best time to top-graft?—A. The season opens four weeks before the beginning of growth, and extends a couple of weeks after, so that there is a period of about six weeks in the spring of each year when you can top-graft with success. About a week before the buds start, I think, is the most favourable time.

*By Mr. Carpenter :*

Q. Then it is necessary to cut the scions beforehand?—A. The scions should really be cut the season previous, in order to secure them from possible injury during the winter, because it is most important that we should start with a healthy scion. It might grow though partially injured by winter, so that the centre of the pith was brown, but the chances are it would not be long-lived. So to avert injury we cut scions in autumn, and store them in a cold cellar. The best packing material is dry forest leaves, just as you find them under the trees blown down by the autumn winds. Tie the scions up in bundles, place them in boxes, and pack the leaves about them tightly. They will retain their plumpness if kept in a cold cellar, and just be in the right condition for top-grafting in the spring.

*By Mr. McMillan :*

Q. In planting an orchard, supposing a farmer had a choice of a southern and a northern inclination, which would you advise?—A. I should advise a northern inclination. It has been my experience here as well as in other portions of the province, that not only the trees that we plant, but the trees that nature plants are healthier and longer-lived when growing on northern slopes than on southern slopes. The reason is this, I think, that on southern slopes you have more rapid changes of climate. The spring suns beat in upon the trees and this may be followed by severe frost, and those of us that have made maple sugar know that the sun starts the sap. In the case of an apple tree which has thinner bark than the sugar maple, and is not protected by the tops of other trees as the maples are in the forest, the sun beats down to such an extent as to start the sap circulating; then if there is severe frost the tree is injured, and sun-scalding results. In most cases the northern locations furnish the most equable climatic conditions, and offer the most favourable conditions for long-lived apple trees.

*By Mr. McGregor :*

Q. How were those plum trees laid down that you were speaking about?—A. In the first place, when the trees are planted the roots are divided into two parts. The tap root is cut, and the laterals are separated into two parts. Then, in planting, the roots are divided by a saddle-shaped mound in the centre of the hole. In that way the root system of the tree practically forms a hinge which allows you to swing the tree over at right angles to the line at which its roots run.

Q. Would the tree not be affected by a heavy wind?—A. When they are taken up they are staked, of course.

Q. How are they fastened to the stake; with a hay rope?—A. I don't know what system Mr. Sharpe, the gentleman I referred to, uses, but the best plan I find to follow is to plant a stake on either side. With two stakes, one on each side of the tree, a strap may be fastened to each post and looped round the tree, which gives the tree a certain amount of lee way, but does not allow it to fall over.

*By Mr. Carpenter :*

Q. Does this plan not interfere with the growth to a certain extent in the spring?—A. It does interfere with rapid growth to some extent, but it also encourages fruitfulness. The trees are not long-lived, but by heavy fertilizing the vitality is kept up for a sufficient number of years to allow of paying crops being realized.

## NEW VARIETIES OF PLUMS.

I now pass on to the subject of plums. We have in connection with other large fruits been testing plums quite largely at the Farm. I have already mentioned the class of plums we have most largely experimented with, namely, the American varieties, because the English type of plum, or what is known as the West European type, is not sufficiently hardy for this climate. If the trees are not killed themselves, the fruit buds are frequently injured in the same way that the peach buds have been injured in the Niagara district this year to such an extent as to prevent fruit being produced. This fact has thrown our work into these channels, and the varieties which we have found of greatest value are American sorts. The best of these are Hawkeye and De Soto. We have in America three wild species. The first is called *Prunus Americana* and to that species belongs these two varieties which I have mentioned. The Hawkeye is a large richly coloured plum, covered with a purple bloom. It is quite as large as the Lombard and much more productive. It has not, however, the same solid character of flesh that the Lombard has and will not, therefore, carry as well, but at the same time the tree is much hardier, will bear just as much fruit, and in localities where the Lombard cannot be grown on account of the severity of the climate, then the Hawkeye or De Soto, both belonging to the same type, should be planted.

The Early Red and Moldavka are two varieties that belong to the European class of plums which we are testing. They are of Russian origin. They rank next in hardiness to the American plum. The fruit of the Early Red and the Moldavka resemble each other somewhat in size and appearance but differ in time of ripening. They are both large blue varieties and of very fair quality. Glass Seedling originated near St. Catharines with a gentleman who lives near that city at the present time, a Mr. Glass. I think he resided at the time he originated this plum at Guelph. However, it is the hardiest of all the blue plums of the West European type. It is hardier than Shippers' Pride or even Lombard and in this locality succeeds fairly well.

Now, we hear a great deal at the present time about the Japanese plum and I am glad to say that a great many of the good things we hear about that class of plums are true, because from this family we have obtained some varieties which are going to be of exceedingly great value to plum growers in districts where the Flemish Beauty pear and Greening apple can be grown with success. I mention these varieties just as indicative of the northern limit of sections where we might expect the best Japanese plum to be grown successfully. All through the Niagara district, in Essex county, and in the Annapolis Valley, the Japanese plums are of growing importance. The trees are as a class very vigorous. They fruit young and they are not subject to fungous diseases to the same extent as plums of the Lombard and Glass Seedling class. I will mention one variety known as the Burbank. We will take that as a type of the Japan plums and it is one of the handsomest fruits that I know of. It is about two inches in diameter, longitudinally, and of a bright crimson colour overlaid with a beautiful purplish red. It is an exceedingly handsome fruit and one of the strong points about it is, that the flesh is so firm that unlike other plums it can be shipped with comparative ease and without suffering injury. A basket was sent to me last year by a large fruit grower in Western New York; it came by express, being two days on the road. I then kept the fruit in the comparatively warm temperature of my office for ten days in good condition.

*By Mr. Carpenter :*

Q. What about the flavour?—A. I think a good Burbank plum in regard to flavour will compare favourably with a good Lombard plum. You see it does not rank high in this respect, yet on account of its firmness, beauty and productiveness I think it is a variety of plum that is destined to be of great value to the best fruit growing sections of Canada.

Let me just throw in a word of caution here, and that is that we have in the Japanese plums now introduced into Canada, some 30 varieties, and they rank in value and quality all the way from very good to worthless. Growers or planters, therefore, should be careful only to plant those that have been tested and are recommended. At

## Agriculture and Colonization.

the present time I would not feel like recommending other than the Burbank, the Abundance and an early variety—and earliness is the principal point of value in this last variety—called Early June. It ripens with the last of the cherries and for that reason would be valuable.

### GROWING OF CHERRIES.

Just a word in regard to cherries. I drew your attention a few years ago to the work we were doing in testing cherries. About the same time a bulletin was issued on that subject, giving the results up to date, and our opinions of the varieties we had tested, naming those which I considered would be worth growing in different portions of Canada. These are the varieties which at that time proved themselves valuable and which still sustain their reputation, Early Amarelle and Shadow Amarelle, Minnesota Ostheim and Montmorency. From ten trees of the Minnesota Ostheim variety last year we sold 50 baskets of cherries in the Ottawa market. They were 10 lb. baskets and sold from 75 cents to 90 cents a basket.

*By Mr. Carpenter :*

Q. Were they white cherries?—A. No. They were all red cherries of the Early Richmond type. The principal points of excellence of these are hardiness and productiveness.

Q. I think you cannot overrate the importance of our people taking hold of the cultivation of cherries. I know our large dealers in the Peninsula say there is an immense demand for a good variety of cherry, especially of the tart or sour varieties?—A. Yes.

Q. Is there any difference in the soil? Would a clay loam be as good as a sandy soil for cherries?—A. A sandy and gravelly soil is the ideal soil for cherry growing, although in this matter we cannot make any hard and fast rules and say they will grow on one kind only and not on another. A well drained warm gravelly or sandy loam usually gives productive and long lived trees.

*By Mr. McGregor :*

Q. In our district Indian cherries used to grow on the corners of the fences all over and now we have hard work to get cherries to do well with us?—A. On account of black knot, I imagine.

*By Mr. Carpenter :*

Q. I find the cherry tree one of the most difficult to grow. It requires more care and attention than any other I am experimenting with. I don't know why it is?—A. You are on pretty heavy stiff soil, which may have something to do with your lack of success.

*By Mr. McGregor :*

Q. The native cherries grew splendidly in the Indian Reserves. We could go up there and get a cargo at any time.—A. If I may be allowed to digress a moment I may say the champion cherry story that comes to me this year is from Winona. A single variety of the Yellow Spanish gave 50 baskets of fruit, which sold at \$1 a basket. That was on the farm of Mr. E. D. Smith.

Q. Of what variety?—A. Yellow Spanish. As you can plant cherry trees at the rate of 100 to the acre, at the rate of \$50 from one, you would soon get up to some very tall figures.

Q. Mr. E. D. Smith tells me he finds it impossible to supply the demand for this kind of cherry, and at good prices?—A. I may say that I have sent out during the past four years, and particularly since that bulletin on cherries was published, a very large number of scions of the varieties mentioned, to fruit growers, because they are not yet

in the hands of nurserymen. Information is being asked from all quarters as to where they can be purchased. In order to increase our usefulness, we have cut our trees of all the available wood possible and sent scions to everybody who asked, just as far as the trees would allow, in order to give them a stock of these varieties. The nurserymen are now propagating them, and in two or three years everybody will be able to obtain trees through the regular trade channels.

*By Mr. Semple :*

Q. Has there been any success in top-grafting cherries?—A. Not as a rule. If you wish to propagate cherries, it is best done by budding. Old trees do not take kindly to top-grafting. The wild cherry of the forest, however, makes a very good stock for top-grafting when young. You can perhaps dig up the suckers in the wood or grow young trees from seed suitable for budding or crown-grafting, when small.

#### SELECTION OF PEARS FOR GROWING.

With regard to pears, we are not able to grow the best varieties successfully at Ottawa. We have gone in rather for the hardier kinds, irrespective of quality, and have tested of Russians some 35 varieties during the past five years. Some of them are extremely hardy, in fact just as hardy as forest trees for that matter. We have with these had no trouble from winter killing, but our difficulty has been with "blight." They blight much more readily on one soil than the Flemish Beauty, Bartlett, or other varieties of that class. The two varieties which succeed best with us are the Flemish Beauty and Russian variety, known as Bessemianka. The name Bessemianka means seedless. It is a Russian seedless pear, but does not rank with Flemish Beauty in point of quality or appearance. The tree is very hardy, and will grow where the Flemish Beauty will not succeed.

*By Mr. Carpenter :*

Q. Can you grow any of the Bartletts here successfully?—A. Not on their own stock. I am attempting to grow them on the Bessemianka stock with some success.

*By Mr. McGregor :*

Q. We have a pear in my county (Essex), which was planted by the early Jesuits 150 years ago. It is like an elm in appearance and some of the trees are 11 feet in circumference at the base. We cannot reproduce them, however, and have no way of growing them.—A. Through the kindness of Mr. McGregor, last summer, for the first time I saw these giant pear trees of the Windsor district. They were planted by the original French settlers. It is most interesting to see these trees appearing like regular old forest monarchs, 75 feet or more in height, I photographed a couple of the trees, but regret that I did not bring the pictures with me. As to their propagation we have trees at the Farm growing from the seed of these trees. I have not secured scions of the original trees, but I do not see why they should not grow if they were grafted on suitable stocks.

Q. How long would it take?—A. You could get fruit in about 3 years by top-grafting. They all bear fruit pretty much alike showing that the type is well fixed.

*By Mr. McMillan :*

Q. Will the fruit if top-grafted be the same as that grown on the native stock?—A. I could not guarantee it would be the same, but I could guarantee that there would be very little difference. The flavour is often slightly different. By grafting a sweet apple on a sour apple, there is sometimes a slight change in the flavour, but the changes are inconstant and you cannot account for them. Sometimes there is no change, and sometimes there is considerable.

## Agriculture and Colonization.

### TEST GROWING OF SMALL FRUITS.

I will now proceed to speak of the results of our small fruit testing at the Farm. I have mentioned already the very hot weather we have had here during the summer. This enables us to ripen a larger number of varieties of grapes than the climate of Ottawa would be ordinarily credited with.

*Grapes.* We have in our vineyard 180 varieties of grapes, and out of that 180 last year we ripened about 110 fairly well. About 90 varieties we ripened perfectly, but last year was an exceptionally good year. Usually we are not able to ripen perfectly more than half the varieties under test. We have a great many new kinds of value which are not well known. Among them I would recommend the Winchell which is now catalogued by leading nurserymen. It is also known as the Green Mountain. It is with one exception the earliest white grape we have. The earliest is the Lady, but I cannot recommend that as a market variety. The Winchell is a free grower and a good producer; its quality is very fair. I am pleased to draw attention to the Kensington because it is a product of the good work of our worthy Director, Professor Saunders, before he came to the Experimental Farm. It is a cross between the European and the Native grape. The fruit of the Kensington combines in a remarkable way the qualities of the European grape with the American. The characteristic of the American grape is sprightly acidity with a large amount of juice and small amount of pulp. Sometimes, I may add, it has a large number of stones. The Kensington has the sprightly quality of juice of the American with the meaty character of the European grape and the Californian grape. It is a little late for this locality, but in the Niagara district it should be a good variety. I have already sent plants of this to the fruit growers' associations of the Dominion and it is being tested by them. Of the red ones, I might draw your attention to one of Canadian origin, the Moyer. It originated in Western Ontario and was introduced by one of the nurserymen there. Its strongest point is its earliness. It is the most reliable and profitable red grape that we can grow in this district. It will thrive and mature its fruit in most portions of Quebec. It ripens with us a little before Moore's Early. It bears a small bunch with rather a small berry, of good quality.

*By Mr. Carpenter :*

Q. It bunches very close?—A. Yes; it is a short-jointed grower. For Eastern Ontario and Quebec, and for Nova Scotia I would recommend the Moyer quite highly. It will never compete very strongly as a commercial sort because it is not a strong grower, therefore does not bear large crops, but for home use and for market to a limited degree it is certainly valuable. The Vergennes is another red grape ripening two or three weeks later than the Moyer, very much more productive, but requiring a longer season in which to ripen. The next variety I would mention is called "Chase Brothers." It has been designated in this way because it was sent to us for trial by Chase Brothers, nurserymen of Rochester, New York. It has never been sent out by them for the reason that, they said, in their experience they did not find it sufficiently productive, and for this reason they did not offer it for sale. I find it an exceedingly good variety. It ripens here between Vergennes and Moyer. As the proprietors have not sent it out we have propagated it to some extent, and distributed a few cuttings in different parts of the country. Among black grapes not well known, I would recommend the Peabody, the Aminia, (Rogers' 19), Secretary, and the Mills, the last originated by the late Mr. Mills, of Hamilton, one of the former Presidents of the Fruit Growers' Association of Ontario. The Mills and the Secretary have the same character of flesh as the Kensington,—that firmness which gives the keeping quality to grapes—I find no difficulty in keeping them till midwinter. The same may be said of the Vergennes which is the best keeper among the red grapes.

*By Mr. Carpenter :*

Q. Do you experiment with the Concord at all?—A. It ripens only one year in three with us. I have no doubt it is the best grape "for the million" in Western and Southern Ontario.

*Raspberries.* In raspberries if you wish a white variety, there is nothing better than the Golden Queen. For the red ones I have put in Heebner, Marlboro, Cuthbert and Sarah. Marlboro is the earliest. In my opinion the Heebner is the best early raspberry we can grow for home use. It is not generally known because it has been tested only at the Experimental Farm. It was secured by Mr. Hilburn, the former horticulturist of the Central Farm, from a party in Muskoka. The Sarah I point to with some pride, as a production of the horticultural work at the Experimental Farm through the good offices of the Director. The good points about it are that it is somewhat later than the Cuthbert and better in quality, in addition to being a strong grower and a very productive variety. It was produced by crossing a black cap with a red raspberry; in consequence, the fruit is intermediate, being light purple in colour as is the fruit of most varieties produced in this way. If you cross the black with the red you nearly always get an intermediate purple colour.

Q. The colour interferes with the sale, does it not?—A. It is not so dark as the Shaffer, the one you are probably thinking about. This is a dark crimson. We have tested a large number of black raspberries, and find the best of these tried is the Older. The Older has given 50 per cent more boxes of berries for the past four years than almost any other new variety tried in the experimental plots.

*Gooseberries.* Touching gooseberries, I am again pleased to draw attention to another production by Professor Saunders, namely the Pearl, a cross between the English and the American gooseberries. It resembles the American type very closely and is one of the best at the present time of this class. Of the English varieties, Whitesmith takes the lead for productiveness and general profit. I have included Sir Harry and Green Ocean, because they belong to the very largest class of English gooseberries. The Green Ocean produces berries two, to two and a quarter inches in length, and its quality is such that when you have eaten one (uncooked), it makes your mouth water for another. Sir Harry is also very large, and a very good fruit. I would say that in my opinion there is money in growing these English gooseberries for city markets. It is almost impossible to find in our markets in the gooseberry season anything but the small American varieties which are picked green and used for preserving, but such varieties as Green Ocean and Sir Harry can be eaten raw just as peaches, plums or other dessert fruit are used; when once eaten they will always be appreciated. I have tried to persuade fruit growers who have the proper situation and conditions which, roughly speaking, are a clay soil with protection from wind and hot sun, and a near market, to grow these English gooseberries, because at the present time in fruit sections we run too much in ruts. We all grow too much of the same kind of fruit, and if we can diversify our system of fruit growing, we will increase the possibility of profit.

*Currants.* I need not do more than draw your attention to currants, because there is nothing particularly new in the varieties mentioned, except one kind, the Moore's Ruby. I would recommend all who wish to grow currants for home use to plant Moore's Ruby. People imagine that a currant is a currant, and that all kinds are about the same with regard to quality, but it is not so. The Moore's Ruby is 25 per cent better than any other variety of currant that I know of, and is also fairly productive.

*Blackberries.* In blackberries Agawam and Ancient Briton have done the best with me, and can be grown with profit in this locality if a little care is taken in either growing them low enough so that the snow will protect them naturally during winter or high enough to enable them being bent over and covered with sufficient soil to hold the canes down.

*Strawberries.*—As to strawberries, we have tested this year about 180 varieties, and of these find the best to be Beder Wood, Warfield, Crescent, Williams and Parker Earle. For the past two years they gave us the largest yields, and possess those points of excellence which mark them as the best market varieties.

## Agriculture and Colonization.

COMMITTEE ROOM 46,

HOUSE OF COMMONS,

WEDNESDAY, 25th March, 1896.

The Select Standing Committee on Agriculture and Colonization met this day at 10.30 o'clock a.m., Mr. Sproule, Chairman, presiding.

MR. JOHN CRAIG, Horticulturist at the Central Experimental Farm, was present by recall, and on invitation, addressed the Committee as follows:—

### TREATMENT OF FUNGOUS DISEASES.

Mr. Chairman and Gentlemen,—I intend taking up this morning with your permission some of the results we have obtained during the past six years in carrying on the work of spraying for the prevention of fungous diseases. This is a work of great importance and great value to all the fruit producing districts of Canada, and each year that I have had the privilege and opportunity of coming before you, I have endeavoured to impress that upon you, particularly the representatives of the fruit districts of Canada, that this was new work the value of which was not generally realized, but which should be brought home to fruit growers and thus be practiced more thoroughly. I want to present to you this morning some facts and figures regarding the cost of doing this work and the profits which may be derived from it. But first let me briefly point out what has been done during the time which has elapsed since I appeared before you at your last session.

*Quebec.* In Quebec, where spraying as yet may be said to be principally confined to apples, there has been no new work of an investigating character carried on. Our work in this province has been of a demonstrative character taking the form of object lessons, illustrating its benefits and given in districts where spraying had not yet been practiced. By selecting orchards here and there and furnishing the materials to the party owning the orchards, who has agreed to carry on the work under our direction during the year much good has resulted. This work I may then say has been of considerable value in bringing before residents of those different districts the good which may be derived from carrying out our directions carefully and perseveringly. As an instance, in the province of Quebec, on the Island of Montreal, in that renowned fameuse growing district near Lachine, an orchard was selected, the orchard of Mr. Descaries. At the proper time, in early spring, just before growth commenced, a meeting was called of the farmers of that vicinity. I attended that meeting and gave an address on fungous diseases and how they might be successfully prevented. A practical illustration of how to make and use Bordeaux mixture was given by preparing the material, going to the orchard and spraying the trees. The owner afterwards carried out the work during the summer, and on page 117 of the Annual Report which is now in press you will find a letter from Mr. Descaries in which he bears satisfactory testimony to the value of that work. He says that “with regard to the quality of the fruit of the fameuse there is a great improvement.” Indeed the effects are more clearly shown on the fameuse (which spots badly) than on other sorts. He closes his report by expressing gratitude for this work being done in his district, and his intention to carry it on another year in a larger way.

*By Mr. Carpenter:*

Q. How many sprayings did you give that orchard?—A. That orchard received four sprayings during the season.

Q. Did you spray for black spot only?—A. The work was done primarily to prevent black spot. I should have stated that the Fameuse apple in that district, and in fact all over Canada, has during the last eight or ten years been very much affected by

“black spot,” (*Fusicladium dendriticum*. Fekl.) and our work was particularly designed to prevent this disease. Spraying is always effective just in proportion as it is thoroughly done. That has been clearly demonstrated year after year.

Following the St. Lawrence eastward for something over 200 miles we come to L'Islet County. We find here another important fruit growing centre in which spraying has not been practiced in the past. An orchard was selected here and the work inaugurated and carried on in the same manner as I have already described in the vicinity of Montreal. We have also in the annual report Mr. Verrault's testimony which is practically to the same effect as that of Mr. Descaries, and altogether very satisfactory.

*Ontario.* In Ontario I described to you last year the results of our previous season's work upon apples, pears, plums, and cherries, which were very important indeed. This season we did not do very much on apples, and nothing on plums and cherries. The work on pears was continued, and new work taken up on peaches. The experiment with peaches had for its object the prevention of a very serious disease known as the “peach curl.” This disease has in some districts been serious some years although perhaps not every year. Last year when I was before you I described the life history of this disease, and its effect upon the foliage and fruit of the tree in addition to outlining how it might possibly be prevented. It was with the object of finding whether my surmises were correct that the experiments were carried on last year, the substance used was a material called lysol. It belongs to the carbolic acid group, and is a coal tar product. This has been recommended in Germany and France as a fungicide, not particularly for peach curl, but for fungous diseases generally, in fact for all those diseases which are propagated by spores. It was with the object of determining its efficacy, the proper strength to use, that these experiments were conducted. The work was carried on in two orchards, in Essex County, one at Leamington and one at Cedar Springs. We determined the maximum strength which could be used with safety so far as injury to the foliage was concerned, but we were not successful in getting decisive results as to its effectiveness in preventing this disease because luckily for the peach growers of that district, “peach curl” was not prevalent to an injurious extent last year. So that with this particular substance we are only able to point out thus far what strength it is safe to use it without injury to the foliage. That is as far as we have gone. Our experiments show that a one per cent solution may be used with safety on peach foliage.

*By Mr. Carpenter :*

Q. I hope you are not going to allow the matter to stop there because some years it is a very serious matter in the Niagara peninsula. Do you intend to go on experimenting this year or not?—A. The carrying on of this work involves considerable expense, and the Director of the Experimental Farm—I am glad to see Mr. Saunders here this morning—has to use his judgment in dividing up the farm vote to the best advantage. The question, therefore, of carrying on this work is at present under consideration.

Mr. SAUNDERS.—Mr. Craig made a recommendation to me yesterday with reference to this matter, and I think it is very likely to be carried out.

Mr. CRAIG.—In connection with the experiment with lysol I also used the Bordeaux mixture which I have frequently spoken of and described before this Committee, and if we are able, as I hope we shall be, to carry on this work during the present season, I trust I shall be able to give the Committee useful information with regard to the results obtained during the opening year, at our next meeting.

Now, I said that this work had been carried on by the Experimental Farm for the past six years. I am sure it will be of interest to you to know something about the cost per acre of spraying, its effect on the apple crop of Canada if it were done in a large way and the Dominion over, also the cost to the country of our experimental work up to date.

I claim, and I think justly, that it has, up to the present time, been of great service not only to Ontario but to all fruit-growing districts of Canada.

## Agriculture and Colonization.

In considering the actual cost of the work of spraying an acre of apple trees for one year with the return, we may take into consideration increased yield as well as improved quality, because sometimes, though not always, we get an increased yield of fruit as well as an improved quality of fruit; we do not claim that we always get an increased yield but if you spray two years in succession the chances are you will get an increased yield, because the healthier leaves obtained by spraying the first year will give you a stronger growth and more fruit buds to produce fruit the next season, so that I say the chances are that you will get an increased yield, as well as an improved quality. Now, it costs for trees, say 30 years of age, \$7 per acre to spray an orchard for one season, and to do the work thoroughly. It need not cost more than \$5, but I am placing the figure at \$7 as an outside limit which is sure to cover the whole amount. That gives us a cost per barrel, supposing we have a yield of 50 barrels to the acre, and one and two-third barrels per tree of only 13 cts. per barrel. In 1894, in the orchard of Mr. A. H. Pettit, Grimsby, where I carried on important spraying experiments, the spraying was done at a cost of \$5 per acre—less than the cost given above. The result of that spraying was that the sprayed area yielded 24 per cent more of first-class apples than did the trees which were unsprayed. It yielded 6 per cent less of second-class fruit and 18 per cent less of third-class fruit; so you see the ratio is all in favour of increased quality of the first-class fruit. Now this improvement in quality and quantity would mean a net profit on an average crop from an acre of between \$40 and \$50, if the apples were sold at \$2 a barrel.

*By Mr. McMillan :*

Q. You cannot get that figure. I have sold apples for the last 15 years and I think \$1.75 was the highest price I ever got?—A. Supposing you took \$1.50, that would reduce it, say 25 per cent.

*By Mr. Carpenter :*

Q. In your estimate of the cost of spraying it does seem to me you are a little high. To spray an orchard four times each season the cost need not exceed \$5 per acre?—A. I am trying to be on the very safe side in this estimate and I am giving the outside figures for doing the work. The chances are that the cost will be under \$7.

Q. Very much under?—A. It costs us less than that. So that a yield of 50 barrels per acre sold at \$2 a barrel would give you a profit, on the actual returns which I secured, 40 to 50 dollars per acre. Now let us consider the profits derived from the improved quality alone, and that perhaps is the best basis upon which to look at this matter, because that is something we may be sure of securing every year if the work is done faithfully and well. These figures are based also on the actual results of our own work. We will again place the cost of spraying an acre at \$7 and the cost per barrel 14 cents. This on the basis of a 50 barrel yield would give us a net profit of \$10 per acre. That does not seem very large but if we consider the entire crop of apples in Ontario from 100,000 acres—we have in orchard and gardens in this province about 220,000 acres—we should have a return from this area at the rate of \$10, of a million dollars and supposing we reduced the profit one-half, or to \$5 an acre it would still mean \$500,000 saved to the producers.

The cost of the spraying experiments which have been carried on at the Farm—the actual cost of the work—during the past 6 years has averaged less than \$100 a year. I am not counting in that statement my own time, but the amount of time given to this is comparatively small as compared with the time I give to other work. The actual experimental work up to date has cost the country \$475; but we will suppose that it cost \$100 per annum or \$500 altogether. If we were to spread that over the possible improvement and quality amounting as I have pointed out to \$500,000 a year we would see that the \$100 per annum would mean a tax of one-fiftieth of one per cent on the amount thus saved. That is just as a result of improved quality, not quantity, and for one year. I am putting the matter in this somewhat striking manner in order to impress upon you the value of urging fruit growers in every district to practice this as a

necessary part of orcharding more fully in the future than they have in the past; and I can also justly and safely say that up to the present time that this valuable work has not from the outlay at the Experimental Farm cost the country a great deal, although productive of important good.

Ontario probably produces more than half of the Canadian apples exported to Great Britain and it might interest you to know that the average export between the year 1890 to 1894, inclusive, from Canada amounted to \$1,233,833, per annum. Of course that says nothing at all about the vast amount consumed in our home markets. An industry bringing back to the country such a large income and having its prosperity based upon the development of natural resources is worthy of being encouraged in every possible way.

I have here some photographs for your examination which graphically illustrate and will bring to your notice the benefits of spraying. Here are two pear trees—possibly some of the Committee have seen the views before—one illustrates the benefit of spraying by its healthy, fruitful appearance and the other is a tree which has not been sprayed, has little fruit and that of poor quality; you will easily see the difference. Here are two grape vines of the same variety that are grown alongside of each other in the vineyard of the Experimental Farm. One has been sprayed every year, the other has not been sprayed at all. You will see that the one that has not been sprayed has entirely or almost entirely lost its foliage and carries no fruit, while the other is in a good healthy condition, and has a fair crop. We merely keep these views in the Farm vineyard as an object lesson for our visiting farmers. They are more conclusive and convincing than hours of argument. Here is a photograph of two apple trees,—Northern Spy—grown alongside each other; one sprayed and the other not sprayed. Here are two other trees—Flemish Beauty pears—showing similar results to those already noted. You will also see two trees of American Baldwin. One side of one was sprayed and the opposite tree was not sprayed. If you will look closely you will see the apples hanging thickly on the branches of the sprayed tree, while the other tree is unhealthy in appearance and is destitute of a crop.

*By Mr. McMillan :*

Q. Will this spraying prevent the cracking of the Flemish Beauty pear?—A. Yes. That is one of the most satisfactory diseases to treat from our standpoint because it always yields to careful treatment. If the spraying is commenced before the leaves push out and repeated at intervals of two or three weeks, this, of course, depending on the weather, no difficulty at all will be found in preventing that disease. I need not draw your attention at any length to our spraying machinery as I dwelt on that when I was before the Committee last year. The illustration of a spraying pump at work, which I have here, was taken in our orchard at the Experimental Farm last spring. It illustrates the mode of operating the spraying pump, which is fitted into a cart, a vehicle that we find quite suitable for our work.

*By Mr. Carpenter :*

Q. I see you were using a two-wheeled cart. We find a four-wheeled cart carries the barrel a little steadier than the two-wheeled?—A. As a rule four-wheeled vehicles are better for the reason which you mention, but sometimes it is convenient in old orchards where the trees are crowded, to use a two-wheeled vehicle as you can turn more easily.

Q. What is the pump which you use?—A. This pump is one supplied by the Toronto Wind Engine and Pump Company. We have equally satisfactory pumps made by other Canadian manufacturers.

Q. What nozzle?—A. The McGowan and the Vermorel. I use generally two, one on each pole, they are different in construction. One of them, a fine sprayer, we use for the lower branches of the tree, and the other throwing a coarser spray is directed to the upper part of the tree.



PLATE II.—LINDLEY GRAPES, NOT SPRAYED.



PLATE III.—JANBLEY GRAPES, SPRAYED.

## Agriculture and Colonization.

### REMEDY FOR DEFECTIVE FERTILIZATION OF FRUIT BLOSSOMS.

One of the special lines of investigation inaugurated last year, and one which I consider is going to be of great value to fruit growers—especially as we are now going into fruit growing more extensively than in the past and consequently planting larger blocks of trees—was to determine the period at which different varieties of fruits blossom. There are here and there throughout the country many orchards which have been in the past unfruitful and without an apparently adequate reason. For instance there may have been a large block of Baldwins, a large block of Greenings, or a block of Northern Spies which for unaccountable reasons have been unfruitful. Perhaps they have been fairly well cultivated, the trees pruned and sprayed, the land well drained and manured, but still they have failed to bear satisfactory crops of fruit. Recent investigations in connection with the blossom has established the fact that some of these fruits, notably a number of varieties of pears, also grapes of the Hybrid kinds are infertile of themselves. That is, the blossom is not properly fertilized with its own pollen and therefore cannot produce fruit. This defect is accentuated when you have a large block of trees of one variety planted in such a manner as to be dependent on their own pollen for fertilization. In order to remedy this, it is necessary to ascertain what the trees are and to plant alongside of them other varieties that bloom at the same time, or in setting an orchard, to intermingle the varieties so that we shall have trees blooming about the same period contiguous to each other, in order to favour cross fertilization. In order to secure data with regard to the time of blossoming of different varieties I sent out small record books all over Canada early last spring to leading fruit growers asking them to co-operate with me in securing records of the blossoming period of fruit trees in their respective localities. In most cases they responded very readily and I was able to secure in this way some very valuable records. Last season was somewhat abnormal, especially in Southern Ontario where the spring burst upon us very suddenly, the unusual heat causing nearly all varieties of fruit to blossom much nearer the same time than usual. On this account the records will have to be carried a year or two longer in order to corroborate those of the past season. I have prepared a chart for your examination giving the condensed results of the observations. It is rather interesting to note the length of time which the blossoming period for the same variety covers from one side of Canada to the other. You will notice that the Alexander blossoms in British Columbia on May 7th; in Ontario (and these figures are averages made up from records obtained in different portions of each province) on May 19th; in Quebec May 16th; in Nova Scotia June 5th and so on. On this other chart the coloured lines illustrate or show the same varieties blossoming at the same time in different districts. The yellow line illustrates the Windsor district; the black line the Winona district. The dates at the top show when each variety blossoms at a certain place; by following it out it is easy to throw the different kinds into groups based upon the blossoming period.

*By the Chairman:*

Q. But won't that depend largely on the warmth in the spring, whether it is early or late?—A. Yes; but it will affect them all the same. As a result of the work this year, I have been able to put into provisional groups, based upon the time of blossoming of the varieties recorded. In the first group the earliest bloomers are the Duchesse, Fameuse, McIntosh Red, and Ben Davis. In the second or middle group, that is, those coming between the earliest and the latest, we find the Baldwin, the Golden Russet, Wealthy, Wagener, Yellow Transparent and Red Astrachan. If these are planted in positions where the pollen can be carried from one to the other, we may expect complete fertilization. In the third or latest group, we have the Alexander, Maiden's Blush, Northern Spy, Ribston Pippin, Roxbury Russet, and the Talman Sweet. These are the principal varieties of apples recorded, placed in three groups. Now, with regard to pears, they may for practical purposes be placed in two groups, the first of which will include Howell, Keiffer, Seckel, Sheldon and Anjou. The second group will

include Bartlett, Chapp, Duchess and Flemish Beauty. The plums may also be divided into two groups, the first including Burbank, Duam's Purple, Lombard, and Bradshaw; the second group, German Prune, Imperial Gage, Moore's Arctic, and Reine Claude. The cherries are mostly self-fertile and blossom all about the same time. I shall not have time to go into the matter more minutely this morning. The subject is one of very great interest and importance. Any one engaged in horticultural work should know the parts of the blossom and how the process of fertilization takes place in order to assist it artificially, if necessary.

*By Mr. McMillan:*

Q. In reference to this question of blossoming, you can go into one locality and get an orchard which lies with a southern inclination and another with a northern inclination, and they will be nearly a week apart in the time of blossoming, with the same variety of fruit?—A. Quite so, but that does not affect the point I am making. If you have different varieties of trees under the same conditions, they will all be affected in the same way as to time of blossoming, so that, if the period be early in one district and late in another, the effect on all varieties will be more or less uniform.

Q. But, if you want to give us accurately the time of blossoming, you should carry on your observations for a few years in order to give us the average?—A. Exactly. The reason I have discussed it this morning is to show that this is a work that is new but of coming importance. I was about to ask the members of the committee who represent fruit-growing constituencies who should be particularly interested in this work, to endeavour to help me by securing the co-operation of reliable men. I shall be glad to send them record books to assist in carrying on these investigations.

*By Mr. Featherstone:*

Q. Then this chart just shows the comparative blossoming dates of the different varieties last year?—A. These are the average dates for each province. I have placed them on the chart for the purpose of showing the extent of the country where apples are grown and the time covered by the blossoming period of the same variety in crossing the continent from west to east.

Q. But you will find a difference in them?—A. Yes. From year to year.

Q. No, in the same year? For instance, they blossom at a different time along the lake and ten or fifteen miles back in the province of Ontario?—A. Yes, of course, in a chart like this covering the whole of the Dominion, I can only give averages in each province.

Q. Then this other chart gives you the different localities in the province of Ontario?—A. Yes, that gives you the blossoming period of the same variety in different localities in the province of Ontario, and the other gives the averaged records for the Dominion

*By Mr. Carpenter:*

Q. Your argument respecting fertilization of course applies with equal force to grapes?—A. With much stronger force.

Q. You take a vineyard of Brighton, for instance, and without being mixed with other varieties it would be almost valueless. You would scarcely get a crop at all?—A. Yes, that is quite so.

*By Mr. McMillan:*

Q. Are not strawberries the same?—A. This fact has been established in connection with the cultivation of strawberries for years, and also with reference to grapes for a shorter length of time. It is comparatively new as related to pears, apples and plums. But as we go on we find the varieties depend more and more upon cross fertilization for the fecundation of their blossoms.

## Agriculture and Colonization.

By Mr. McGregor :

Q. You say it may be done otherwise than by the pollen moving in the air. How is this process carried on?—A. Artificial fertilization, that is what we do when we blend two varieties, when we wish to control the parentage of a variety we hope to produce. This means taking the male of one kind and the female of another, and crossing and operating on the blossoms by transferring the pollen from one to the other by hand.

Q. Can those who are not well posted do it?—A. All that is necessary is a knowledge of the parts of the blossom. This illustration shows you longitudinal section of an apple blossom just about open. You will first notice the green portion, or outer envelope, below this is the protecting part of the blossom, the calyx which covers up and protects the tenderer parts and protects them from the cold of winter. The next envelope is more delicate in texture and more highly coloured and is called the corolla. That part has for its object the attraction of insects. It is not so much of a protection as the outer cover or calyx. In the next series we have these yellow filaments, the stamens, or pollen bearing organs of the blossom, and they contain the fertilizing substance. Then next we have the central organ, the pistil, divided into three parts as shown on the chart, it really has five parts. The other two parts have been cut away in making this section. The perfect apple has five parts to the core, representing the same number of parts into which the pistil is divided. These divisions are styles. The stigma is the enlarged portion at the end of the style. These compose the female portion of the blossom. It is divided then into five portions, each division representing one of the five parts of the core of the apple. Fertilization is effected by the pollen being carried from the stamens to the pistils. The stamens are the male organs, and the pistils the female. To secure successful artificial cross fertilization, the work must be done before the blossom is open, otherwise the blossom may fertilize itself. We remove the male organs by cutting away the stamens. We then cover the blossom with a paper sack so that no pollen can be carried to it from another blossom on the same tree or from any other tree. It is, I say, covered with a paper sack, and in 24 hours is usually ready to receive pollen from the variety you wish to cross with it.

Q. But suppose you want to cross to get a good crop of apples?—A. I was just describing the process of artificial fertilization. If you wish to produce a good crop, it would be necessary to introduce pollen in a large way, by intermingling varieties in the orchard or by means of branches, for instance. The presence of bees in the orchard will generally secure cross fertilization, going as they do from one tree to another in quest of nectar. Where varieties are intermingled there is usually no difficulty experienced in securing a good crop, because the pollen is a slight powdery substance, and is easily carried by the breezes and by insects. This figure represents the blossom when it has been prepared for cross fertilization. The outer envelope with the stamens have been taken away. Then it is covered up with a paper sack in this manner, as represented here.

### CULTIVATION OF THE CRANBERRY.

Now, Mr. Chairman, I would like to speak about five minutes on another fruit which in Canada is increasing in importance. I refer to the cranberry. For the past two years many inquiries have come into the horticultural division of the Central Experimental Farm, and into the Director's Office asking for information regarding the cultivation of the cranberry. In Canada there are undoubtedly large areas which are admirably adapted, which might be profitably devoted to the cultivation of this fruit; some of the requirements necessary to success may be briefly indicated. In the best cranberry growing sections they have a moderately cool and equable climate. One of the necessities towards success in cranberry growing is the absence of late spring frost. With regard to soil, all soils of an alluvial character seem to be fitted for the cultivation of the cranberry, these include soils of a vegetable formation. We find in Canada that there are two wild species of cranberry, one (*vaccinium oxycoccus*), a small fruited kind, which grows more or less extensively over the lower provinces. This variety I

found while in New Brunswick last winter had been shipped to Boston the previous season by the carload. It is called there the "fox berry." It does not equal the cultivated cranberry in point of size, quality or productiveness, but as it grows without cultivation and incurs no expense except that of picking and packing, it has been shipped considerably. The cranberry of commerce belongs to the large fruited variety called (*vaccinium macrocarpon*.) I may say that cranberries belong to the blueberry and whortleberry family. A drift formation of soil has not been found suitable, but there are, however, one or two exceptions that I know of where cranberry bogs have been cultivated with a fair amount of success on soil of this character.

*By Mr. Carpenter :*

Q. You have not experimented at all with blueberries?—A. The blueberry is one of those fruits which does not seem to take kindly to cultivation. I have received plants from the Georgian Bay district that came with the most glowing descriptions regarding their size and quality that filled me with enthusiasm and hope that I should be able to produce berries on the farm as good as those described, but my hopes have not yet been realized.

*By Mr. McGregor :*

Q. Blueberries grow at Lake St. John?—A. All through the Saguenay region the blueberry flourishes, as well as in parts of New Brunswick, the Georgian Bay and Muskoka districts. It is also to be found quite plentiful in the Gatineau district not far distant from Ottawa.

*By Mr. Featherston :*

Q. Have you any stumps on the farm?—A. Not now.

Q. That is the secret of the non-success of the blueberry. It thrives well around the roots of pine stumps?—A. Yes, but we find them on the thinly covered rocks in the Gatineau district, where there may have been stumps in the past but where there are none now. They undoubtedly thrive best on soil rich in humus and vegetable deposits.

The cultivation of the cranberry only began about half a century ago at Cape Cod, in Massachusetts. I have said that late spring frosts were one of the drawbacks, and therefore in selecting a site it is necessary to choose one which is as little liable to this influence as possible. A peat or a mossy bog is very suitable, not only on account of the soil but on account of being more or less exempt from weeds. The work of clearing and preparing a bog is the principal item of expense in connection with the industry. In the cranberry regions of Cape Cod the practice is to mow the undergrowth, cut the turf in squares and in this way clear off the whole surface. That is followed by a levelling the soil which in turn is followed by sanding. Sand is distributed over the surface to the depth of 3 or 4 inches, this prevents the growth of weeds and also renders the soil somewhat poorer. If cranberries are grown on a rich nitrogenous soil such as we find in these bogs, they run too much to wood or vine and too little to fruit, by covering the surface of the soil with the sand conditions are provided which favour greater productiveness.

*By Mr. Macdonald (King's) :*

Q. How much sand?—A. About 4 inches.

Q. What is the formation underneath?—A. A peat bog varying in depth from 15 inches to 3 or 4 feet is used in Cape Cod, and is considered the most suitable. One of the prime requisites to successful cranberry growing year after year is to have your bog situated so that it can be flooded in the fall, this necessitates dyking and ditching so that the water can be let in by means of the ditches and can be held there by means of the dykes. It must not be supposed that the cranberry needs water up to the surface of the soil all the year round; in preparing a bog, therefore, it is necessary to provide open ditches in order to lower the water level to a depth of 15 or 18 inches below the

## Agriculture and Colonization.

surface of the soil. This ditch is also necessary in order to flood the bog properly in the autumn. The water is let in in the autumn, after the fruit is picked, and is allowed to remain on the bog until the danger of spring frosts is past, and this latter possibility is one of the principal reasons why arrangements should be made for flooding.

Q. Is it allowed to remain on all winter?—A. Yes, it is allowed to remain on all winter and at the same time it should be flooded rather deeply, because I think that one of the principal causes of the failure of the large cranberry enterprise entered into by Mr. Walker, in Western Ontario, was insufficient flooding the ground, freezing the young plants held in the ice and on the soil settling back they were left out on the surface and consequently withered away.

Q. To what depth would you flood?—A. This I think would depend upon the amount of frost and snow. It should be sufficiently deep so that the frost will not penetrate the soil to any great depth. Of course in order to have this flooding done economically the ground must be carefully levelled, so that you will not have deep pools and unflooded portions in other parts.

*By Mr. Cargill:*

Q. At what time in the spring would you allow that water to run off?—A. If I were speaking for this locality I would say as we rarely have any frosts after the 15th of May, that this would be the proper time, but you would have to be guided by the occurrence of the latest spring frosts in whatever district your bog was situated.

Q. Would you leave the water on continuously?—A. Continuously throughout the winter.

Q. Until you think the spring frosts are past?—A. Yes. Now the setting out of these plants is a comparatively easy matter and the best plants to select are the upright shoots from the runners. The habit of the cranberry plant is to run along the ground and wherever it strikes root it throws up a shoot. In this respect it somewhat resembles the strawberry. The best plants to select then are these shoots. They are planted after the ground has been levelled, sanded and the rows lined out by a marker which when drawn across the field at right angles leaves the rows 18 inches apart each way. They are very easily set, a boy drops them at the intersection of the rows, while a man follows with a stick and presses the cuttings into the sand, then packs the soil around with his foot, when the work is done. It takes about four barrels of these cuttings to plant an acre. They should be kept, of course, when they are gathered, in a cool and damp place until they are planted. I need not go into the matter of constructing a dyke and flooding. The dyke is made of sods and turf and should be strong enough to resist the pressure of the water. The flooding should be even and uniform.

*By Mr. Macdonald (King's):*

Q. Have you heard of a weevil attacking the plants?—A. There are a number of insect pests which are quite injurious to the plants and fruit in the Cape Cod cranberry districts, but the principal remedy for these is thorough flooding in the fall and keeping the bog submerged till late spring.

*By Mr. Bain:*

Q. How far south do cranberries succeed on American soil?—A. They are grown not much further south than New Jersey. Some are grown in the Chesapeake Bay district, I think.

Q. That is about their limit?—A. Yes. The greatest cranberry growing districts are Cape Cod, Massachusetts, and New Jersey, and, to a limited extent, Chesapeake Bay.

Q. I suppose the New England climate is favourable?—A. It is most favourable and they have a suitable soil also.

After planting, the weeds should be kept down for the first two or three years until the plants form a solid mat over the surface of the ground; subsequent to this

there is very little trouble, because they will take complete possession of the soil themselves. There are a few insect enemies, one called the "fire-worm," another called the "fruit worm." The first insect eats the leaves, and the remedy is, as I said before, to flood somewhat later in the spring than is necessary to prevent frost, up to June the first. The fruit worm bores into the fruit, and the remedy for this also is late flooding.

Now, about harvesting the crop. In the Cape Cod district the average yield for a cranberry bog is computed at 50 barrels, and the average price for the last seven years has been about \$6 per barrel, a return of \$300 per acre. The picking costs about \$1.75 per barrel, making a total of \$83 per acre. Before packing, the berries should be screened, and this costs \$12.50. The packages cost \$12, making the cost of picking, packing and marketing, with cost of care of bog, \$10, and interest on \$425, \$25, a total of \$144, leaving a balance of about \$150 as a profit. Like other crops, there are years of total failure.

In Nova Scotia there has been quite an interest taken in this work during the past three years, and cranberry bogs are being set out to a considerable extent in the vicinity of Berwick in the Annapolis Valley. Between 40 and 50 acres are being prepared this year. Last year, at the meeting of the Nova Scotia Fruit Growers' Association, Mr. Henry Shaw, of Waterville, showed the account sales of 27 barrels of cranberries, which he picked and sold from a quarter of an acre. These netted him \$6 per barrel, or \$162 for the quarter acre. Of course this is exceptional, but at the same time there is no doubt that, with care and judgment, cranberries can be grown with profit in many portions of the Dominion. In the counties of Annapolis, King's, Digby, Lunenburg, Queen's, Yarmouth, Richmond, Cape Breton, Guysborough and Inverness they grow naturally and are beginning to occupy an important place in the fruit crop of the province.

*By Mr. McGregor :*

Q. Is the high bush cranberry of any commercial value?—A. It is not of very great commercial value.

Q. Is it not recognized in the North-west where they have no small fruits?—A. Do you mean the high bush cranberry? I know the Buffalo berry is grown and is esteemed for jelly making. I do not know that the high bush cranberry has any commercial value, or is used to any extent for this purpose.

*By Mr. McDonald (Assiniboia) :*

Q. Is not the fox berry preferable for jelly making or preserves?—A. I have had no opportunity of comparing them.

*By Mr. McGregor :*

Q. The high bush cranberry has a little hard stone?—A. Yes, a small, hard, flat stone. It is not of the same family as the low berry. It is *viburnum* and bears a white flower like the snowballs. We have a number of plants of this variety at the Experimental Farm and they are strong, vigorous growers. Possibly it might be of interest if I mentioned to the committee the figures of the cranberry crop in the United States during the past six years. They are as follows:—

	Bushels.
1890 .....	800,000
1891 .....	760,000
1892 .....	600,000
1893 .....	1,000,000
1894 .....	400,000
1895 .....	650,000

At no period during these six years have I been able to find that the market was over supplied, so that it seems to me, especially at this juncture, now that they are

## Agriculture and Colonization.

beginning to be shipped to England, that this is a favourable opportunity for our people to commence cultivating this fruit. We are told that cranberries in the past have not been appreciated in England. Cranberry sauce with turkey was comparatively an unknown luxury. But this state of affairs is being changed. The Cranberry Growers' Association of New Jersey call attention to this fact in their reports. When in Prince Edward Island a short time ago, I found a grower who shipped 30 barrels this season which netted him \$7 a barrel.

*By Mr. Macdonald (King's) :*

Q. Did he ship them to England?—A. Yes, to London. The varieties grown most extensively in the Cape Cod district are the Early Black, Second Early, and the Macfarlane. I do not know that with my present experience I would advise these to be planted in Canada very largely, because it is just probable they may not prove to be well adapted to our soil and climate. Possibly it may be better to hold to the native varieties. I should not forget to mention that the fruit should always be cooked in porcelain vessels, because if cooked in ordinary metal ware, the sulphuric acid which analysis shows to be contained in the fruit, more largely than in other fruits, is said to attack the metal, in this way affecting the flavour of the fruit and making it dark coloured. Cranberry growing is an industry in which if the conditions are favourable, there certainly is money for the grower. It has been entered into in the eastern townships of Quebec, and with some success.

*By Mr. McGregor :*

Q. I would like to mention the experience which we have had in the county of Essex. We put in 200 acres in cranberries with a reservoir constructed to flood it, and went at the thing scientifically, but with all our care and the expenditure of \$200,000 I do not suppose we have gathered a barrel of fruit. For this reason I feel that in advising any one to go into this business they should do it in a small way, to find first whether the climate and the soil is adapted to growing them.—A. What was the character of soil?

Q. This land was covered with 4 inches of gravel which is supposed to be favourable.—A. As far as I have been able to learn from experience and by reading that is not a suitable kind of soil. A sharp sand to cover the muck is preferable. You would get a drift soil if you had coarse gravel and drift soils are not favourable to the growth of the cranberry plant.

Q. I am inclined to think that any one going into this business should go at it quietly and gradually in order to guard against failure. The expenditure was very great with us, and consequently there was considerable loss. We had the engines and pumps and all the machinery that we wanted and yet you could not gather a barrel of cranberries in the whole of that district.—A. Mr. McGregor's advice is very timely and applicable in connection with all new and untried lines of fruit-growing. You must begin slowly at first. That brings to mind my first experience in cranberry growing. Some 18 years ago I assisted in planting out a very carefully prepared cranberry bog of about  $1\frac{1}{2}$  acres in extent. The plants were carefully collected and brought from a distance, they were planted as best we knew how, following the most reliable book directions, but the bog was not sufficiently flooded and the plants failed. The remainder of the plants left over after setting out this carefully prepared patch, were gathered up with a pitchfork, and thrown into a springy piece of ground which the cows used to frequent to drink. The outcome of it was, to make a long story short, that the carefully planted never gave us a berry. But in four years we picked fruit from the plants thrown into the mud hole, and it has been constantly increasing in area and yield up to this year. This small beginning has induced the owner to extend the plantation and he is preparing a couple of acres and going into it more thoroughly, using some of the plants that have established themselves and being guided by the experience he has gained in this small way.

*By Mr. Macdonald (King's):*

Q. A man told me that he took a lot of plants and put them in a barrel and chopped them up with a spade, and sowed them on ploughed land and they did very well?—A. I would rather not advocate that method of preparing plants. I have heard also of running them through a feed cutter, and planting them, but I don't think as a rule that is likely to be very successful.

COLD STORAGE FOR FRUITS.

Last year I gave you some of the results secured in an attempt to find out how different fruits were affected by being preserved by means of cold storage. At the request of the Fruit Growers' Association of Ontario, an experiment was made in the way of endeavouring to carry to England some of the early soft and perishable fruits. The request came rather late in the season and at the time no provision could be made in the way of a special compartment for transporting these fruits, and the Minister of Agriculture further carefully explained to the delegation who waited on him that no further appropriation could at the time be set aside. The appropriation already voted upon was for the purpose of transporting butter; but if the fruit growers cared to accept the situation as it stood, and if they were willing to substitute a shipment of fruit for a shipment of butter, which the compartments were originally designed for, it would be agreeable to him. This was done, and a shipment of fruits consisting of pears, peaches, plums, grapes, tomatoes, and apples was made. These fruits were carefully selected in the Niagara and Grimbsy districts, each specimen being wrapped in paper and put in small packages and forwarded to Montreal from Winona by refrigerator car. Unfortunately, the car did not arrive in Montreal in a sufficiently cool condition for the proper preservation of the fruits. The ice had disappeared, and the fruit was comparatively warm. It was immediately cooled with ice and salt and placed in a compartment on board the steamer and shipped to England under the best conditions that were available at that time. The delicate fruit, I am sorry to say, did not arrive there in a satisfactory condition. The peaches, plums and grapes suffered considerably. The pears and tomatoes arrived in somewhat better condition. Of the apples there were 40 cases shipped from Montreal of early fall varieties more or less, perishable kinds, such as the St. Lawrence and Alexander. These were shipped in cases 10 inches deep, 12 inches wide, and 20 inches long, holding about a bushel each. They were sold by auction in Liverpool, and they netted a little over a dollar a box, so that as far as the apples were concerned, the shipment gave good returns. The growers, at any rate, were quite satisfied.

The conditions which militated against the successful carriage of the pears and peaches were that the compartment did not afford a sufficiently low temperature to prevent the germs of fermentation from developing and multiplying. The process of fermentation having been started in the heated car it was developed by the fruit being packed in these tightly closed packages with the temperature too high. I believe that a tightly closed package is the best one that we can use in a low temperature, and it was with this thought in mind that they were used, but, under the circumstances, the closed package undoubtedly furnished the most favourable conditions for decay when fermentation had once started. We have at any rate gained considerable information on this matter. The Government defrayed the freight and cold storage expenses although they only originally agreed to assume only the cold storage expenses, so that the cost to the growers was the fruit and the labour of packing. The returns from the fruit which was sold more than defrayed the cost of the packages, so that the growers were not out of pocket, as they at first expected to be, and if ordinary packages had been used there would have been a balance on the right side.

*By Mr. Bain:*

Q. Who supervised the shipment? Who was responsible for the cold storage on the steamers? Who saw that the compartment was in proper condition?—A. The steamer compartment was in proper condition when the vessel left Montreal. I went to Montreal and with the Dairy Commissioner saw the fruit placed in the compartment, and saw that the compartment was iced.

## Agriculture and Colonization.

Q. It appeared to be in bad condition when it reached England?—A. I have stated that already with reasons therefor.

*By Mr. McGregor :*

Q. I thought that was largely caused by the fruit not being in proper condition when it went on the boat?—A. That was undoubtedly the initial cause of failure.

*By Mr. McMillan :*

Q. I think the report said it was on account of insufficient supply of ice on board the boat?—A. I don't think the gentlemen who received the fruit are competent to speak of the conditions on this side. They saw the fruit when it arrived, but they could not say in what condition it left Montreal. The car with the fruit arrived at Montreal in a heated condition owing to the insufficient supply of ice.

Q. I will just read you a few lines of the report from the other side: "The tomatoes in many of the boxes had literally dissolved so that nothing remained but a mass of skin and seeds. The grapes were wet, and separated from the stems. The plums were in a state of decomposition, though still showing some signs of their original bloom and beauty. The peaches were simply transformed into lumps of black rotteness. The pears also suffered severely. Out of several boxes examined there was not a single perfectly sound fruit. Some were completely decayed, and others had retained their form and colour in perfection but collapsed on the slightest pressure, and were found to be exceedingly bad. It is a great disappointment to all concerned that what was allowed by all who saw it to be a very fine collection of fruit should have turned out so unfortunately."—A. I have a copy of the account sales which is a better indication of the character of the fruit than general statements of this kind.

Q. That is a letter from the Ontario agent to the Secretary of the Fruit Growers' Association. You will find it in the *Horticulturist*, in the library here?—A. The amount secured from the fruit was sufficient to cover the cost of the packages. These packages were made to order and cost 25 to 30 cents each. The shipment was not a money making return, but purely an experimental undertaking.

*By Mr. Bain :*

Q. The conditions on the other side seem to have been highly discreditable to somebody, the fruit had all gone to waste. It is the more surprising because shipping fruit across the ocean is not a new operation. Does not California ship fruit across the continent in refrigerator cars, and then ship it across to England?—A. She has been shipping peaches with varying success for a few years past. It is done successfully with winter pears as we do with winter apples, it is not difficult to do that with safety. But the fruit we sent, as already stated, was untried up to this date in shipping long distances.

Q. Were they confined to pears exclusively in California?—A. No. Peaches and plums. Their experience has not been uniform. One or two shipments arrived in good condition and one or two in very bad condition, but they have used a very different system, a very expensive one, cooling by means of sterilized dry air.

MR. SAUNDERS.—There were shipments from Canada to the Colonial Exhibition in 1886 which got there in very good shape?—A. Yes; comparatively small quantities.

*By Mr. Bain :*

Q. I do not understand how this would have occurred if the temperature of the compartments had been kept down, for I suppose a fortnight would be the time occupied in sending the fruit from Grimsby until it was landed in Liverpool?—A. About a fortnight, yes.

Q. It seems to me if the fruit had been kept cool during that period it should have reached the other side in better condition than that?—A. If it had been kept cool enough. I have already pointed out that such was not the case. The car was insufficiently iced and subsequently the ice gave out in the compartment on board the steamer.

*By Mr. McMillan :*

Q. I think the ice had given out before the shipment arrived. At least the report says so.—A. We cannot attach the blame entirely to the steamer neither can we attach it to the land transportation companies. The conditions happened to be unfavourable in both cases.

*By Mr. McGregor :*

Q. Last year I got 6 or 7 baskets of peaches and put them into a butcher's ice box, where he kept his meats. The air was cold and dry and when the peaches were taken out after about 20 days, they were in fine condition. They only required to be well warmed before using, but apparently they were all right and the flavour was just the same as when they went in. I am satisfied, in your case, the deterioration occurred in shipping to Montreal, because if they once got warm after being chilled you could do nothing with them again?—A. This seems to be the solution and the alternating temperature was responsible for the failure. The fruit was picked before it was fully matured, yet not until it was fully grown.

*By Mr. McMillan :*

Q. The apples arrived in good condition?—A. The apples arrived in good condition and sold at remunerative figures.

*By Mr. Featherston :*

Q. You don't recommend picking the apples in green condition?—A. Not absolutely in a green condition, but when they separate easily from the spur on turning them up.

*By Mr. McMillan :*

Q. What would you recommend as the proper condition?—A. For early apples, I would recommend beginning to pick as soon as you can go over the tree and get a percentage that are fairly well coloured and fairly grown. In the case of winter apples I would leave them on till the seeds are well coloured and they can be separated readily from the twig by turning the apple upwards.

Q. I was told by a gentleman who has been engaged in the business for 20 years that they should be picked the very moment the seeds turn brown?—A. I think if you picked some of the winter apples when the seeds first turn brown it would be rather too early.

*By Mr. Featherston :*

Q. Winter fruits stand the fall weather much better than the early fruits. They won't deteriorate but will go on and ripen?—A. The early fruit should be disposed of just as soon as they can put them upon the market.

*By Mr. Carpenter :*

Q. Our people in Niagara regret very much the failure of the first experiment in shipping fruit, but they are not discouraged by it. The concensus of opinion is that the failure was largely brought about by the condition of the car itself; that the fruit got heated in the car in transit and when it was shipped at Montreal it was not in a condition in which it could be carried across the water successfully?—A. I do not wish to lay any blame upon anybody, but I thought the arrangements were all sufficiently well understood by the Transportation Company so that the car would have been thoroughly iced en route whenever it was necessary to do so. There seems to have been a misunderstanding in that way.

## Agriculture and Colonization.

*By Mr. McGregor :*

Q. In the carriage of fruit from California to the sea there are stations where the car stops and is re-iced?—A. Yes, that is a well-established rule.

*By Mr. McMillan :*

Q. In any future shipment if anything goes wrong, it would be better not to ship the fruit?—A. We can see that now, but I do not know that I felt like taking the responsibility of holding the fruit under the circumstances. When the fruit arrived in Montreal, I recognized that it was not in the best condition for forwarding, but I did not feel willing to take the responsibility upon myself of stopping the experiment by placing that fruit on the Montreal market and disposing of it there. There are plenty of people who would say, it would have arrived all right, without having tried it. I could not say that it would not, but at the same time I quite see the force of what Mr. McMillan says now, especially in the light of past events.

*By Mr. Featherston :*

Q. Did any responsible person receive the consignment on the other side?—A. The agent of the Ontario Government, Mr. Byrne, received the consignment and placed it in the hands of a leading commission firm in Liverpool, Messrs. Woodall & Company.

Q. And it was sold immediately?—A. It was sold immediately.

I have now about covered all the topics which I had intended bringing before you, and I thank you very much for your kind attention. I might say, however, in concluding this topic that perfect refrigeration depends upon the circulation of dry, pure, cold air. It is based upon natural laws which are well known and readily observed: air exposed to heat is expanded in volume; it is then made lighter and will rise, being forced upward by the surrounding cooler air; per contra, air exposed to cold is condensed and made heavier; it will then gravitate to lower levels. The capacity of air for absorbing and retaining moisture varies with its temperature. Warm air will sustain a considerable amount of vapour which will be condensed if the air is cooled. As water is cooled and brought to the freezing point it expels a large part of the heat gathered at a higher temperature. As ice is melted to water this process is reversed and heat and air are re-absorbed. The operation of these natural laws is taken advantage of in refrigeration.

*By Mr. McGregor :*

Q. I would ask Mr. Saunders, would there not be some way of permitting Mr. Craig to visit us a little oftener and stay a little longer?

MR. SAUNDERS.—Mr. Chairman and Gentlemen.—In reply to the query whether we can spare Mr. Craig to visit certain districts oftener, I may say that I think Mr. Craig has gone every time, in response to invitations sent to him, except until this year. It has been customary of late to submit all invitations for officers to visit certain districts, to the Minister of Agriculture for his approval. Two or three invitations came in from different places about the same time, and they were submitted to the Minister when he had other meetings in view, and he instructed me to inform the organizations applying for the services of our officers that it was not possible for them to go at that particular time. That was the only instance where invitations had not been promptly responded to, that I know of. The Committee will readily understand that it is quite impossible to meet all the wishes or to accept all the invitations from every part of the country to attend farmers' institutes. An expenditure of \$30 or \$40 is made by the time an officer has returned to Ottawa, and we have a very limited amount available for travelling expenses. If the members of the Committee would back me up a little more strongly and assist in securing a little more money for us to spend, our officers would be in a position to visit different places more frequently. We do the best we can with the means at our disposal, but the claims are so strong and urgent in every direction that I thought it the most prudent course to refer all the invitations to the Minister and let him settle the matter, and I then carry out his instructions. The Minister, of course, is in full sympathy with us in our work.

*By Mr. Featherston :*

Q. Which of the Ministers?—A. I refer to Dr. Montague. I fully appreciate the good work that Mr. Craig is doing, and aid him to the best of my ability to carry out the suggestions that he makes as far as the means at my command will permit, but, unfortunately, we have only a limited sum to cover the travelling expenses of all the officers for the Dominion, in the year. That sum is placed at the approximate amount of \$1,000, although we have usually exceeded it. Last year we spent \$1,200. In view of the large number of departments we have and the importance of every one of these departments, I have to consider the whole and make such recommendations as I think are just to each department. The department of horticulture is treated quite as liberally as any department of the farm work. May I make a suggestion at this point to the Committee? Several resolutions have been passed by the Committee from time to time without the members having all the facts at their command. I think these recommendations would have more weight with the Government and the community at large if opportunity was given to investigate, before any resolutions are passed, and to present all the facts in connection with the case. My officers are all very enthusiastic, and very properly so, in the different branches of their work; all have important duties to perform, and I am glad all of them are so enthusiastic in their work, otherwise it would not be possible to carry it on successfully. The officer of each branch of the farm work knows more of his department than of any other department, and I, as director of the whole, have to recommend such a division of the funds, so as to enable the work to be carried out and equal justice to be done to each branch. I am heartily in sympathy with every branch, and would like to do more for each one, but it is not possible with the amount of money we have to extend our work very much in any particular direction unless the appropriation is increased.

MR. MCGREGOR.—In my districts we have at least 5,000 acres in grapes and 3,000 acres in peaches and large quantities of other fruit. Tobacco also is becoming quite a crop with us. I know of 100 acres in one field and there are many of 20 or 25 acres. Now, would it not be possible to place some one at the Experimental Farm to perform the office work there and let Mr. Craig travel more in the fruit growing districts, especially in those districts where they grow fruit that you cannot grow at Ottawa? It would not cost much if he did this. There are a lot of farms close together and if he visited them he could render a good deal of help by giving practical suggestions, and by studying fungous pests.

MR. SAUNDERS.—Mr. Craig has visited the district every season for the last two years.

MR. MCGREGOR.—I know that, but his visits were too short. It is impossible to over-estimate the importance of this fruit industry. I know one man who cleared \$26,000 last year out of peaches. I know another man with 40 or 50 acres of grapes. We are doing a good deal for dairying and I think the fruit growers require some little assistance also. By doing this it is not helping a particular district only, but the country generally.

MR. SAUNDERS.—All the meetings of the Provincial Association are visited by the officers of the Farm. I trust, gentlemen, that we shall receive your assistance in the House to enable us to get more money. I can promise you that we shall spend it judiciously, if we can only get it. In regard to the matter of publication the selection of the material in the horticultural department is always left to Mr. Craig's discretion. He arranges his own material and submits it to me. I must say it is most judiciously done and I invariably approve it. With regard to the Farm reports every man applying for one gets it. Our mailing list is over fifty thousand.

Having examined the preceding transcripts of my evidence of the 18th and 25th March, respectively, I find them correct.

JOHN CRAIG,  
*Horticulturist, Central Experimental Farm.*

# Agriculture and Colonization.

COMMITTEE ROOM 46,  
HOUSE OF COMMONS,  
Thursday, 26th March, 1896.

The Select Standing Committee on Agriculture and Colonization met this day at 10.30 o'clock a.m., Mr. Sproule, Chairman, presiding.

THE CHAIRMAN :—We have with us this morning Mr. William Johnson, of Montreal, who wishes to outline a scheme to this Committee by which cold storage might be provided for different towns and cities and villages in the Dominion. This meeting was called more especially for the purpose of hearing him, and we have also with us Mr. Robertson, Dominion Dairy Commissioner, who will if necessary give us additional information upon that subject.

In response to an invitation from the Chairman, Mr. Johnson then addressed the Committee as follows :—

Mr. Chairman and Gentlemen,—I appear before you this morning as representing the Dominion Cold Storage Company, a company which has been incorporated for the purpose of erecting cold storage warehouses throughout the Dominion.

*By Mr. Wilson :*

Q. How long is it since it was incorporated?—A. It was incorporated in October last.

I had much pleasure in listening to the remarks made here yesterday by Messrs. Craig and Robertson on the question of cold storage, the remarks of the latter in particular simplify what I have to say on the subject. Mr. Robertson brought the point of the necessity for cold storage so strongly before you that I need not enlarge upon it. He showed very clearly that it was an absolute necessity that we have cold storage to protect and preserve our perishable products so that they could be delivered in the consuming markets, whether in England or Canada, in the same condition as they were produced. Therefore I feel that you know enough about the necessity for cold storage already. In our efforts to supply this want we have been supported from one end of the Dominion to the other by the entire press and heard no dissenting voice.

## COLD STORAGE COMPANY,—PROPOSED PLAN OF OPERATIONS.

The Dominion Cold Storage Company at the present time stands thus : Their capital is pretty well subscribed, and they are prepared to go on and erect warehouses in the consuming districts. It was originally intended to put up only warehouses in the large centres, and the exporting points, especially in Montreal. On the wall before you there is an illustration showing the warehouse in Montreal. This house gives access to the river, to the railroads and to the city.

But as we went in the country to find out how the proposal would be received, we found a desire among the people to have warehouses as near their butter factories and creameries as it was possible to get them, and the further we went into the matter the more we became convinced that a cold storage system with houses in the producing districts was a necessity for the farmer, so that he can not only preserve his produce in the best manner possible, but that he will be put in an independent position as far as the marketing of his products is concerned. With warehouses in a convenient locality available for the farmers, instead of having to force the sale of his products for fear of their losing in quality, he can put his products into this cold storage warehouse, and keep them there in perfect condition. I venture to say that this feature of the scheme will commend itself to all who are acquainted with the interests of the

producers in Canada. In other words, to-day the man who has his products to sell must sell them when they are ripe, at a time when there is a large quantity of these very products in the market. Everybody is selling them, and everybody is not wanting to buy them, and in consequence he takes the lowest price. If he is not willing to take the risk of their losing in value he must sell. In a cold storage warehouse, where he could put his apples, or butter, or cheese, he could say to the buyer—"there is my stock, I am ready to sell it when you give me the price." He is not forced to do it. I believe that these warehouses can be erected from one end of the Dominion to the other, in those districts, and that they will prove not only a boon to the producers and to the farmers, but a boon which will bring to them more returns and save them from more loss than anything else that could be devised. It will not only do that but it will help them in another way. It offers the means whereby the producers of our Dominion can take advantage of the education which they are receiving from the Experimental Farms, in the producing of the highest grades of goods. To take the goods from the farm to-day, and get them to the consuming market, I do not care what they are, they have to be exposed not only to climatic but to all other adverse influences. If the goods have to be brought to Montreal they have to be transported and transhipped and subjected there to changes of temperature. If instead of that, the men could put their goods into the warehouse from the cheese factory, for instance, after it is properly cured, and there keep it until they want to sell it, they would obviate not only the risk of a decrease of price, but what is of far greater importance to my mind, they would control the sale of their own product, which a majority can not do under present circumstances. As an illustration of our work, we commissioned one of our men, last fall, to make an examination of the egg market in England. He went over there expressly to find out how things stood, and discovered that there was no reason in the world why we should not increase our egg business very materially upon the lines which we have indicated. He has received assurances from the largest buyers there, that if we can send over the eggs properly picked, marked and branded, that there is a large trade to be done in them. Our business would not only consist in preserving the egg, which we have the experience and skill to do, but it would also include the work of preparing the eggs properly for the market, so that they would reach the consumer as they were required. I need not draw the attention of you gentlemen here to the great discrepancy between the figures of our export of perishable products (excepting cheese) and the total amount imported into the United Kingdom. In 1894 while England imported \$18,426,000 worth of eggs we exported of that only the paltry amount of \$450,867 worth.

*By Mr. Roome :*

Q. What year was that?—A. 1894.

Q. There was an increase in 1895?—A. There was a small increase.

Q. It has increased rapidly?—A. Yes.

I will venture to make the statement that with the enterprise that we are now endeavouring to establish, that amount of \$450,867 could be increased within the next two or three years to \$5,000,000. Say it is increased to \$1,000,000 only, that would be a great gain to the farmers of this country, but I think the company would give a substantial guarantee that that would be increased in a very few years to \$5,000,000.

*By Mr. McMillan :*

Q. Eggs alone?—A. Yes.

*By Mr. McShane :*

Q. You mean shipping them to England?—A. Yes.

Q. I think it is a bad business?—A. Well, England eats \$18,000,000 worth of eggs a year and the market is there. It may appear a bad business to you now, but it may not when you understand the advantages. The egg business is a peculiar one and it is one that no firm to-day cares about at the present prices. Under the present condition

## Agriculture and Colonization.

the man who buys eggs has to assume all the risk of their decreasing in quality, risk of breakages and everything else. Now we take this position: A man brings eggs into the warehouse, and at a charge per case we will select and brand those eggs and pack them properly for the English market. The eggs that are not suitable in size or in character, or those that are broken or defaced, instead of being lost to the producer, we take the meat out of those eggs and put it into tins, which is then frozen, thus preserving the freshness of flavour, and that meat is sold at a price per pound in the English market to the confectioners and the large hotel-keepers and other large consumers, at a price which equals the value of the egg in its original condition.

*By Mr. Carpenter.*

Q. What will it be per case to the producer of the eggs?—A. Our charge is 50 cents per case.

Q. Per case of how many?—A. 40 dozen.

Q. Then that is a cent a dozen?—A. About that, yes.

*By Mr. MacGregor:*

Q. That is a very small charge. I suppose the profit would depend upon the amount you turned over?—A. Yes. Of course, there is this feature in it with us. We want and we have to create a business, and to do that we have to make the producing of these eggs profitable to the farmer. In any case, it is upon the quantity that we will get, that our profits will depend. Speaking for myself, I believe there is room for a great improvement in our egg business. I cannot imagine anything that appeals more to everybody in connection with a farm than being able to get a good price for eggs. It requires no extra capital, it requires no extra labour, comparatively, and yet there is a large market open to it. The English people import every year to the amount of \$18,000,000 of which we only do about \$500,000.

*By Mr. Cochrane:*

Q. You say that if they were put on the market in proper condition they would fetch better prices. What was the average price they realized in 1894?—A. Do you mean Canada?

Q. No, I mean England?—A. I have that here, I cannot speak of the Canadian market, but if you mean in England I have it here for you.

Q. It is very important to show the farmers what they would realize if the eggs were put on the market in England in proper condition?—A. Perhaps you will allow me to read a report which we received from Mr. McGregor on that very subject of the egg business, and it will put it more strongly than I could give it myself. Mr. McGregor has been in this business for the last ten years. In fact he is considered one of the most expert refrigerating men on the continent to-day. He is now in our employ and one of our directors.

*By Mr. McMillan:*

Q. Can you tell us how the eggs are managed in the cold storage warehouses?—A. Yes, but if you will allow me I will read this letter first.

“MONTREAL, Oct. 16th, 1895.

“The Dominion Cold Storage Co. Ltd., City.

“COLD STORAGE EGG TRADE.

“GENTLEMEN,—With a view of finding a more profitable market for our egg trade, I interviewed the leading egg merchants in London, Liverpool, Manchester and Glasgow, and examined the cold storage facilities in each place. I find that London, Liverpool, Manchester and Bristol already possess good refrigerating facilities, and can handle our American cold storage eggs advantageously.

“The average summer price of eggs at these English distributing points is 10 pence or 20 cents per dozen, while the winter season average price is 18 pence or 36 cents. The only imports outside of the Irish trade come from Denmark and Russia, but the quantity is so very small that it does not seem to have any effect on regular market prices.

“Leading dealers say they can handle any quantity of our No. 1 Cold Storage Eggs as now preserved by mechanical refrigeration, at prices nearly equal to fresh eggs, and are anxious for the business. If we are in good running order next fall 250,000 cases could easily be disposed of in this way on most favourable terms, and our egg friends will be glad and willing to avail themselves of such a good outlet. Glasgow is getting into line. A strong refrigerating company has been organized, and expects to have cold storage in running order next summer.

“Egg business in the west is the best paying cold storage trade we have. Chicago houses last season carried 375,000 cases, and made \$190,000 on same.”

“Yours truly,

“JAMES MCGREGOR.”

*Ry Dr. Roome :*

Q. When he says that the average summer price of eggs is 20 cents a dozen in England, does he mean fresh eggs?—A. No, those are for the cold storage eggs, and 36 cents a dozen in the winter.

*By Mr. Cochrane :*

Q. Will you tell us what it would cost per dozen to put them on the market?—A. Well, we would charge 50 cents a case, but that means six months. For fresh eggs of course it would not mean that much because they would come in and go out the same week. We are talking about eggs to be held for the season.

*By Mr. McGregor :*

Q. What would it cost supposing you were shipping a carload from the west coming east? Have you any idea of the cost on the road?—A. Possibly Mr. Robertson could give you a better idea of what it would cost per dozen to deliver them in London.

*By Mr. Cochrane :*

Q. What does your 50 cents cover?—A. We take the eggs at the door and it covers putting those eggs in the proper condition as I have explained to you for the English market. Of course we do not provide the cases.

*By Mr. Gibson :*

Q. Do you repack?—A. We not only repack but we handle them all. Let me say here that if you gentlemen will bend your efforts to get the producer of the egg to realize the fact, that a great deal depends upon preventing the fertilization of the eggs, you will be doing the country a service, the effect of which will be impossible to calculate.

*By Mr. Carpenter :*

Q. You just said that the eggs would be worth 20 cents a dozen if placed on the English market?—A. Yes.

Q. What we want to get at is this: after all the charges are deducted what would be the net results to the producer?—A. I will not go further with you just now than this—

Q. That is the question our people would ask?—A. I will say this: suppose eggs are worth—what will they average in our country?

Q. Twenty cents a dozen at the present time?—A. On my word, no.

## Agriculture and Colonization.

*By Mr. Cochrane :*

Q. I think  $12\frac{1}{2}$  cents would perhaps be nearer?—A.  $12\frac{1}{2}$  cents is a high price in the spring for eggs.

*By Mr. McMillan :*

Q. I was home ten days ago, and we produce a number of eggs, and we were getting 15 cents a dozen in the neighbouring village?—A. Yes.

*By Mr. McGregor :*

Q. I was home a week ago, and I saw as fine eggs as you could see, sold for 10 cents?—A. Last year the surplus quantity of eggs, the eggs we have for export, did not net the farmer more than eight cents a dozen. I will make this statement, here is the result of Chicago, I will give you the figures of what was done at Chicago.

*By Senator Owens :*

Q. Do you propose building refrigerators at the producing points?—A. Yes.

### COST OF STORAGE AND FREIGHT.

Q. Can you not give the probable cost it would be to the farmer of placing his products in the refrigerators, shipping them to Montreal and using refrigerators there, and then delivering to the vessels?—A. That is simply the freight rate.

Q. Give it as near as possible ; they must go down in refrigerator cars?—A. They must go down in refrigerator cars. Let me put it to you in this way, gentlemen : You have asked me a question and I have not got the facts wherewith to answer. We can estimate it if Professor Robertson would tell us what he calculates it is going to cost him to take his meat per 100 lbs. from any point in Ontario to Liverpool. If he does that I will tell you what it will cost you to transport your eggs.

*By Mr. Cochrane :*

Q. Do you not know what eggs will cost?—A. Well, it should not cost but a trifle, a mere bagatelle, compared with the difference in the values.

*By Senator Owens :*

Q. Would two cents a dozen cover it?—A. I believe it would.

*By Mr. McGregor :*

Q. Supposing we would say this : half a cent would cover the cold storage where they are taken in at the start?—A. Keep it at the cent, then you will be on the safe side.

Q. Well, now about \$35 will take a car from the west to the east—that is in Ontario?—A. That is the way to get at it. Oh, excuse me. I have the figures here it is two cents a dozen.

*By Mr. Davin :*

Q. For what?—A. For freight to Europe.

Q. From where?—From our warehouse. Let me avoid Montreal, that is what I want to impress upon you. What is the reason eggs should go to Montreal and add to the cost of them when they are produced in the west and can go through on a through bill of lading and thus save money instead of reshipping at Montreal. Do not do that at all.

*By Mr. McGregor :*

Q. They have got to be reshipped?—A. Not at all. They have not to be reshipped, that is the point I made. You ship on a through bill of lading—the transportation company does that.

*By Mr. Macdonald (King's) :*

Q. Will not a bill of lading carry them right through?—A. Certainly, that is the point I am arguing—that the day has come and is now here when our farmers and producers must ship their goods direct. Why do they want to give all these profits to the middlemen? Every time there is handling and every time there is a transshipment it costs money and who loses that money? Of course, it is the producer.

*By Senator Owens :*

Q. There is one point I wish to make clear. If we understand you perfectly well, one cent per dozen will cover the cold storage and handling and say two cents per dozen for freight?—A. Yes, sir.

Q. That would be three cents per dozen from the point of producing to the English market?—A. Yes, that is it.

*By Mr. Roome :*

Q. That depends upon the producing point?—A. It takes the average you know.

*By Mr. McGregor :*

Q. What would be the probable loss on these eggs that would not be fit to go to England? Take from a dozen eggs three or four that would be too small or would not be coloured right, or something else and you broke them up, what would be the loss? They would go in by the pound?—A. Go in by the pound, and I believe, myself, that the price obtained in Chicago for the pound is better than the price obtained per dozen, for this reason: If you take a large hotel where they are going to do so much baking and they want 10 pounds of egg meat, under our system all they have got to do is to cut off 10 pounds the same as they would cut off 10 pounds of cheese. When they purchase eggs by the dozen so many of them break and they do not know where they stand. The great American Biscuit Company, who have a cold storage on the premises, buy eggs by the million dozen and treat them in that way. They break the eggs, freeze them solid and treat the meat just the same as they would treat flour, sugar or anything else. So that I hold the difference between the egg meat and the egg itself would be so slight that we need not calculate it, and there you remove at once the great element of keeping the price down.

*By Mr. Cochrane :*

Q. Do I understand you to say the cold storage company would do that?—A. Yes, that is their business.

*By Senator Owens :*

Q. One cent per dozen would cover it?—A. One cent per dozen would cover it.

*By Mr. McGregor :*

Q. What would be the probable cost of a small refrigerator at one of these country places, say at one of the shipping points in the west?—A. Well, I am going to come to that when I have finished these details; I do not want to take up too much of your time.

Q. That is the practical part we want to come at?—A. Yes. Well, I have taken up a little time to illustrate and try in my imperfect way to give you what we are going

## Agriculture and Colonization.

to do in the egg business. Now, the same thing applies to all other lines, the principle that we are working upon. That the producer and the consumer of perishable products should be brought into the closest possible touch with each other. The producer and the consumer of every other article in this world are brought so very close that it would be a very difficult matter indeed for anybody to get in between them to get any profit. Now, we cannot see why the same condition of affairs should not exist for our farmers. In fact we go further. We go as far and say that treating our farmers on business principles, in the same way as other manufacturers are treated, that the effort should be to create for the products in the great consuming centres of the world a consumptive demand for each and every article they produce, and that instead of selling their products for the best price they can get, they will sell them because people demand them, and will pay a higher price for them; and there is nothing which will produce this condition except the cold storage system now before you. The experimental work done on the Farm is teaching our farmers how to produce these goods. We step in exactly where Mr. Robertson stated, yesterday, the Government wanted to get out, and take up the commercial side of it. We are specially equipped and prepared as a business company to do that—to take up the commercial side of it—and in doing so we have no hesitation whatever in saying that it will be of very material advantage to the whole of the Dominion of Canada.

### COST AND CAPACITY OF COLD STORAGE HOUSES.

The question about houses is now the practical part, Mr. McGregor, which you have asked about, and in dealing with that I will be very brief, a house of the capacity of 50,000 cubic feet.

*By Mr. McGregor:*

Q. That would be about what?—A. That would hold say 25,000 boxes of cheese. The system that we are using, and that we are going to use, is the most modern mechanical refrigeration, producing a dry and sweet atmosphere wherever it is; that we can put any article you choose into any room or compartment and we can maintain an even temperature for six months, if necessary, without a particle of change in it—it won't vary half a degree—and we will hold any article, no matter how delicate it is, for an unlimited time in the different rooms. A house of 50,000 feet would cost \$12,500.

*By Mr. McDonald (Assiniboia):*

Q. 50,000 cubic feet?—A. Yes.

*By Mr. Roome:*

Q. Refrigerating apparatus and all?—A. Everything but the land, all complete, allowing a fair working capital on it.

*By Mr. McGregor:*

Q. That would be a little large for a country store, where you gather by the car load?—A. I do not think so. I think a house of 50,000 cubic feet could be located in almost any producing district, taking a radius of 15 miles. Calculate how much butter, cheese of all kinds, how many eggs, what poultry and what meat is produced there, and I think you will find a house of 50,000 feet would be very moderate indeed.

Q. 50 feet square and 40 feet high?—A. Oh, you can build it to suit your own convenience.

*By Mr. McDonald (Assiniboia):*

Q. If you build smaller it would be much cheaper?—A. Yes, the smaller the house there is so much less to build.

*By Mr. McGregor :*

Q. What method of refrigeration do you use ; ice or ammonia ?—A. Ammonia. Ice is out of date altogether now.

Q. Would your company provide, where there is a good locality, and put up a building and take a cent or two cents for putting the eggs in shape and keeping them cool for a certain time? Would your company be willing to build such houses provided we can show there would be quite a business from that point of view ?—A. I may answer that question by coming to the object of the company and my appearing before you this morning. It is this: We have tried to get our capital to do this work and have not succeeded. We have gone not only to a great deal of expense, but we have thrown a great deal of energy into the work, and while we have been able to demonstrate beyond a doubt that it is a business that will pay much better than any other business in the country, yet it is dealing with agricultural products. It is a business undeveloped, as it were, and there has been no evidence to bring forth from the men whose sympathy you want to enlist, and consequently we found it difficult in getting capital up to this point. Now, we come to this Committee, and to the Government, and want you to assist us in doing that in this way. As Mr. Robertson pointed out yesterday, very ably, the work which the Government has done and is doing for the butter business and such like has cost the country nothing because of the future results. We want the Government to say to us: We will guarantee your stock to a certain extent. This will be as an evidence to the investor, and especially to the farmer, that they really have his interests at heart and are willing to do something that he can put his hand upon. That is what I want to see. Now, as an evidence of the Government's desire to aid the farmer, we ask a small guarantee, and we shall be able to demonstrate to everybody that it will not cost the country a cent.

*By Mr. Davin :*

Q. Do you mean you want to guarantee the stockholders in your private company ?—A. Yes.

Q. From the Government ?—A. Yes.

*By Senator Owens :*

Q. Do you want a guarantee of interest ?—A. Yes.

*By Mr. McNeill :*

Q. To what amount ?—A. It will cost about \$3,000,000 to thoroughly equip the Dominion with these cold storage warehouses, in the condition I have explained, from one end of the country to the other.

*By Mr. Pridham :*

Q. You want the Government to guarantee the interest of \$3,000,000 ?—A. Yes.

Q. For how long ?—A. For ten years.

Q. At what rate ?—A. Four per cent.

Q. That would represent \$120,000 a year ?—A. Exactly.

*By Mr. Carpenter :*

Q. In return what do you bind yourselves to do ; to establish cold storage warehouses in every county ?—A. Not in every county. We bind ourselves to establish cold storage warehouses wherever produce is available. We can go no further than that. We offer to you, and to every person interested in this business the control of these cold storage warehouses in these districts, and we try to get the men in the districts to take up our stock which we have a guarantee for, and simply say to you and any person else interested, gentlemen, here is our proposal. We have a Government guarantee which is

## Agriculture and Colonization.

an evidence to you that this project is going through. The business will pay better than four per cent and will give good returns as soon as it is in operation. We don't ask the Government to give us a financial grant. We simply want a guarantee to enable us to go to work at once, and give our farmers the accommodation for cold storage they require. If we get this guarantee we will save to the farmer more than double the amount before the year is out. The government of New Brunswick, I am told, has already made an offer in this direction to a company starting business in that province. It is equal to about four per cent on an investment of \$200,000, which we purpose taking advantage of.

*By Mr. McGregor :*

Q. Is there any other country using the same means?—A. Yes. It is used the world over. In the United States they have over 70,000,000 feet of cubic space.

*By Mr. Wilson :*

Q. Guaranteed by the Government?—A. No. I am not speaking of the financial system ; I was talking of the mechanical system.

*By Mr. Roome :*

Q. Would it not be better for the Government to guarantee half of the 4 per cent?—A. No ; I will tell you why. It is not worth splitting hairs about. To get this thing going right we want the full guarantee, and then there is more money in it for the country itself.

*By the Chairman :*

Q. I apprehend the guarantee is to raise the money in the first instance?—A. That is it.

*By Mr. Livingston :*

Q. What will your company guarantee to charge?—A. We will give the Government a schedule of charges on each item of produce and bind ourselves to stick to that.

Q. Will you give us that now?—A. I have instanced one case, viz., that of eggs.

*By Senator Owens :*

Q. I presume, in the event of this matter being accepted by the Government, you would be prepared to submit a schedule of prices to be approved of by them?—In the event of this going through, you understand it would be to the interest of the company to make the charges as low as possible, so as to create business?—A. I say this, that our costs for preserving a case of eggs for the season of six months is 50 cents. We take them in, examine them, pack them, and everything else.

*By Mr. McMillan :*

Q. How many dozen are there in a case?—A. Forty-nine dozen. We keep them there for the season for that charge, and we have here—

*By the Chairman :*

Q. What about insurance?—A. That brings to my mind another very important point I have missed. You all realize, and I believe it is a fact, that in dealing with these products it puts the producer, no matter who he is, in the position that if he wants to borrow money, he takes a receipt from us which we will give him, and that is as negotiable as any paper in the country.

*By the Chairman :*

Q. A warehouse receipt?—A. A warehouse receipt. That is a great advantage to the business. A man may have 500 boxes of cheese. He does not want to sell them

to-day, but he wants the money. He knows that it is in good condition, so he takes the Warehouse Company's receipt to his bank and gets an advance thereon. We will have in each warehouse a representative man to supervise and manage the whole thing, a man living there who would issue those receipts, and who would know whom he was dealing with, and whom the banks would have confidence in. Our system would be so perfect that any banker from one end of the Dominion to the other would simply have to get his receipt, and he would know that it was *bona fide*. We will do the mechanical portion of the work.

*By Mr. McMillan :*

Q. Have you had any experience in storing eggs for six months and shipping them to the old country?—A. Personally I have not had experience of eggs, nor do I think it is desirable to keep them for six months. I merely mention what our price is for the six months, but we have had lots of experience, hundreds and thousands of cases of experience in keeping them six months in Chicago and shipping them to the eastern markets.

Q. But they are not kept in cold storage?—A. Yes.

Q. They are kept in tanks?—A. No.

Q. I think they are kept in tanks?—A. You mean in bulk?

Q. And put in pickle?—A. Oh, no. The day of pickled eggs is past, because it costs 2 cents to pickle them and it only costs one cent to keep them in cold storage, and the cold storage egg is worth more money than the pickled egg.

*By Mr. Cargill :*

Q. You say the three millions of capital would not be sufficient to enable you to build a cold storage warehouse in each county, but that you propose to build wherever the produce is available. Now, if there is not one in each county the difference in the cost of teaming 8 or 10 miles to a factory in place of delivering at a station convenient to that factory would be more than the cost of storage?—A. I answered that question so as not to put myself on record as if we had determined to put cold storage in each county. I believe there are many counties where there is necessity for two cold storage warehouses, but I do not want to say it. We may have to put cold storage in each county. We are going to put cold storage, mark you, wherever it is to the advantage of our business.

*By Mr. McDonald (Assiniboia) :*

Q. For ten million dollars you could build 800 cold storage warehouses at \$12,500 a piece?—A. Oh, well in speaking—

*By Mr. McMillan :*

Q. I would like to ask how do you propose to collect the eggs to be placed in cold storage, because it is impossible for the farmers to deliver their own eggs. Mr. D. D. Wilson, of Seaforth, has carried on the egg business for the last 25 or 30 years by means of cold storage. He went twice a year to the old country himself and ascertained what were the different methods of preserving eggs, and I must say that since he lost the market in the United States, he has not been able to make the business a success. He found that there was a necessity for him to keep teams to go through the country and collect eggs. In Seaforth alone, he had sixteen, which were engaged in ransacking the country, gathering eggs. He found it would be an impossibility for the farmers themselves to directly furnish eggs to any system of cold storage where they do not keep one or two cold storage warehouses in the country?—A. What Mr. McMillan says, of course, proves exactly what we are contending for. It is for want of these facilities that his friend has not been able to get the English market for his eggs.

Q. Mr. Wilson has cold storage and can keep his eggs. I have seen eggs taken out of his cold storage buildings in the month of November that were put in in the month of March. They were broken and tested and found perfectly fresh?—A. You

## Agriculture and Colonization.

have there struck exactly the key note. We want to get our eggs into the English market fresh, and we want to have facilities for doing it; we don't want to keep them crowded up and kept for six months. We would undertake to get the eggs into the market within ten days, and it is just for the want of such facilities as I am now describing to you, that our producers are standing waiting.

Q. I would say that Mr. D. D. Wilson shipped eggs direct as he collected them, until they sank below a certain price. The moment that occurred, he held his eggs until there was a better price in the old country market or the American market, and he could, as I say, keep them in cold storage for six months. It would be a necessity if you wanted to put them on the market when the price was highest?—A. Certainly. Do I understand, Mr. McMillan, from what you say, that there is anything in what I am stating that you object to; that is what I want to find out?

Q. What I object to is this: You are trying to make it appear that the farmers would deal directly with the producer by means of cold storage?—A. Not at all, excuse me. No, Mr. McMillan, do not misunderstand me, we are not merchants.

Q. You said that you wanted to bring the consumer and the farmer directly together?—A. Most decidedly.

Q. And do away with these middlemen?—A. I did not say, do away with the middlemen.

Q. When the farmers would bring their products directly to the cold storage?—A. You are quite right, and I reiterate that we want to provide facilities so that if a farmer wants to get to the consumer, he can do so independent of anybody, and I think that is to the interest of anybody who appreciates the condition. We are not going around gathering up eggs, not at all, but what we do say is that our cold storage system will provide the means whereby the same can be carried out profitably for the farmer and merchant.

Q. You say you are going to get the farmers to take advantage of cold storage. What system of collecting are you going to use; that question has not been answered?—A. I will tell you the system we are going to provide. It is this: When we have our warehouse in Seaforth, you will find that Mr. Wilson and everybody else who wants to make money when they find we can handle eggs in the manner such as we have described, there will be no necessity for us to run about collecting eggs; there will be lots to do it. That is not our business. It is the business of others. Just as soon as they find they can bring the eggs into Seaforth or any other centre, and have these eggs marketed and the highest price obtained for them there will be lots to do it.

*By Mr. Livingston:*

Q. You will readily understand a farmer producing one or two dozen eggs per day could not send those eggs to the cold storage on his own account?—A. Certainly.

Q. There must be a middleman, in other words?—A. Certainly, but how many middlemen are there to-day?

*By Mr. McGregor:*

Q. All the storekeepers are middlemen now?—A. Yes, and the storekeeper is not the man. He has to sell his eggs again to the speculator. A storekeeper to-day cannot buy eggs and take advantage of the market. No storekeeper can go into the market and store up eggs and keep them for any length of time. The facilities we provide will enable him to do so. Do not misunderstand me as talking about any particular interest. I am talking about the principle of the thing. I think I have gone over the matter as fully as it requires, and I hope from what I have said that you, gentlemen, here, if the scheme recommends itself to your judgment, will assist us in providing those facilities. All we want to get is the assistance of the Government to provide the capital in the first place. It is not a permanent thing. It is not of necessity going to cost the country anything at all. We simply want to get the thing started. The Australasian Governments have assisted their farmers, and look what they have been able to do in sending butter to the English markets.

*By Mr. Davin :*

Q. Assisted in this way?—A. I do not know the particular way except by bonus-ing.

GUARANTEE OF INTEREST ON CAPITAL.

*By Mr. McGregor :*

Q. Do you want the Government to guarantee the interest on the bonds?—A. There are no bonds. We are going to have our stock certificates and sell the stock to the amount of \$3,000,000. We want the Government to say, as an evidence of their desire to help this interest,—“we will guarantee the interest on the stock for ten years at the rate of four per cent.”

Q. That is \$120,000 a year?—A. Yes.

*By Mr. Wilson :*

Q. Have you any patent rights or privileges on the buildings?—A. No. The only rights we have is our experience of the business.

*By Mr. Roome :*

Q. What is your subscribed capital now?—A. Our subscribed capital is \$200,000 and our authorized capital \$300,000. Our present organization is simply an organization from which the other will develop.

*By Mr. McGregor :*

Q. After getting through with the egg question what would be the other advantages in cold storage?—A. We could hold butter and fruit, poultry and meats. I gathered from what you said yesterday that you represent a fruit-growing constituency. Our system would enable you to land that fruit at Toronto, Montreal, London, or any other consuming point in the same condition which you gave it to us in. That is what we will do. Cold storage embraces, of course, a very large number of things. I would like to mention this fact to the Committee that cold storage charges in England are very high. We have a letter from a large buyer over there in which he says, “There is already cold storage available here, but the charges are so high that they interfere very much with business, in these days of nominal prices. We should be glad to have your table so as to compare your prices with what are charged here, as probably if a regular business could be relied on, charges could be brought down to something not quite so onerous, and there is no doubt that having proper cold storage available would steady markets very considerably.”

*By Mr. Roome :*

Q. Have you any warehouses on the other side?—A. No. We are limited to Canada entirely.

*By Mr. Livingston :*

Q. You say you have no patents. That all you have is your experience. Now, what experience have you had?—A. We have had the experience of ten years in the working of mechanical refrigeration—almost from its very conception.

Q. Your company has had this experience?—A. No. Our management has had it. Our manager has followed it from the time that ice was dispensed with until to-day.

Q. He has been connected with the business?—A. Most intimately connected with it.

Q. And you are able to carry it on?—A. Yes. Our superintendent, Mr. James McGregor, who has been in the business for ten years, was acknowledged to be one of

## Agriculture and Colonization.

the leaders of the business the United States and is to-day. We come before this Committee and the Government asking for this guarantee on this ground, that it is a business of itself. We have learned the business and have built it up. It is a demonstrated fact that we can do what we represent we are able to do.

Q. But you cannot do it without this guarantee?—A. I do not say that. But with this guarantee to start the thing, it enables us to go to work at once, and instead of having to go through the country as company promoters trying to get capital, we go through it promoting the interests of the country in the business itself. It is quite understood, of course, that the Government will place whatever restrictions they might please in regard to the capital stock which they guaranteed.

*By Mr. Davin :*

Q. In whose possession would the property remain even if the Government gave a guarantee?—A. In the company.

Q. They would own the buildings?—A. They would own the whole thing, of course. There is no ownership outside of the company.

*By Senator Owens :*

Q. The buildings belong to the stockholders?—A. Certainly.

*By Mr. Roome :*

Q. In case the company pays four per cent on the stock you would not ask anything from the Government?—A. I say unhesitatingly that in the smallest district in Canada we can pay four per cent.

*By Mr. Livingston :*

Q. Don't you think ten years is a long time to ask for the guarantee if it is going to pay, as you say?—A. The reason we ask for this guarantee is to enable us to go to work at once. We want to avail ourselves of the full benefit of that. We want the full assistance and the backing the Government can give us.

*By Mr. McGregor :*

Q. People putting their money in there, you say to them, we secure the interest to you for ten years, but you must take some chances on the business?—A. Yes. What suggested itself to my mind was to get local owners. The agents of our company would go about and say in different communities, we want you to put your money into it ; we want to get up local companies ; we want to interest the people ; we will go into the districts where warehouses are to be established and organize local branches.

*By Senator Owens :*

Q. So that the buildings will be practically owned by the people?—A. Yes.

*By Mr. Roome :*

Q. Would it not give you a monopoly for ten years if the Government put money into it?—A. Certainly it would.

Q. Is not that a disadvantage?—A. How are you going to avoid it?

*By Senator Owens :*

Q. If you paid over four per cent another company could come in and start up a business of their own?—A. The only monopoly we would have would be our business ability to do the business.

Mr. ROOME.—I beg to differ there, because if another company sprang up to carry on business, you could drop yours below four per cent and get the balance from the Government and the other company would have to shut up.

*By Mr. Livingston :*

Q. What guarantee would the Government have that the three million dollars would be properly expended?—A. It is taken for granted ; provision would be made to cover that.

Q. It is a large amount of money you know and there might be a great many ways of spending it?—A. Of course.

*By Senator Owens :*

Q. The Government will surround that with guarantees?—A. With guarantees. I think the best guarantee for that would be in the fact that we place the administration of the company—

*By Mr. Livingston :*

Q. In the hands of the Government?—A. No, but in such a way that the Government would control the issuing of the stock. We would not ask the Government to guarantee until the buildings were put up.

Q. But in the expenditure of the money is where the leakage might take place?—A. It is possible. I think that could be provided for, before the guarantee was given, in submitting the estimates. For instance, we are going to build a warehouse in your county and we are going to give a contract for the erection of that building. I do not know what county you live in but the same thing would apply all over. There is the whole thing before you.

Q. It is simple, explained in that way, but I know how many of these things have been managed.—A. We have no axe to grind here whatever, we are simply and solely in this business. Personally I am in it because I—

*By Mr. Wilson :*

Q. For what there is in it, I suppose?—A. This larger scheme? No. I am not. I am in it because I got interested in it, and I can see a future for our country in it, that nothing else presents. I am in it for what there is at the origin, the start ; that is how I got into the business.

Q. Or is added to it. You would receive the same as any of the rest of the shareholders?—A. Only in proportion to my holding in the present company.

*By Senator Owens :*

Q. Of course, the money that would be in this business would be the money of the stockholders?—A. Altogether.

Q. My friend here appears to think it would be the money of the Government?—A. No,

*By Mr. Livingston :*

Q. What I meant to say is this : here are three million dollars to be spent, and if instead of spending that sum in putting up warehouses, a million dollars is spent among those who—A. The promoters, say.

Q. The promoters and letting the contract out for some men in Montreal or somewhere else, you know the jobbery that is done all over.

SENATOR OWENS.—Not in Montreal.

Q. Well, in some other place. Of course, the Government would be obliged to pay this four per cent on the three million dollars whether the money was actually spent

## Agriculture and Colonization.

in building refrigerators or not?—A. I do not think there would be any difficulty whatever in safe-guarding that point. For instance, we would be prepared to give estimates and to show our figures, as I say, to the Government. Before we ask a guarantee, we will show them what it will cost; of course, we could do nothing more.

*By Mr. McMillan :*

Q. I think before you came before this committee you should have had your estimates prepared, and been able to show us exactly what you propose, if you wanted us to back the matter up?—A. I have them.

*By Mr. Davin :*

Q. I would like to ask, Do you expect that three million dollars would be all the money you would require?—A. No. I do not.

Q. Well, then, you would issue more stock than that?—A. We would issue—I believe this, for instance, I will give you an illustration. The city of Toronto are to-day negotiating with us for the refrigeration of their entire market system. They want us to put our system into the St. Lawrence market. A petition has been presented to the City Council signed by each and every one of the lessees, asking that they do this, and the city has offered us a large piece of ground in connection with the market whereon to build a very large warehouse for them. In our estimates we did not anticipate anything of that kind. The same thing will prevail in all the different cities. In all the American cities, to-day, the public markets are all refrigerated, and there is no doubt at all that, once we have the system going and the three million dollars invested, a great deal more capital will go into this business.

Q. You have now answered a question whether any more capital will be required. You say “yes.” Then in what form would you issue that stock; as preference stock?—A. The extra capital?

Q. Yes.—A. No. We could not, in justice to our guarantees.

Q. Then I want to know what you wish to do?—A. You are anticipating away ahead before we get the three million spent and that much done.

Q. I want to try and get at what you want to do?—A. I could not answer a question that has not presented itself yet.

Q. Of course, it presents itself to us at once. Supposing we decided to give help to your scheme, we would have to do it in the House of Commons, and that is where it would have to be advocated. Suppose these gentlemen had floated their concern and have built between two and three hundred warehouses throughout the country, and they find the three million dollars gone. That sum would build 240 warehouses at \$12,500 each. Very well; with what money would you pay your salaries and so on? Suppose, as sometimes happens, that the profit does not pan out, as may well happen, and you want more capital, as in big enterprises you know happens, and you are going to issue more stock, what relation would that stock you are about to issue bear to the three million dollars stock that is guaranteed?

Mr. MCGREGOR.—None whatever. The Government would not be responsible for any more stock.

Mr. DAVIN.—That is what I am coming to?—A. I think I see the gentleman's point now. He does not want, as it were, to issue preference stock.

Q. I want to know what position the stock that you would issue after the three million dollars, would stand in?—A. It would stand on precisely the same basis as the three millions of stock, without the guarantee.

Q. Without the guarantee?—A. Without the guarantee.

Q. Very well, then. Suppose any further stock you would issue would be unguaranteed stock?—A. We suppose it would be unguaranteed stock. It might have done so much for the country in the meantime, and the Government might want to guarantee it, but we would not like to allow them to do it.

Q. Suppose you have six millions of stock, and the profits only pay three per cent or two per cent. Would the shareholders of the three millions stock get the four per cent provided, before the subsequent stockholders got any, or would it be spread over and the Government have to foot the bill for the balance of the three millions? I want to put that as a business question?—A. I will answer you in this way: If we had our three millions going, and the business was not paying us more than four per cent, the question of issuing further stock would be very easily settled, because you could not possibly sell it.

*By Mr. McGregor :*

Q. If you issued six millions of stock, instead of three, you would only have half the amount to divide amongst the whole lot?—A. The point Mr. Davin makes is different from that.

*By Mr. Livingston :*

Q. I think there is a worse feature than that. Supposing, as my friend Mr. Davin says, you build these 240 warehouses and you spread them over this Dominion—of course that would only cover a part of the Dominion, and suppose this company has made four per cent profit besides the four per cent guaranteed. Well, then, there are other parts of the Dominion would want these cold storage houses. Would they not have just the same right as the first cold storage house? Do not you think that one portion of the Dominion would be entitled to a share in this Government guarantee as another?—A. If I could produce figures to show that our company could earn six per cent I should not be here this morning, because we would get all the money we wanted without the Government aiding us. We simply want this guarantee to start with and if we can demonstrate that we can earn six per cent, there will be a cold storage warehouse wherever that six per cent can be earned.

*By Senator Owens :*

Q. Some members of the Committee are under the impression that you will get four per cent in any case on the Government, even if you make six per cent?—A. Not at all. We want the Government to guarantee four per cent to the stockholders.

*By Mr. McDonald (Assiniboia) :*

Q. In case the company does not earn it?—A. Exactly.

Q. If the company earns four per cent the Government pays nothing?—A. That is it exactly. We want to be in a position to guarantee to any person putting his money into this scheme that there will be four per cent on his stock guaranteed by the Government. I have not a shadow of doubt but that we shall earn four per cent.

*By Mr. Semple :*

Q. Then why ask the Government to give a guarantee?—A. To get the business going, as I have explained. We have to show the people there is something behind it. It is a new business which will put the country in the front ranks with the rest of the world. You might on the same principle ask why help the butter and cheese trade?

Q. So many different schemes have been floated and have failed that the Government will have to be careful?—A. I quite agree with you.

MR. McMILLAN.—Let me give you a little advice. You talk about our producing five million dollars' worth of eggs in Canada alone. Now, up to the time the McKinley Bill went into force, two million dollars' worth was the most, and when you talk about five million dollars' worth being produced in Canada, I concluded that you either wanted to gull the farmers or that you were talking about something you knew nothing about. If your scheme is carried out you will not bring up our export of eggs to more than three or three and a half million dollars' worth for the next ten years. Farmers have been gulled so often that it makes them a little suspicious of any new scheme.

## Agriculture and Colonization.

MR. JOHNSON.—I am obliged for Mr. McMillan's advice. As far as the McKinley Bill is concerned, if you had free entrance into the United States to-morrow it is not worth a snap of the finger to the farmer. Because, when you send to the United States are you not competing with their own products?

*By Mr. Roome :*

Q. I see that the United States are now looking for a market for eggs in England?—A. Exactly. The difficulty which presents itself to Mr. McMillan's mind is one I want to overcome.

*By Mr. McMillan :*

Q. It seems that not having been able to make this cold storage a success you ask the Government for a guarantee. Now, what the farmers would like would be to have you make an experiment and show what can be done?—A. Have I not been trying all morning to put it in that way. I want you to put us in a position to do this by affording the farmers cold storage facilities. If there is any further information in regard to this scheme, financial, mechanical or otherwise, we shall be glad to give it.

*By Mr. Semple :*

Q. Would the company guarantee the number of warehouses to be built?—A. To a certain extent, but that is a matter of detail.

*By Mr. Carpenter :*

Q. The Government would have a voice in fixing the charges for cold storage accommodation?—A. Certainly. There would be a schedule of prices. The privileges we have secured in Toronto are based on that ground.

*By Mr. McGregor :*

Q. You only want a guarantee of the money expended?—A. That is all. The same way as you pay a subsidy to a railway.

Having examined the preceding transcript of my evidence, I find it correct.

WILLIAM JOHNSON,

*Vice-President of the Dominion Cold Storage Company (Ltd).*

## COMMITTEE ROOM 46,

## HOUSE OF COMMONS,

WEDNESDAY, 1st April, 1896.

The Select Standing Committee on Agriculture and Colonization met this day, Mr. Sproule, Chairman, presiding.

Mr. JAMES FLETCHER, Entomologist and Botanist to the Dominion Experimental Farms, was present by request, and, on invitation, addressed the committee as follows:—

Mr. Chairman and Gentlemen,—The annual appearance before the Committee is always one of the pleasant features of our work, because we find it is very useful as members of the Experimental Farm staff to come into direct communication with the Members of Parliament from all parts of the Dominion. In that way, we have opportunities of making our departments useful to the constituents of those Members. Naturally, if a matter is brought before the attention of members at the meetings of this Committee, they remember it, should occasion arise; whereas if we had not the chance of meeting the members, many opportunities for useful work would be lost. The different officers of the farm staff naturally consider that their own particular work is the most important to the country. With regard to my own, I know that it is, but I want to lose no opportunities for making this fact known to the public at large. The correspondence with all of the divisions of the Farm is very large, and we are frequently able to trace the influence of Members of Parliament through many of the letters that we receive, from the fact that many of the farmers, when writing, seem to think they are under an obligation to us when receiving information, and they mention the fact that they have been told to write by their Member of Parliament. We wish it to be widely known that the more the farm is made use of, the better we are pleased. We wish to be referred to, and we wish the farmers of the Dominion to make use of the information that has been gathered by the members of the farm staff. I state this now, because the matter has been mentioned to me by one of the members of the Committee, and I am glad to have an opportunity of drawing attention to it.

## INSECTS INJURIOUS TO FRUITS, AND THE REMEDIES.

The work in my own department during the past year has been carried out on very similar lines to those of previous years. There are to be recorded some triumphs in the way of practical remedies for some of the injurious insects. We are able now to speak definitely of many matters concerning which there was some doubt previously, as a result of experiments carefully carried out and compared with the accumulated experience of previous years. The work in the entomological division during the past year has been very largely with regard to insects injurious to fruits. This, I think, does not indicate that the injuries to fruit have been more serious than to some other crops, but that more attention has been paid to the matter of destroying injurious insects by the fruit growers than in some of the other branches of agricultural industry. The fruit growers of Ontario and Nova Scotia, particularly, have adopted very largely the improved methods of “spraying” with insecticides and fungicides to protect their crops against insect and fungus enemies. This simple and cheap operation has given such good results, that the work of a few has acted as an object lesson for the rest in the different districts where it has been conducted. Good careful work by a comparatively small number has convinced the rest of the fruit growers in the districts of the efficacy of treating their trees in this manner. There is now nothing indefinite or doubtful about the effects of the use of some of the arsenites or compounds of arsenic for treating biting insects, that is those which bite their food.

All insects for economical purposes come into two large orders, those which bite their food, and those which suck the juices out of it. For those which bite their food, and eat the substance of the leaves, poisonous materials placed on the surface are effec-

## Agriculture and Colonization.

tive remedies. By carefully conducted experiments we have found which are the best poisons to use and in what proportion they should be applied, the best time to apply those remedies, and the cheapest way to get good results. During the past two years particularly, a large amount of work has been done in spraying fruit trees and other crops, and exceedingly good results have followed. In addition to the work done at the Central Experimental Farm and the other stations under the control of the Dominion Government, the Provincial Government of Ontario are now helping this work along by publishing valuable instructions and reports, and I think it may be said now that there is no farmer or fruit grower in Canada who may not get much help from his own Government's reports on all the different parts of his agricultural work. The Ontario Government during the past year has carried out a very successful series of experiments in spraying orchards by means of object lessons conducted by Mr. A. H. Pettit, of Grimsby, a man of energy and intelligence and of great experience as a fruit grower.

In the province of Quebec there are a great many active farmers and fruit growers adopting the same methods. In Nova Scotia and British Columbia the same thing is going on, and the results are always satisfactory.

I have been preaching the gospel of spraying for ten years, and at the Experimental Farm we have done all we can to spread the requisite knowledge, by publishing bulletins, and by pushing the work along in every possible way. Last spring, Mr. Craig and I went to the Niagara district and held a series of meetings in the places most convenient for the fruit growers to meet us. This series of meetings took about a week and we were able to meet a large number of the best fruit growers of the district. This effort has had a good effect. At any rate it is evident from our correspondence that a great many have adopted spraying, which they had not before used, and with considerable success. I think spraying is now recognized as part of the necessary annual work of fruit growers. They recognize it now as a method to be adopted, as a matter of course, whereas, a few years ago, we had trouble to persuade them that it was a thing they ought to try and from which they would get good results.

*The Canker Worm.*—A large number of the insects one notices every year in Canada are not necessarily injurious, and experiments are necessary to find out which are injurious, and which are likely to be most injurious, so that particular attention may be paid to them. This work can only be done by specialists, but a good many are doing it, and there is no reason why the farmers should not take advantage of the results. They can get information by asking for it and, by promptly applying the remedies advised, they may save themselves a good deal of trouble and avoid a great deal of waste in labour and in money.

Among the insects which have been brought very prominently to my notice from their frequent occurrence during the past year, I would just mention one or two. The canker-worm, well known by that name, has been injurious in Ontario and Nova Scotia, and I bring it before the Committee because there is a good deal of difference of opinion in various parts of the country as to what is the best remedy of dealing with this pest. Now, there are very few insects concerning which there are not a dozen or even a score of different methods which may be tried by way of remedies, and the great object for everybody who wants to get practical results, is to get to know the *best* of these. If there are a dozen remedies before the public it is very likely that none will be used, because while you are making up your mind which is the best, the opportunity for applying any of them passes away. If there is only one remedy recommended, we are likely to get the good results that we wish for, because the farmers are in no doubt as to what ought to be done. In Nova Scotia the general opinion is that the best remedy for the canker worm is banding the trees with some viscid or sticky substances to prevent the moths climbing up the trees. With respect to nearly all these injurious insects it is of the utmost importance to study their life history. Unlike many others, the insects of which we are speaking appear late in the autumn or early in the spring. The females, which lay the eggs from which the caterpillars are produced in the spring, when the eggs are hatched and the caterpillars come out, appear late in the autumn. They have no wings, and they climb up the trees to lay their eggs on the branches. The eggs stay there during the winter, and the young caterpillars hatch during the spring.

There is another kind of canker worm, the moths of which lay their eggs in the spring instead of the autumn, but I need not trouble you about that because the treatments for both are similar. The method which has been adopted in Nova Scotia, and is a favourite remedy there, is to paint a band of some viscid material round the tree, such as printers' ink and oil, or a mixture of castor oil and resin, which will remain viscid for some time. This is done in order to catch the spider-like female moths, which climb up the trees to lay their eggs. If the moths cannot pass, no eggs are laid on the tree, and no caterpillars can appear the next year.

In Ontario the general practice has been to spray with Paris green or some other of the arsenites, and it has always been my experience that spraying the trees with Paris green at the time the young caterpillars were on them, is by far the best remedy. I could not understand, then, why it was that many of the practical men in Nova Scotia, whom I knew were reliable, should keep on saying, "the best remedy is banding the trees." It certainly is more expensive and involves a great deal more trouble. I found by making enquiries, and after a good deal of correspondence, that the difference was this: that in Nova Scotia the trees are very much larger, as a rule, than they are in Ontario, and it is a very different matter spraying a tree of 20 feet high, to spraying one of 35 or 45 feet high. With the smaller trees the apparatus which we have is quite useful and suitable, in fact answers all purposes for spraying a tree, we will say, 20 feet high. By raising the nozzle of the spraying pump on a light pole it is not too long to be conveniently handled and it can be raised sufficiently high to throw the spray over the trees. If you add another 10 feet, however, the additional height makes it a very inconvenient and troublesome operation, it is so much more inconvenient, in fact, that the work is only partly done or left undone altogether; therefore, this other remedy of painting the trees, where they are too large to spray easily, is quite effective.

On account of the natural life history of the canker worm, in that it has no wings and cannot fly, but must crawl up the trees before the eggs can be deposited, if we put an insuperable obstacle in its way, the female is destroyed below that, or can be kept from getting on the trees to lay her eggs. This fact accounted for one of the difficulties which I could not understand until I had inquired into the matter very carefully. We have, therefore, two remedies for this insect, which must be adopted according to the circumstances of the operator. In Ontario, therefore, a systematic spraying is the best remedy, but in Nova Scotia the trees are too high to be conveniently sprayed thoroughly, therefore the method of banding must be added to that of spraying. Statements very frequently appear in the newspapers that are not entirely accurate. The writers of these articles of course have not a special knowledge of many things they write upon, but they do the best they can. A very slight inaccuracy, however, may have very serious results, and statements are made in the newspapers sometimes quite misleading. Many such statements have appeared about this very matter.

*By Mr. Cochrane:*

Q. Do trees grow more quickly in Nova Scotia?—A. The trees in Nova Scotia orchards are older than we have in most parts of Ontario, although we have some very old trees. Around Lake Erie in particular there are some very old pear and apple trees. I think that in Ontario there has been a different method of pruning adopted in growing fruit trees and many new varieties have been introduced in the young orchards. The climate in Nova Scotia is certainly exceedingly favourable for the advantageous culture and development of apples, and when they have secured good varieties they have kept them up. The same trees by being taken care of have lived a long time. I have no doubt though, that it could be done in Ontario, but I think we have in this province more new and young orchards than they have in Nova Scotia.

Q. Do you know how the trees in Nova Scotia are propagated, whether from the root or from the stalk?—A. The methods of propagation adopted there are just the same as we pursue in Ontario.

Q. You do not think there is anything in the theory that they are shorter lived from being grafted in the root?—A. Mr. Craig has studied that matter very carefully

## Agriculture and Colonization.

and I think he says it does not make any difference, in one of his bulletins. I know the matter has been considered and studied by him, and as far as I can remember his statement on the matter is that it does not make very much difference. Some hold very strongly that a tree grafted on a piece of root is not as good and strong as one grafted on a whole root, but I think Mr. Craig does not agree with that.

Q. I recollect seeing a tree at Niagara which a man told me was nearly 100 years old. It was as high as a maple?—A. Yes; I have seen similar large trees.

*By Mr. Carpenter :*

Q. Do you not think the system of trimming has more to do with it than anything else? People trim to keep trees down in our section?—A. It is very much a matter of fashion or fancy, and trimming is often done for the convenience of picking. Do you not think that the small size of the trees is also due to the large number of new orchards all through your country?

*Recipé.*—To resume, I may say that with these methods of banding the trees, under different circumstances, the best method may vary. The formulas which have been used most satisfactorily for making the mixtures I have mentioned are castor oil and resin, two pints of castor oil and 3 lbs. of resin and printers' ink and fish oil. In the last report of the Experimental Farm, which is not yet distributed, these receipts are given in full. For five acres, Mr. Armstrong, a good orchardist in Nova Scotia, uses 20 lbs. of printers' ink, which he gets, at from 10 to 12 cents a pound, and to that is added 2 gallons of fish oil. These are well mixed and stirred together and applied to the tree, by being painted on a strip of common roofing paper tacked around the tree.

*By Mr. Featherston :*

Q. What advantage is there in using printers' ink?—A. It remains viscid for a long time and does not dry up very easily. By mixing printers' ink with oil, it remains sticky longer than any other material, and it has been found as a result of experience that it is one of the best of the cheap materials that are available.

*By Mr. McGregor :*

Q. How do you mix the oil and resin?—A. The castor oil is warmed and the materials are boiled together. Mr. O. T. Springer, of Burlington, has used this very satisfactorily. He uses a portable coal oil stove in the orchard and paints the material directly on to the trees with a whitewash brush.

*By the Chairman :*

Q. What about the use of tar?—A. I think sometimes it injures the young trees, and it also dries up quickly.

*By Mr. Carpenter :*

Q. Do the worms crawl over this sticky bandage?—A. They are not worms, but the female moths, spider-like creatures without wings which crawl up the trunks of the trees to deposit their eggs.

Q. And they stick fast?—A. Yes, they stick to the bands on the trees. There are many methods used, but this is the best, as far as I have been able to learn.

*By Mr. Featherston :*

Q. Do they crawl up in the spring after the hatching time?—A. There are two different moths, one that appears in the autumn, the other that does not emerge until spring. This latter is a different species, scientifically, but it is the same kind of moth to the ordinary fruit grower, and the method of controlling it is the same.

*By the Chairman :*

Q. The ordinary caterpillar's eggs are laid on the bark of the tree, are they not ?  
—A. They are laid in a ring near the tips of the smaller twigs.

Q. Yes ?—A. The kind you mean can be easily destroyed by Paris green.

Q. Is the mixture applied to the trees in the fall of the year ?—A. The painting ? Yes, it is put on both in the autumn and in the spring, when the moths appear. The same bands can be left on during the winter and the material painted on to them again in spring.

*The Cigar Shaped Case-bearer.*—I will now pass on to another insect injurious to the apple tree, which has been successfully treated during the past summer. It is the cigar shaped case-bearer of the apple which is a small caterpillar that forms a case in exactly the shape of a very small cigar. It carries this case about with it and lives inside of it, while it eats the leaves, the young buds and forming fruit of the apple tree. It does a great deal of harm from its habit of frequently attacking the flower buds just as they are opening. It is difficult to fight against this pest because although it eats some portion of the surface of the leaves it is only a very small portion compared with the injury it does beneath the surface.

The method of attack is as follows :—The caterpillar eats a very small hole through the outer surface of the leaf and then extends itself inside between the two coverings of the leaf and eats out the cellular tissue, thus the only opportunity of poisoning it is at the time when it is eating its way through the skin of the leaf, when it makes a hole so small as to resemble the prick of a pin. Spraying experiments have been tried with Paris green mixed with the first sulphate of copper wash, which is applied immediately before the buds burst. Since spraying has become so generally adopted as a method of preventing injury by insects and fungous diseases, particularly the black spot of the apple, spraying with sulphate of copper first of all, and afterwards with Bordeaux mixture, is now well-known as an effective remedy, and we have no difficulty in getting fruit growers to spray when they are asked to do so, because they have had it demonstrated to them that excellent results will follow the application of these mixtures.

The cigar case-bearer will be much checked if 4 ounces of Paris green be mixed in the first sulphate of copper wash which is made by dissolving 1 lb. of sulphate of copper in 25 gallons of water.

Then again, following that at short intervals of about four days either with another application or two of Paris green, or with a kerosene emulsion wash. This is a mixture of soap suds and coal oil. Many kinds of insects can be destroyed with the kerosene emulsion also, but from a different reason. Whereas the Paris green destroyed them from being an active poison, the kerosene emulsion kills them by suffocation, the coal oil running over the bodies and stopping up their breathing pores. As I have stated, this is not an easy insect to fight against, but requires persistent work and frequently repeated applications. Three or four would be required early in the spring, and the results are certainly slow to obtain, but in the end success will be attained if the applications are applied regularly. Mr. Worden, of Oshawa, has had a great success in treating the same insect with a mixture of lye and Paris green, three pounds of concentrated lye in 45 gallons of water to which three ounces of Paris green are added.

*The Peach Bark-borer.*—In the Niagara district, and at Queenston particularly, a great deal of injury has been done during the past four or five years by a very small beetle which bores into the bark of peach trees. The peach bark-borer for some years has defied all efforts to control it, but the past year a practical remedy has been discovered. In trying a great many experiments, we found that by painting the tree with a carbolic alkaline wash this pest can be checked. The wash is made of soft soap, diluted sufficiently to permit of its being applied with a brush, with a strong solution of washing soda which makes it more alkaline, Paris green is then added, and enough carbolic acid to give the mixture a strong odour. We have been trying now for three years to get some remedy by which this injury could be stopped, and I am glad to say that we have now succeeded largely through the systematic efforts of Mr. Carl Fisher of Queenston. The present is the season of the year to apply the remedy for this troublesome insect.

## Agriculture and Colonization.

Perhaps some of the Members living in Western Ontario know by sight the effects of the work of this insect without really being aware that the pest is at work in their orchards. Early in the spring, where the insect is at work, a large quantity of gum exudes from the trees and falls in a mass below the peach trees. In some places two or three quarts will be found to have fallen beneath infested peach trees. This is the result of the work of this minute insect which is only about one-sixteenth of an inch long. By working in the bark it injures the forming wood, and the tree in its efforts to cover up the injury pours forth large quantities of gum. Under these circumstances the trees soon become exhausted, for it is not possible for the tree to lose all this amount of nourishment which may be called prepared food required for the next year's growth. The chief result then of the work of this insect is to weaken the tree by taking away the nourishment required for the use of the tree during the growing season.

*By Mr. Carpenter :*

Q. I have just been using washing soda and soft soap. How much Paris green do you put in the mixture?—A. I will give you the exact proportions used by Mr. Fisher—Five pounds of washing soda, three quarts of soft soap, water to make six gallons and then enough lime to show what trees have been treated. That will, of course, make the mixture thicker and also enable us to identify the trees which have been washed. Add to the foregoing three table spoonfuls of Paris green and one ounce of carbolic acid. I think probably that the carbolic acid is the most important part of the mixture. The whole should be applied with a whitewash brush. The carbolic acid acts as a deterrent, preventing the insects from alighting to lay their eggs when flying through the trees, for this beetle flies readily from tree to tree. It was committing great injuries and drastic measures were required to prevent its spreading. Many experiments were tried with different substances, and, at the end of last year, Mr. Fisher found that all the trees treated as above were greatly benefited and the attacks of the bark-borers upon those trees had almost ceased altogether.

*By Mr. Carpenter :*

Q. Do you recommend the application of this remedy when the leaves are coming out?—A. The first wash should be applied before that. The insect comes out early in the spring and immediately sets to work ; as the injury begins early the application should therefore be made early in the spring, so as to be preventive.

*By Mr. McGregor :*

Q. Do you spray the mixture or apply with a brush?—A. It is applied with a whitewash brush.

Q. Does the insect go from limb to limb?—A. This insect works mostly on the rough bark of the trunk, but also occasionally on the larger limbs and even on young trees. There was an impression prevalent that it only attacked old and dying trees, but that is a mistake.

*By Mr. Carpenter :*

Q. The mixture is quickly put on?—A. Yes ; very easily.

*The New York Plum-Scale.*—Another insect which caused a good deal of injury in Canada last year is known as the New York Plum-Scale. The attention of fruit growers generally has been drawn to it because it has increased so rapidly in some of our orchards. Luckily for us in Canada, we have found that it is badly attacked by a natural parasite which has kept it down, but not sufficient to check it entirely so as to prevent loss. Thanks to the good work of Mr. Slingerland, of the New York State Agricultural College, it has been shown that by the application of kerosene emulsion this insect can be destroyed. In Canada, Mr. Fisher, of Queenston, and Mr. William Orr, of Fruitland, adopted this method of fighting it and found last autumn that they had stopped its ravages. In this way it is shown that we had a practical remedy for this insect also.

Speaking of scale insects, there is yet another one to which I desire to draw the attention of the Committee. It is rather hard to recognize it as a scale insect. It has the appearance of a little tuft of cotton wool and occurs on grass. I do not know the extent of the injury caused by this insect, but from the fact that the meadows where it occurred had the appearance as if there had been a fall of snow, when the egg-sacks were formed, the injury cannot but be great. It affects grass entirely and the only places where it has been reported in recent years have been during the past summer on Cape Breton Island and in Nova Scotia.

An interesting fact with regard to injurious insects, which has been frequently noticed, is that no sooner does any one species become unduly abundant than it is almost invariably brought down to a normal occurrence by its natural parasite. This sample of the Cottony Grass Scale which I have here came from Cape Breton, and during the winter I saw several parasites in the jar. I bring it to the attention of the Committee now so that the members may be able to recognize it, if unfortunately it should appear in their locality and they may then be able to notify the Department of its occurrence. The remedy is a very easy one, these white bags which you see on the grass are very conspicuous. They appear late in the autumn and if the fields where it occurs are carefully burnt over so as to do no injury to the roots of the grass and of course care being taken that the fire does not spread, the insect will be effectually destroyed. It was not brought to my attention sufficiently early last fall in all cases to burn over the grass, but I have recommended our Nova Scotia friends who have complained of it, to burn over the meadows in the spring and in that way the insect will be destroyed.

*By Mr. Carpenter :*

Q. Do you find them more prevalent in a dry than in a wet season?—A. There is very little known about it. It has never occurred in injurious numbers to my knowledge, before, but the report on the field was that the grass was light and it was on high and dry land. The grass would be light from the large number of insects having fed on its juices during the summer.

*By Mr. Pridham :*

Q. Would that be in pastured fields?—A. Hay fields.

*By Mr. Featherston :*

Q. The insect must stay on the grass, if it is killed by burning the grass over?—A. The insect passes the winter in the egg state, inside those bags to which I call your attention, during the winter. In fact, each of the white cottony bags is an egg-sack containing a large number of eggs.

Q. On the grass?—A. On the grass, yes, about two inches above the surface of the soil. It passes the winter in the egg state, so that it cannot move, and burning over the grass will destroy the whole of the eggs with the grass.

*Black Peach-aphis.*—During the past summer there has been one introduction into Canada of rather a serious nature, although we have been able I hope to check it, and have not allowed it to spread, that is the well-known fruit pest the Black Peach-aphis of New York State where it has done a great deal of harm. It belongs to the plant-louse family, and, as its name says, it is black. It does injury to both the roots and twigs of the peach tree. When occurring on the twigs and branches it is very easily treated with the well known standard remedy for sucking insects, coal oil and soap suds. When found at the root the difficulties of treatment are greater because any applications to the surface simply drive the insects further down towards the young tips of the roots, and there they do injury by sucking out the juice and prevent the young feeding rootlets from performing their proper functions.

Professor J. B. Smith, of New Brunswick, New Jersey, has tried very extensive experiments with kainit, and he has found where it is applied the insect has been checked and the tree very much invigorated and improved in health. The application

## Agriculture and Colonization.

he recommends is 10 lbs. to each tree, spread over the surface of the soil where it is dissolved by rain and washed into the soil. This is another instance showing how we have the advantage, in dealing with many of the imported insects, of the experience of our friends to the south, and are able to check them upon their first appearance, with the remedies which experience has shown to be best. Some of the orchards near Leamington where this trouble has occurred have been treated with kainit, and further applications will be made in the spring.

*By Mr. Carpenter :*

Q. Have you estimated the probable expense of the treatment?—A. That is a matter that will depend upon the demand for kainit. The cost has been high in Canada, heretofore, because there has been a very small demand for it. During the last year it has been very largely used in New York State and it is used to some extent in Canada as a fertilizer, but the price varies. I do not know if Professor Robertson is aware of the present price.

Professor ROBERTSON,—I think the last quotation I saw was very much lower than formerly, about \$16 a ton.

*By Mr. McGregor :*

Q. Would not fresh ashes have the same result?—A. To some extent they would but they have not been found as effective as the kainit. They have been used and are certainly a wonderful fertilizer for the trees, but the results are not so satisfactory, as far as the insects are concerned, as those obtained from the kainit, which if Prof. Smith's experiments are confirmed, are very remarkable.

### HOUSEHOLD INSECT PESTS.

*Moths.*—Another branch of insect life that has been brought prominently forward during the past year is household pests. In Toronto there seems to have been almost a plague of carpet moths, and this is a subject that is of interest to everybody, because there are very few of us that have not had the annoyance of finding that our clothes have been destroyed by carpet moths, and to find out the best means to prevent this loss is a matter that is well worthy of consideration by all. The chief thing, really, I suppose, is to keep our eyes open and notice when the moths first begin to appear. Moths are beginning to occur now, and those of us who have not put away our winter furs and clothes had better do so as soon as possible and put them away in a tight receptacle, so that the moths cannot get at them to lay their eggs on them. The life history is so well known, and perhaps is well known to everybody here as to make it clear that the moth itself does no injury to our clothes; it is all done by the little caterpillars which come from the eggs laid by the female moths. The moths are naturally attracted by any material which will provide suitable food for their young. They lay their eggs on any cloth or any material made of animal substances. Our clothes are made of wool and these form proper food for these minute caterpillars. Cotton is a vegetable material, so that it is not attacked. Paper also is chiefly made of vegetable matter and as it is not attacked, any box or receptacle can be made moth-proof by simply pasting old newspapers on the outside. In this district I know of several of our farmers' wives who have adopted this method of putting away their winter clothes and fur robes; any old box or packing case will answer. If there are no eggs laid by the moths before the garments are put away, there certainly can be none laid afterwards, because no moths can get inside to lay eggs after the box or other receptacle has been pasted up, and the caterpillars which do the damage can only originate from eggs laid by the mother moths. The moths are only beginning to appear now and there is yet time to put the clothes away without fear of their being infested. Packing away clothes with camphor or that abominable malodorant called "moth camphor" will have no effect in destroying the moths after the eggs have been laid. It makes an unpleasant place for them to live in just in the same way as it does for ourselves, but it does not kill the caterpillars. Clothes should be shaken or beaten thoroughly and then put away in a box made moth-proof in the way I have mentioned.

By Mr. McGregor:

Q. Would you advise the use of tar paper for robes?—A. It will help.

Q. I have tried successfully for years and I have found tar paper the very best thing you can get? A. It is a good deal more trouble and expense to get tar paper than ordinary newspaper.

Q. Moths are so susceptible to its influence?—A. Yes, it certainly is a good deterrent, but it does not matter how susceptible they may be to the odour, if the moths do not lay their eggs upon clothes and robes, no injury can be done.

Q. But I mean to wrap them in tar paper in boxes?—A. Certainly, it is very effective if it is done soon enough, but if the robes were not wrapped up until the eggs were laid, even that would not prevent them being injured.

Q. I would suggest the robes be thoroughly beaten out before putting away. Farmers lose so many by leaving it a little late in the season?—A. They do most certainly, and that is the chief point I wish to emphasize.

Q. But if they are thoroughly shaken up and put in the sun, and then wrapped in the tar paper, I think they will be entirely cleared of moths?—A. Yes, but if the eggs are hatched all the beating and putting in the sun would not have the effect of destroying them. You might beat many out and destroy many more by the heat of the sun, but if any were left, damage would be done. The chief thing is to do it soon enough, and to recognize that directly the winter is gone, woollen things and furs should be put away as soon as possible. If there is any doubt about eggs having been laid, it is a good thing to keep robes and everything else in a convenient place where they will be frequently seen, and not wrap them up too soon, but keep them shaken and beaten frequently for some time before putting them away, so that you can examine them and see if they are safe. A caterpillar does not come except from an egg laid by a moth, and no conditions or susceptibility of the material can produce a caterpillar unless the eggs have been laid. If we put off wrapping up clothes till late in the season, we are liable to have injury. The thing is to shake and brush things well, and then put them away carefully.

*Carpet Beetle.*—Another insect which has appeared rather strangely in Canada, and has lately spread alarmingly through the Brantford district and west to London, and from London to Toronto in considerable numbers, is a little beetle known as the "Carpet beetle" or "Buffalo moth" (*anthrenus scrophularia*). I have said that it is strangely distributed, because the only other places I have heard of it besides those mentioned are at Fort Macleod, North-west Territory, and here at Ottawa. It is called a "moth," because it destroys clothes, as does the carpet moth. It is, however, really a little black beetle with conspicuous white and red marks on it; it is less than one-eighth of an inch long. It affects carpets where they are nailed down close to the skirting board, and particularly those carpets which have any red in them. Evidently the red dye has an attraction for the insect, for it will eat out the red and leave the rest of the colours untouched. I have seen an account of injuries to carpets in which this insect is described as having cut out strips right through the middle, as if cut with a knife. Evidently there is something pleasant in the red dye which the insect likes. This little beetle has lately spread very much in Canada, and has been very troublesome. It has been called, "the despair of good housekeepers," as even good housekeepers cannot keep it down without a good deal of care. The remedy which is recommended in the Washington division of entomology in regard to carpets which are infested is a good one. The plan there recommended is to spread damp cloths upon the carpets and iron them with very hot flat irons. This has the effect of generating steam, and sends it down into the cracks in the floor, and in this way the insect is killed in all stages. Another remedy which may be mentioned is sprinkling the carpets freely with gasoline or benzine. Neither of these would injure the carpet, and they would certainly destroy the insects. As these materials are very dangerous from their inflammability, great care would have to be taken not to carry a light into the rooms where carpets had been recently sprinkled with either of these inflammable liquids, until the room had been aired.

## Agriculture and Colonization.

*Croton Bug.*—Another troublesome household pest abundant in some places, to which reference might be made, is the Croton bug or small “cockroach.” It is a frequenter of many large mills, and is found in hotels which are heated with hot water. It sometimes does harm in eating off the surface of boots and gloves, or anything in which faced leather enters into the manufacture. I saw a pair of boots at an hotel in Brandon, Manitoba, the surface of which had been eaten off in patches, the same as if it had been pared off with a knife. The remedy is powdered borax, which if sprinkled round the edges of the room where the insects generally run, it not only drives them away but kills many outright.

*By Mr. Powell :*

Q. What is the colour?—A grayish brown or dusty colour.

*By Mr. Featherston :*

Q. It is the regular cockroach?—A. It is the cockroach of this country. It is not the same as the cockroach which is found in England, and at some of our seaports, which is much larger. Under any circumstances they are nasty things to have about a house. They smell nasty, get into food and destroy many things. Borax has been found to be a successful remedy. Mr. Rosamond, M.P. for North Lanark, had them in his Almonte mills at one time. He wrote to me asking for a remedy and I recommended him to apply borax freely about the floors of the mills. This he has done and reports to me that the insects have quite disappeared. They will probably appear again at some time and will require a second treatment.

*By Mr. McGregor :*

Q. In Western Ontario we are troubled with an insect which bores the soft maple tree. I got Mr. Craig to look at it when he visited us. This insect is spoiling all our nice shade trees; thousands of them. It is very troublesome and is now affecting the ash?—A. Mr. Craig brought some specimens of the affected bark of the trees to which you refer, with him to Ottawa, but the grubs were all injured. They had become mouldy and I could not learn anything from them. I wrote to Windsor for more but could not get any further specimens. I have no doubt it is one of the borers well-known to attack the maple. Nothing can be done except painting the trees with an alkaline wash to prevent the beetles from laying more eggs next year. The female beetles probably appear in June. If the trees were treated the same as apple trees are for borers, the eggs would not be laid and the injury could not occur. Generally when the holes are observed in the trees it is too late to remedy the evil, because the holes merely show where a fully developed beetle has emerged.

Q. We often find them between the bark and the wood?—A. That is where the chief injury is done.

Q. I suppose dozens of trees in our district have been affected by them?—A. I wrote to a gentleman whose name was given me in Windsor, and asked him particularly for all information possible as to the extent of the injury, but I got no reply.

Q. About a foot in diameter is the size of a 15 or 20 year old tree.—A. There is nothing can be done except painting with an alkaline wash in the spring—the time the beetles occur so as to prevent the females from laying their eggs.

Q. The same wash you spoke of?—A. Yes; soft soap and soda.

Q. We put in a little coal oil?—A. I do not think that would have much effect. If you made any addition at all I think carbolic acid would be better. I say that coal oil would not have much effect for this reason: Where I have tried the ordinary kerosene emulsion for the peach bark-borer it had not the effect of keeping it away. The effect only lasted for a little while, the odour of the coal oil, seemingly, soon disappearing.

Q. I used a syringe to the hole?—A. Where you can find the hole you can get at it in that way. But that hole is merely where one insect has come out, and while you are syringing that, hundreds of other borers may be at work and you could not get at them.

With apple borers you can detect their presence owing to the thinner bark of a young apple tree but with this other borer you cannot see what is going on, owing to the thick rough bark of the maple tree.

*By Mr. Semple:*

Q. Can you recommend anything to be done to check the grasshoppers which are doing a great deal of injury in Western Ontario?—A. We can adopt the methods which are pursued in the Western States where the grasshoppers occur every year. In Ontario we have not often had serious occurrences of grasshoppers year after year such as occur regularly in the Western States. Where we have them it will certainly pay us to follow the plan which they have in the west, and that is to make hopper-dozers. These are light pans, containing at the bottom a coating of a sticky material. These hopper-dozers or pans are drawn over the fields before the young grasshoppers get their wings and gather them up by the bushful. The pans are very light and can be drawn over the field quickly by a single horse. In the States of Dakota and Minnesota they have to adopt this method of drawing pans or hopper-dozers over their fields nearly every year and they destroy the grasshoppers there by the thousands of bushels. In that way only have they protected their crops. On Sable Island during the past summer the injury was so severe that the Government had last autumn to buy large quantities of hay—a thing they had never had to do before—on account of the grasshoppers having eaten all the vegetation, and particularly all the hay upon which the wild ponies would have subsisted during the winter. They had to buy, I think, 50 tons of hay to feed these animals during this winter. That is mentioned in my report for 1895 with a diagram of a hopper-dozer. The only method of preventing grasshoppers is to take action early in the spring, say at the end of May, just at the time when the grass is beginning to shoot up and the young ones first appear. You will then see large quantities of the young grasshoppers in the grass. The pans of which I have spoken can be drawn over the fields without any injury to the grass and large numbers of grasshoppers and other insects injurious to grass will be destroyed. In vineyards and gardens such a method is not practicable. You can only poison them there with active poisons in the same way as you do other insects which bite their food. There is a mixture of bran and Paris green with sugar which has been used satisfactorily in vineyards in California. It is claimed the grasshoppers will eat it in preference to vegetation. The same remedy can be applied with more or less success in the case of the cut worm.

At the request of the Chairman I have brought with me to-day some honey produced at the Central Experimental Farm. The work carried on in the apiary has been done almost entirely by Mr. John Fixter, the Farm foreman, and it has been very satisfactory. He has carried out certain suggestions that I had made and that were made also by Mr. Holtermann, of Brantford, who has helped us in this work. The annual report of the Experimental Farm last year contained a statement of these operations and during the past summer further experiments have been carried on. Mr. Fixter has brought here to-day some samples of the different kinds of honey. He has also brought some sections of comb made in the apiary, and I think perhaps the most interesting experiments which have been carried out have been those with regard to different kinds of foundation. When the apiary started last year, Mr. Holtermann wrote and asked us if we would carry out some experiments with the different kinds of foundation. The central portion of the comb is formed from the foundation. The foundation is produced artificially, and is supplied to the bees, thus saving them a large amount of labour, time, and energy in producing the foundation, which is then "drawn out," as it is called. The wax in the foundation is drawn out and extended until it forms the cells of the honeycomb, such as I have in my hand. Now, according to the nature of this foundation, so is the comb which is produced, and I have here in my hand two sections of the comb which was made last summer by our bees and filled with honey. The honey has been extracted and we have the empty comb for examination. I have here a piece of the artificial foundation similar to that we put into the section. This is cut to the size of

## Agriculture and Colonization.

the section, and is put in the centre ; the bees then draw it out from either side and fill it with honey. We have found by supplying this foundation that it saves the bees a lot of time and energy. They are working all the time and we are getting all the meat without any bone. They draw out the wax we give them and add to it very little and the whole of their effort is then given to producing the honey. It takes about 10 pounds of honey to make one pound of wax, so that by every pound of foundation we give the bees we save 10 pounds of honey, and therefore it is a paying operation to give them the foundation, and we have also found that it pays very decidedly to supply bees with the best foundation which is procurable.

*By Mr. Featherston :*

Q. That is a natural comb is it not ?—A. Yes, it is drawn out from the foundation.

Q. It is natural comb, not an artificial one ?—A. No, it is a natural comb, but it was drawn out from the artificial foundation given to the bees to work on.

Q. It is done by the bees ?—A. Yes, certainly. Another advantage is that it is always much straighter and more even. It is stronger and easier to handle. If you give them a good foundation they build their comb and section, as it is called, straight, so that is more easily marketed, but in the old basket hives the comb was irregular and you had to cut it out in pieces and sell it by weight and there was a great waste, so that in every way there is a great advantage in supplying a good foundation, and in following the newer methods adopted by bee-keepers.

*By Mr. Carpenter :*

Q. Is it a new idea ?—A. No.

Q. It has been done for some time ?—A. It has been done for years, but the question we are trying to solve is as to the character of the foundation that should be used. Mr. Holtermann pointed out that the nature of the foundation had a very appreciable effect on the sales of the honey, because if the foundation was dark coloured and gave a dark "fish bone," as they call it, that is the central portion, it would sell for a cent or two a pound less than if that were not showing. Now, the Central Farm honeycombs which I have with me this morning, some are made from good foundations and some from bad ones. But perhaps you will see the difference better from this photograph I hold in my hand.

Really, the experiment was to find out which was the best foundation, and whether it paid the farmer to buy a cheap foundation or a superior one at a slightly higher price. We found that, as in many other things, the best foundation gave the most satisfactory results and paid the best in the end. You will see here from the samples I exhibit, two combs made from bad foundations and one made from the best, and you would readily notice the difference at a glance. It shows how much better it is to get the best foundation you can, because you get better results from it, and that idea is illustrated right through the investigation. In the experiments for the past year there was one very interesting point came out. Mr. Shutt, our chemist, has helped us very much by making the critical examinations and measuring the combs made by the bees during the summer, and he found that the bees deposited a very much heavier comb to hold buckwheat honey than to hold clover honey, so that there was a great deal more waste labour with the buckwheat honey than the clover, and moreover it sold for a very much lower price.

*By Mr. Featherston :*

Q. Is it because the buckwheat honey is thinner ?—A. Well, no, I would rather say it was thicker to look at it. It certainly appears thicker, but as to the reason why the bees should make a thicker comb for buckwheat than for clover, we have not found that out. Here is a specimen of the buckwheat honey and of the clover.

*By Mr. Cochran :*

Q. Do they make a heavier comb when you furnish the foundation ?—A. The foundation is now supplied by all bee-keepers.

Q. But do I understand you that the bees make a heavier comb for the buckwheat with the foundation you supplied?—A. Yes. I said it was waste labour because they had to do more to produce a less valuable kind of honey than they would have had if it had been clover honey. These samples of the combs were prepared by Mr. Shutt, who washed out the honey to find out the exact weight, and carefully weighed it with his delicate scales in the laboratory, where every care was taken to have the experiment accurately carried out.

*By Mr. Pridham :*

Q. How is the apple blossom as a honey producer?—A. It is very good. It not only produces large quantities of honey, but it is much more attractive to the bees than any other plant at that time of the year.

*By Mr. McGregor :*

Q. Do you know anything about the new production of honey from sugar?—A. I have heard of it, although I have never seen it. Sugar, undoubtedly, is supplied by some bee-keepers to be stored away by their bees and then sold as honey. I think there is no doubt that it ought not to be allowed. It is an adulteration, look at it in the mildest way you can. If a sufficient quantity of sugar is supplied to the bees, they will carry it straight into their comb, and fill up the comb with it without it being digested or changed in character at all, so that it will merely be sugar deposited in the comb instead of honey. I believe the Bill to prevent adulteration in this way has passed, and that we shall soon have nothing that is adulterated sold in Canada at all. Canada will soon be a synonym for perfect excellence in everything.

WEEDS AS AFFECTING AGRICULTURE,—MOST NOXIOUS SPECIES.

There are just two other subjects which I would like to refer to if I have time, viz., weeds and grasses. I will only speak of them for a few minutes, because it is merely the general subject that I wish to touch on. A great deal of attention has been given during the past summer to the subject of weeds. I had the opportunity last summer of travelling through Manitoba and the North-west, and I was very much struck with the tremendous headway that weeds have made in that part of the country. The farmers, growing the same crop year after year, and that crop, wheat or grain, have allowed the weeds to increase year by year. By alternate husbandry many of the weeds would have been destroyed, but when the same crop is grown year after year, naturally the weeds in those crops will keep on increasing, and the state of infestation by weeds in Manitoba and some parts of the North-west is a most serious matter to-day.

*By Mr. Featherston :*

Q. Do those weeds grow in the crops or after the crop comes up?—A. Both. A weed that ripens before the crop ripens drops its seeds on the ground year by year and causes great trouble by steadily increasing. Those that are cut with the crop are easily handled, but some of them ripen their seed before the crop is cut and thus they keep on increasing.

Q. What are they?—A. There are many and some of them most aggressive and serious enemies: tumbling mustard, hare's ear mustard, wild mustard, ball mustard, false flax, wild buckwheat, wild oats and many others.

Q. They have no rag weed?—A. Yes, indeed, they have in several places.

Q. The farmers say it is a great advantage to have it, because they plough it down as a green crop in the fall?—A. I have not much faith in that mode of treatment. I have seen it grow eight and ten feet high in the Southern States, and when once I asked a farmer in Virginia why he did not cut it, he smiled on me as an ignoramus, and said: "why, that is my manure for next year." But the miller who gets rag-weed seed in his wheat will tell you that this weed gives him the greatest trouble of all. The

## Agriculture and Colonization.

seeds are just about the same size as the grain of wheat, and the Keewatin Milling Company say that this is the weed they like least of all the many kinds of which the seeds appear among wheat.

*By Mr. Pridham :*

Q. Are they much troubled with the Russian thistle?—A. The Russian thistle occurs only in Canada along the southern borders of the Northern Pacific Railway in Manitoba and every effort is being made by the railway company to destroy it. If farmers in Manitoba and the North-west did one-quarter as much as the Northern Pacific Railway Company has done to keep down the weeds, it would be a great thing for Manitoba. The railway company recognized the fact that they are accused of having brought this weed in, and they have certainly made every possible effort to destroy it. I was along the railway last July, and I saw a gang of men going along from Brandon to Winnipeg right through, to stamp out this weed, and not only the Russian thistle, but any other dangerous weed, wherever it might occur along the line. They were mowing and keeping the weeds down all along the line and giving a grand object lesson to the farmers in the neighbourhood. I understand, too, that they did not do this spasmodically but regularly all the time, and it would be a good thing if the farmers would follow their example. I think probably the Russian thistle scare is one of the best things for Manitoba that has ever happened, because it has awakened the farmers there to the fact that they have got to do something with their weeds, and that they are menaced by a great danger. I detected for miles and miles, as I went along the Northern Pacific Railway the worst weed ever introduced into Manitoba and the North-west—Tumbling Mustard, which was first introduced, it is alleged, about Indian Head. During the past summer this was allowed to get such headway out there on the big Brassey farm, that they actually mowed down and ploughed 1,500 acres out of 2,000 and got no crop from it. The rest of the farm was kept sufficiently clean to get a crop, but this 1,500 acres they lost altogether. I asked Mr. Robert McKay, of Indian Head, to make a photograph for me of a large specimen, and here is a picture of that sample, it was three feet high and two feet across.

*Tumbling Mustard* has now spread all over that country round Indian Head, so that when you look out of the window as you pass by in the train, the country is just one sea of yellow with it. The trouble is that the farmers are not doing nearly as much as they ought to be doing to keep it down. Some told me I was running down the country by drawing so much attention to this weed. I reply to this: "It is absurd to talk like that. My duty is to call your attention to this, or any other dangerous enemy and make as much of it as I can." It has spread for miles and miles up there and also Southern Manitoba is now a sea of tumbling mustard, over hundreds of thousands of acres where this weed has been allowed to spread, and for a very trivial reason.

*Tumbling Weeds.* We have in Canada a weed called "tumbling weed," one of the pig weeds, which does very little harm. At the end of the season the dried up plant bearing its ripe seed separates from the ground and "tumbles," or is rolled along over the prairie by the wind and that is how it gets its name.

*By Mr. Featherston :*

Q. It is a kind of soft grass?—A. It is rather a soft thing in its earlier stages, but it gets very hard when it is ripe. It does very little harm because it develops late in the year and the farmers in this part of the country are not troubled by it at all. When the farmers in the North-west were warned about the weed, which I have spoken of, which I have called "tumbling mustard" but which was also called "tumbling weed," they said "Oh, it is only tumbling weed, that won't do any harm." I was talking to a farmer about it in the west, and I spoke of it as "tumbling mustard." He said, "Oh, well, if it is a mustard we have got to see to it." This showed me how much there was in a name, and I have called it mustard ever since. Three years ago, I sent to Mr. McKay, our superintendent at Indian Head, for a large seeding specimen, and we found by actual count that there were over half a million seeds borne by that single

plant. The seeds are held sufficiently tight in the pods when the plant is blown across the prairie for the seeds to be dropped only a few at a time. I have no doubt that a dry plant of this tumbling mustard could be blown a hundred or a hundred and fifty miles over the snow and leave a trail of seed behind it all the way. It has spread now, as I saw myself, more than twenty miles from the railway in one direction.

*By Mr. Pridham :*

Q. It is an early plant, is it not? It comes early in the season?—A. Yes, it comes early in the season like the other mustards.

*By Mr. McGregor :*

Q. Would not ploughing and summer fallowing have overcome it?—A. Yes, it would, if they had attended to it at once.

Q. When this little old fashioned mustard gets in, it is very hard to remove, but by ploughing and summer fallowing it can be removed largely?—A. It is the great extent of the farms and the comparatively small number of settlers in that part of the Dominion which is the difficulty, also the vast area of prairie over which the tumblers can be blown without meeting any obstruction. Wherever there is a badger hole or an unevenness of the ground, the seeds are left there and if they get to a cultivated spot the plants spring up vigorously. I saw it at Fort Qu'Appelle and other places north of that. By this habit of blowing and tumbling across the prairie it has a great means of spreading.

*Hare's-ear Mustard.* There is also another weed in the west, the "Hare's-ear mustard" which is going to be one of the worst pests they have had in the North-west, unless they at once set to work to get rid of it. It is not a tumbler, but is very troublesome in binding grain and also chokes out grain crops. I procured from the Keewatin Milling Company of Rat Portage—a very large company—which receives grain from many districts, about thirty or forty samples of seeds from as many different localities, and made a critical examination of them. Only in one of these samples did I find a few grains of the tumbling mustard. The reason was this: The seeds were so small that the ordinary methods of cleaning were effective, but with regard to the Hare's Ear mustard, the seeds are larger and not so easily cleaned. The small seeds of tumbling mustards, however, would not appear among the small grain and larger weed seeds, but would be left with the dust and rubbish where the grain was threshed.

There was one point with regard to weeds, which I found was not sufficiently recognized in Manitoba and the North-west. There is no doubt what a marvellous country we have there for the production of grain crops. We should have the magnificent crops like we had last season, every year, if—that little "if"—the rainfall and snowfall were always sufficient, that is just a little heavier every year. Now, then, one of the great injuries weeds do to a district is to pump up the moisture out of the earth and give it out by evaporation through their leaves. The Hare's Ear mustard has big leaves as large as my hand, and these plants are continuously pumping up the moisture from the soil and evaporating it through their leaves. Yet while this is well known, farmers, many of them at least, do not recognize the importance of keeping the weeds down, if only to prevent the moisture from being drawn from the land. If the land was cleared of these coarse succulent weeds they would be able to save at any rate the amount of moisture they use up to help to grow good crops. This should be an inducement to the farmers of the North-west to use greater efforts to get rid of the weeds. Mr. Richard Waugh, of Winnipeg, was the only man I met in the west who realized the importance of this aspect of the value of keeping down weeds on account of the moisture which they extract from the soil. What a difference it would make to the whole Dominion, if all our farmers in the North-west could be got to realize the importance of keeping the weeds down, if only to save the large amount of moisture they take from the soil. Figures could be easily given of the amount of moisture extracted by different trees and plants, but it would not be advisable to detain the committee now.

## Agriculture and Colonization.

### DURATION OF VITALITY IN SEEDS.

*By Mr. McMillan :*

Q. Has the seed of the tumbling mustard as much vitality as the common mustard with us?—A. We do not know sufficient about it to answer that question. It has only been in the country six or seven years. In Nova Scotia, from one experiment which came under my observation, I know that the seed of the ordinary wild mustard or cad-luck will live for 20 years at least without being injured. Colonel Blair, the superintendent of the Branch Experimental Farm at Nappan, told me that, when a boy, his father's farm was infested with cadluck. His father determined to clear the farm and year by year had every spear of it taken up and buried six feet deep in a marsh, so that the farm was at last made a perfectly clear farm ; not a spike of mustard was to be seen. Twenty-one years after the farm was sold, the whole farm burst out suddenly into mustard again. It was such a strange thing that it drew forth much comment and the question naturally arose as to how it occurred. It is well known in Nova Scotia that they get alkali as a fertilizer for their land by digging marsh mud. The purchaser of the farm had dug his marsh mud from where the mustard had been buried 21 years before, at any rate. So you will see that the mustard seeds had retained their vitality all this time and possibly longer, because the seeds which grew when exposed to the air by being spread on the land may have been buried some years before the period of 21 years which had intervened since the farm was sold.

While, of course there are a great many instances reported of the longevity of seeds, this is an actual fact. In artificial treatment we have never been able to keep seeds of any kind longer than about 20 or 25 years. Statements are frequently made in newspapers and elsewhere about mummy wheat. I suppose I have been shown a hundred times, to be moderate, different kinds of plants that were stated to have been grown from seeds taken by some man's father or some other reliable authority out of a mummy. Now, unpleasant as it is to say so, not one of the statements was true, although those who made them may have thought so. People sometimes reflect upon a certain matter or statement they have heard and talk it over until they actually begin to believe it to be a fact they have witnessed, but there was never a grain of wheat or any other seed taken out of an old Egyptian mummy that has ever been grown. Yet, probably, all of us have been shown, all over the world, wheat said to have been grown from grain taken from a mummy. The Royal Society of England some time ago conducted some very careful experiments, and I think, if I remember rightly, that beans retained their vitality longest of any seeds ; I think for these it was about 40 years and the average of others was 20 or 25 years. Since I have been at the Experimental Farm I have had samples of "mummy" wheat sent to me from different parts of Canada. I made this statement at a farmer's meeting last year and a gentleman got up in the audience and said, "I have got some wheat, at any rate, that is 40 years old, and you can try that and see if it will not grow." Well, it did not grow, and I do not think you will ever get wheat or any other grain of that age to grow. But weed seeds in the state of nature buried deeply in the soil will certainly last much longer than by any method of artificial preservation. I have a suspicion, too, that the stories about wild goose wheat having been taken out of the crop of a wild goose, are very much of the same nature as mummy wheat. Any curious kind of wheat is liable to have the wild goose story tacked on to it—particularly the very strange-looking Polonian wheat.

*By Mr. McGregor :*

Q. I have seen an old meadow turned over after a lapse of ten years and the mustard came up freely afterwards?—A. Yes, I have no doubt of that. I think, too, that weed seeds or any other seeds, buried deeply in the soil will germinate when the soil is turned up and exposed. We know that in destroying weeds one of the best methods is to scarify or cultivate lightly the surface of the soil, so as to bring those seeds that are a little too deep to germinate, to the surface, when they will get air, light and moisture. They will germinate at once, and should be ploughed or cultivated down immediately.

Q. In the west after the first crop is taken off and the land is left idle, it frequently happens that in two or three years the grass will come up and kill the weeds?—  
 A. Naturally the grass will come back to the land and destroy the weeds. Many of the grasses are perennial and have strong running rootstocks by which they increase rapidly, and they would in that way produce again the old prairie which existed beforehand.

*By Mr. Carpenter :*

Q. Can you account in any way for the mustard seed lying in this marsh you speak of for 20 odd years without its productive qualities being destroyed. It seems something remarkable to me seeing that it was a moist place. Considering that it was moist all the time one would suppose that the seed would rot and become perfectly harmless?—A. I think the reason that the mustard seeds retained their vitality so long is that they contain a large quantity of oil. This is a well-known fact, as any one can find out by crushing them.

Q. I think there must be something in that. Any other seed would be destroyed in a very short time?—A. Then it must be remembered that it was six feet deep, and the seeds would not be subject to changes of heat and cold, and would get very little air.

*By Mr. Powell :*

Q. Then there is a remarkable preservative power in the marsh mud. The fence posts sunk in the marsh never rot. The remains of the old French tramway down there are still preserved as perfect as ever. There may be something in that?—A. Yes. That is very true; it certainly was a remarkable occurrence. It was not that a few plants grew, but the whole farm sprang out with mustard so that it seems likely that most of the seeds were preserved.

*By Mr. McGregor :*

Q. I do not think it uncommon at all. I have known case after case where mustard has been turned down for 10 or 15 years and has come up again as strong as ever?—A. Yes. I believe it is frequently so, but the point Mr. Carpenter brought out was that of it lying in the wet mud all that time.

#### PRESERVATION OF BEES IN WINTER.

Mr. Fixter has reminded me of one thing I had forgotten to mention. That is that we are carrying on an interesting series of experiments on wintering bees. One of the great difficulties in keeping bees is the winter, and we are carrying on this year a series of experiments in wintering them, in addition to the other to which I alluded. There are some 8 or 10 experiments with bees out of doors and in the cellar which are all detailed in the annual report, and which I think will be of interest to the bee-keepers. Of course I need not say here to any of the members of Parliament that we are always very much pleased to see any one that will come and visit the different departments. During the past summer a great many people showed their interest in bee-keeping by visiting the apiary and seeing for themselves what is being done. They have given us suggestions and we have been able to give much information in return.

*By Mr. McMillan :*

Q. How do you preserve the bees during the winter?—A. We are trying several experiments with regard to that. I am afraid I am rather a heretic among the bee keepers, but it may be that I do not know anything about it, but I think it is worth following up an idea I have. The method of wintering the bees in the past has been to keep them as warm as possible. They say:—"You must keep your bees in doors in winter and keep them nice and warm and comfortable," and all that sort of thing. Of

## Agriculture and Colonization.

course, my opinion may be very far wrong, simply because I do not know much about bees, but my idea is that the right line is quite in the opposite direction. All the efforts of bee keepers in the past have been to keep the bees warm. Now, I am trying to keep them as cold as I can. I know that I have had in my office two bees which stood 20 degrees below zero without any protection at all. They crawled out of the combs which had been put in a cold open shed to destroy bee-moth grubs. These combs were put in a very cold dry shed for this special purpose and these two bees it was found had crawled into the combs. They must have been kept in that shed for about a week, during which the thermometer was below zero all the time, and for two days touched 20 below zero. When the combs were brought in they were noticed and pulled out with a pair of forceps. I kept them in my office, where it was, of course, warm. The next day they were sufficiently recovered to sip honey and water from my fingers. From that circumstance, I am led to the conclusion that bees will stand much more cold than is supposed, and I think the nearer we can bring the conditions of our hives to those in which wild bees pass the winter, the more successful we shall be.

*By Mr. McGregor :*

Q. They will hardly stand the cold, if the Chairman's Bill, now before the House, prevents us from feeding them with sugar in the fall?—A. We will feed them with honey then. I think our bees have been very successfully wintered by Mr. Fixter. As to other things, I have followed the general methods. As to weight, I have tried to get them as near as possible to 50 pounds per hive or colony when put in the cellar for the winter, and we have had no trouble in wintering them. Last winter we lost only one colony, and we could not find out what the cause of this was. It was probably a weak colony or may have had no queen. Mr. Fixter, who has the practical management of the apiary, is here to-day, and I am sure he would be glad to give you any further information that members might ask for with reference to this matter.

Q. We have been keeping our bees for some years in the house?—A. Yes; that is a common practice.

Mr. JOHN FIXTER, Experimental Farm Foreman, called and examined.

*By Mr. Carpenter :*

Q. This is a new experiment, is it not; I think you have only been keeping bees about a year?—A. Two years.

*By Mr. McGregor :*

Q. How many hives have you?—A. About 23.

Q. And what is about the average of the honey taken at the time?—A. Last year we had \$97. That is about 54 pounds to the hive.

Q. 54 pounds to the hive?—A. Yes.

Q. And how many new colonies did you start of the 23?—A. In the spring we had 15.

Q. 15 new colonies?—A. Yes. The \$97 worth of honey is what we sold and then, of course, these sections which have been kept for experimental purposes are not included in that at all.

Q. Then you had about \$100 of honey from 23 hives?—A. About \$110 worth I think.

Q. \$7 a hive is considered a good product?—A. Yes.

Having examined the preceding transcript of my evidence I find it correct.

JAMES FLETCHER,

*Entomologist and Botanist of the Dominion Experimental Farms.*

COMMUNICATION FROM MR. R. F. HOLTERMANN, PRESIDENT OF THE ONTARIO BEE-KEEPERS' ASSOCIATION, ORDERED BY THE COMMITTEE TO BE INCORPORATED INTO THE REPORT AS EVIDENCE.

To the Chairman and Gentlemen of the Select Standing Committee on Agriculture and Colonization.

I regret very much that, owing to the change in the weather, it might have caused considerable loss, through my bees, to remain any longer in Ottawa, and I feel grateful to the Agriculture Committee for consenting to my discharge. With your permission I will put on paper a few ideas which may be of use to those thinking of keeping bees.

LOCAL REQUIREMENTS,—PROFITS OF BEE-KEEPING.

Bee-keeping displaces no other crop on the farm and turns to a valuable article of food that which would otherwise be entirely wasted. The constituents in honey, like those in butter, are taken from the atmosphere, the honey-crop therefore takes nothing from the fertility of the soil. Honey is a finished product and one which requires intelligent care, and a climate and flora such as is to be found in many parts of Canada, to produce. Those situated in localities distant from railroads can market \$100 worth of honey more readily than \$100 worth of wheat or other grain. Those clearing a farm can establish an apiary and have a honey crop before any other crop can be harvested; again, if they are situated where rough and broken land abounds, giving a variety of flora, here bee keeping can often be engaged in with profit when the greater portion of the land in the vicinity may be unfit for cultivation.

Districts which have varieties of elevations, high and low land, heavy dews, willow, poplar, hard and soft maple, raspberry, fruit bloom generally, white and alsike clover, willow herb, (or sometimes called fire weed and purple top), golden rod, boneset, aster, prairie flowers and buckwheat are very well suited for bee-keeping, and many are successful in districts where few of these advantages exist.

Any one thinking of beginning bee-keeping, and wishing to succeed, must devote care, study and a reasonable amount of time to the work. The idea that bees will take care of themselves and yield a handsome profit is a mistake, and such a supposition has led to loss and disappointment. On the other hand, in an average locality, properly conducted, bee-keeping, one year with another, for time taken and capital invested, will hold its own with any branch of agriculture.

H. G. Stafford, Ameliasburg, Ontario, one season increased from 24 to 195 colonies, securing 240 pounds honey per colony, spring count, besides leaving the 195 colonies enough honey for winter.

C. W. Post, Trenton, Ontario, a very extensive bee-keeper, having about 300 colonies, has secured an average of over 150 pounds per colony, and during linden or basswood flow, one season, his bees gained from the Friday of one week to the Thursday following, by actual weight, an average of 75 pounds of honey per colony.

*Quebec* is quite as good.

*Manitoba.*—Report from Portage la Prairie, page 547, *Canadian Bee Journal*: Have been fairly successful with bees for the last three years,—1894 report,—14 colonies in spring increased to 23, got 1,100 pounds of honey. Have wintered them better here than in Ontario. They gather a lot from golden rod and the wild prairie flowers. Mr. Gilbert Gunn, born in Manitoba, from 12 colonies received 20 swarms and 1,200 pounds of honey. The following year he had an average of 146 pounds per colony extracted. He, too, says in regard to the winter: as far as I know it is not so hard on bees as Ontario; they gather much from the golden rod and wolf-berry.

*South of Brandon and Dominion City, N.W.T.*—At Edmonton bees are kept. Henderson has secured over 100 pounds per colony and a heavy increase.

## Agriculture and Colonization.

*British Columbia.*—An experienced bee-keeper writes, page 500, *Canadian Bee Journal*: There are many keeping bees, but only a few who understand it. Chilliwack, Vancouver, and many other points. I consider I can average, one season with another, about 80 pounds of extracted honey per colony, spring count, besides increase. I took 270 pounds from one colony. Many, during such a season as last, secured in Ontario, practically nothing.

### SEASONS OF LARGE YIELDS.

The late Mrs. H. Stennett, St. Marys—From 50 colonies an average of 225 pounds per colony or 11,250 pounds.

S. T. Pettit, Belmont—From 69 colonies 12,000 pounds honey in one year, and he has sold several years \$1,200 worth of honey alone.

Last year, R. A. Marrison, Inverary, secured from 94 colonies with no thistle honey, only a little basswood, and a fair yield of clover, 7,400 pounds honey, 65 pounds wax, and increased to 146.

W. G. Russell, Milbrook, 9,000 pounds from 80 colonies, 1894; 1895, 4,200 pounds from 80 colonies.

Bayne J. McKellar, although clover and basswood were frozen, secured a little over 100 pounds of comb honey per colony.

A. E. Trussle, Trout Creek, last year began with three colonies, increased to twelve; 500 pounds choice honey.

John Sirr, of Hurdville, increased from one to three under same conditions, and took 58 pounds comb honey.

The above information I think will be of use to those thinking of bee-keeping.

### MARKETS.

Honey is understood but little by the general public. To spread the fact that extracted honey is sold for less money than comb, not because it is adulterated, but owing to the fact that in the former case the comb is used over and over again, saving the bees much work, and more extracted honey can be secured per colony. That honey absorbs moisture readily, and both comb and extracted honey should be kept in a dry atmosphere, that honey granulates, or as it is commonly called by the uninitiated, "sugars," that this is an indication of purity rather than adulteration, and that it can be brought back to the liquid state by gently heating. Such information and pointing out that at present prices it is an economic food, and proper methods of marketing would develop our home market tenfold.

When it comes to foreign markets, although, from the last statistics, Europe produces annually 35,000,000 pounds of wax and 180,000,000 pounds of honey, valued at \$19,000,000, that continent not only consumes its own, but imports. The honey imports to Great Britain for June last, a month during which not much honey is sold, is given as £5,550. At 7 cents, the price we get, it would be almost 3,500,000 pounds.

Australia cannot compete with us in quality. Although the Government gives a bonus of 2 cents for every pound of honey exported, that country cannot produce a good quality. *British Bee Journal*, March 12th, 1896, says: "Australia honey sells badly in London," and gives an instance by the gross price realized, one penny three farthings per pound, and the net sum yielded to the producer, under one-half penny per pound.

### HOW TO BEGIN.

After studying a good practical work on bee-keeping and taking one or more papers giving information on the subject, the beginner should purchase two to four first class colonies of bees. The best time to move them to their new location, and the best time of the year for the beginner is, in this part and most parts of Canada, the latter part of May. There may be other hives just as good, but the light frame Langstroth hive is very largely used; probably 80 per cent in America are in

these hives and any prominent supply dealer has goods to fit this hive. For that reason, if no other, I would recommend that hive. A good smoker, bee veil, and at least one empty hive for every colony purchased. If for comb honey, about 100 sections, one pound of light section foundation and one pound of medium brood foundation should be purchased for every colony. If extracted honey is to be taken, sections and section foundation should be replaced by one pound of medium brood foundation. No one can afford to do without comb foundation, it saves the bees time, it saves material and does away with objectionable drone comb.

#### HANDLING BEES.

It is of course impossible to give details as to the different kinds of work, but a few hints as to the best method of handling bees may be of advantage. Bees should never be handled when the weather is cool enough to prevent flying of the bees. They handle best when working freely and are always cross after a honey flow has given out. A colony when queenless is more liable to be cross than when in a normal condition. The species and family has much to do with the temperament, the Italian and partially Italian being more gentle than the Black or German. A good smoker should be used, one that can be depended upon in an emergency. Almost anything which will give a large volume of smoke, not too offensive, dry and lasting, will answer. Dozy hard maple, cedar bark and light material answers well. The operator should have clothing free from fuzz, no woollen should be used, sleeves should fit tightly above the wrist as also the clothing at the ankles and knees. A broad brim straw hat should be used and a veil gives confidence to the operator. As the bees are liable to catch in the hair on the hand and then sting, such superfluous adornments should be singled from the hand.

The operator now walks smoker in hand to the hive, with the disengaged hand he removes the cover, this must be done gently, to jar the hive will result in an angry out-pour of the bees either at the entrance or at the top. The free hand should now remove a corner of the quilt and as the bees and frames become exposed, blow, not a dense volume of smoke, but enough to prevent the bees from flying up, and to induce them to rush to their stores and fill themselves with honey. This is the object of smoking the bees, not to stupefy them or kill them, but to handle them when they are filling themselves with the stores of which they may be deprived. After loading themselves with honey the bees can be handled with comparative ease, the same filling process takes place before the bees swarm and this is the reason why, unless the cluster has been hanging over night, the swarm can generally be handled without discomfort. While the bees are filling themselves with honey, the operator does his work, being, however, careful not to crush the bees. If a bee should be crushed or she should sting, smoke should be used to neutralize the order as the latter would excite other bees to attack. Accurately made and well constructed hives are essential to comfort and success to bee-keeping.

#### SUCCESSFUL MANAGEMENT.

In closing, permit me to say that, to succeed in bee keeping, work must be done promptly and thoroughly. Keep colony strong, prevent excessive swarming by giving room in hive, shade and ventilate the hive, extract honey when ripe, not when thin and unfit for market. Use comb foundation, and keep down drones, produce a good clean comb honey, or only extracted. Do not allow bees during the honey flow to remain idle for lack of room, your whole year's profits may be lost in a few days in that way. Leave the bees plenty of good stores for winter. To put bees in proper condition for winter and bring them through about as strong as they went in, goes a long way towards successful bee-keeping. Weak colonies that require the greater part of the summer to build up, seldom yield a crop. Market as early as you can, secure a fair price, have and preserve a reputation of cleanliness, and do not attempt to wholesale and retail at the same price, but however tempting it may appear for the moment, allow, between the wholesale and retail price, a fair living and business profit.

Yours respectfully,

R. F. HOLTERMANN.

Brantford, April 11th, 1896.

# Agriculture and Colonization.

COMMITTEE ROOM,  
HOUSE OF COMMONS,  
THURSDAY, 2nd April, 1896.

The Committee on Agriculture and Colonization met this day at 10.30 a.m., the Chairman, Mr. Sproule, presiding.

Mr. F. T. SHUTT, Chemist of the Experimental Farms, was present by invitation and addressed the committee as follows :—

Mr. Chairman and Gentlemen,—After the interval of another year I again appear before you to give in as succinct a manner as possible some account of the work of the chemical division of the Experimental Farms. In this endeavour, I find a greater difficulty each succeeding year, for every year shows a widening of our horizon, a greater multiplicity of duties which are more and more varied in their character. Indeed I might say that, so pressing are the claims of the work which is constantly pouring in upon us, and consequently in a large measure accumulating, that it seems well nigh impossible to get the requisite leisure for taking a retrospect or a general survey of what we have done, or for the consideration of what we ought to be doing towards solving the problems in Canadian agriculture, of general interest and importance. Some two years ago, when before this Committee, I took occasion to emphasize the important and intimate relationship that existed between chemistry and agriculture, and I then showed that the basis, and indeed the greater part of the superstructure, of modern and progressive agriculture, was chemistry. It is not my intention, therefore, this morning, to furnish any further illustrations to corroborate that statement, but I refer to this relation now because during the past few years that branch of my work which has more directly to do with the education of the farmer has made greater and greater demands upon my time.

## CLASSIFICATION OF WORK.

*Correspondence.*—I might classify the work of my division under two heads—educational and original research work—the latter being the application of chemistry to the solution of agricultural problems. In the educational work to which I have just referred it is of first importance to mention the correspondence. These letters, the number of which almost daily increases, come from all parts of Canada. They are letters of inquiry in connection with agricultural matters, containing questions relating to the value of fertilizers, the feeding value of fodders, treatment of soils, the composition of dairy products, and, indeed, anything and everything in connection with agriculture. It is obvious that this branch of my work has now become an exceedingly important one. It occupies, I presume, about one half of my time. Just as our people recognize the character of the assistance and the value of the assistance which chemistry can render them in their work, so will this work become greater and greater; that is to say, that we shall be used more and more as a bureau of information.

*Conventions.*—Speaking of the directly educational part of my work, I should mention that a further branch of it consists in the addressing of conventions of dairymen, farmers and fruit growers, on agricultural topics. Necessarily some time must be expended in the preparation and delivery of these addresses and a further time is necessary for the revision of the reporters' manuscripts of those addresses which are to appear in the transactions of the societies before which the lectures are given. You can readily understand that there is not sufficient time to attend all the farmers' institute meetings to which one receives invitations, but every year I am present at some at least of the principal conventions of our dairy and fruit growers' associations in Ontario, Quebec and the Maritime Provinces. All of these societies publish their transactions, and consequently we have issued, under provincial auspices, a considerable amount of literature

which has emanated from my division of the Experimental Farm work. Then, again, in close connection with this part of the work, there is the preparation of articles for agricultural newspapers. Continually there are questions referred to us by them, and the answers are published in the agricultural press of Canada.

*Analyses of Samples.*—A further branch of the work which relates directly to the education of the individual, lies in the examination of samples sent in for analysis and report. As far as possible we endeavour to satisfy these demands. Of course it is impossible, and it would not be right for us to undertake work which would benefit the individual only. There are, nevertheless, many instances when the individual may first be benefited, and, secondly, the results of value to a larger portion of the community. We endeavour, as far as time permits, to meet these demands.

*By Mr. Carpenter :*

Q. Is your work in that respect increasing?—A. It is. I think I might say that as, in the matter of correspondence, we have become a bureau of information, in this other matter we have now become a bureau of reference. In the report which is now in the press, I give in tabular form a schedule of the samples which have been sent in by farmers for analysis and report, from the various provinces of Canada. Last year we received in the laboratory a total of 294, and these consisted of soils, of naturally-occurring fertilizers, such as swamp mucks, peats, marls, gypsum and river muds; and fertilizers, such as slaughter-house refuse, sea weed and many other allied materials of fertilizing value, which could not be classified directly under the head of commercial fertilizers. The samples received also include a large number of well waters from farmers and dairymen, all of which were examined and reported upon. Insecticides, fungicides and other substances, which in some way or other relate to agriculture have also been examined and reported upon. These facts will, I think, make it clear to you that the farmers throughout the country have begun to recognize the value of chemical assistance, and that they are now availing themselves of the help that is offered to them through my division of the Experimental Farm system.

In this connection I might say that I am firmly of the belief that these postal inquiries which, as you are aware, can come to us free of all mailing charges, and these demands for analysis, will become more and more numerous as time goes on. That may be gathered from the experience of the past few years. I further believe that the publication of our literature and the addresses which have been delivered by the Experimental Farm Staff and others upon agricultural platforms, have at last brought the farmers and our agricultural people generally, to a better realization of the necessity of applying more systematic or scientific methods in farming. I think they are coming to see that success in farming depends just as much upon cheap production as upon high prices. Once they have realized that the second step is to learn that cheap production depends largely upon conducting the work on sound principles—and I think that the principles which underlie plant nutrition and animal growth, the production of dairy products, milk and its products, are essentially chemical principles—I look forward to an ever increasing usefulness on the part of the chemical division to the farmers of Canada, and I make this deduction principally from the fact that our people are more and more, every year, perceiving that skilful and profitable farming can only result, in these days, from the application of methods based on scientific principles. I would now very briefly bring before you some of the more important investigations that have been carried on during the past year, and from what I have already said you will understand that the material which appears in my report from year to year, represents practically about one-third of my work, the other two-thirds being taken up in the work which I have this morning designated more particularly as directly educational. Of course all of our work is educational, but that which I wish to particularize now may well be designated as original research or the solution of agricultural problems.

*Soils.*—We have continued our analytical investigation of the virgin soils of Canada. During the past year this work has been restricted to certain soils from the province of British Columbia. Without entering into the details which appear in my

## Agriculture and Colonization.

reports, I would say as far as our work has gone at present, that we have ascertained the alluvial soils of certain river valleys in that province to be exceedingly rich in plant food. I refer especially to the soils of the Fraser and the Pitt River valleys. These are found to be exceedingly fertile, being rich in all the soil elements of plant food.

Another class of soils in British Columbia are known as the Bench soils. These differ very much as regards the amounts of their fertilizing constituents, from the soils just mentioned. They are very much poorer in plant food. As a class I have found these Bench soils to be sandy and by no means comparable to our richer Canadian virgin soils in the other provinces, and to those in British Columbia to which reference has been made.

*By Mr. Carpenter :*

Q. Are you spending much time over worn out soils and the best method of improving them? That is a matter of great importance to the older sections of Canada?—

A. We have not done much in that way yet, save by way of suggestion. The soils sent in by farmers do not receive a complete analysis. Such work requires a great expenditure of time, and it is not possible nor thought advisable under the circumstances to submit all samples sent in by farmers to such complete analysis. The samples of soils received from farmers are subjected to a preliminary chemical and physical examination, from the results of which suggestions for the treatment of the soils are made.

*By Mr. McDonald (Assiniboia) :*

Q. Have you analysed the reclaimed lands on the coast of British Columbia, that is the dyke lands?—A. One of the soils I have referred to—that of the Pitt meadows is one. It is an exceedingly fertile soil.

Q. More so than the Fraser River valley?—A. The soils are very similar, and without referring more particularly to the figures, I could not at the moment make a strict comparison. It is, however, an exceedingly fertile soil.

In reply to the question respecting analyses of soils from the older provinces of Canada, I may say that we received 49 samples of soil from farmers. That may not seem a large number, but considering that a soil analysis demands a great deal of very careful work, you will understand that there has been a considerable expenditure of time given to this class of work.

*By Mr. Carpenter :*

Q. You are supplied with the necessary apparatus to go on with a number of analyses at the same time?—A. We have to do that. A chemist is obliged to have many operations going on at the same time.

Q. Is it possible that the whole 49 samples could be examined at once?—A. No. We are not quite able to do that but we manage to have a good many operations going on simultaneously.

I was referring to the second class of British Columbia soils known as the bench soils which are light and sandy as to their character. In connection with that fact I would say that notwithstanding their constitution many of them have produced excellent crops. This is probably due as much to the favourable climate of the province as to the soils. In fact, as you are aware, the fertility of the soil is not entirely dependent upon its chemical composition. The factors of fertility are favourable climate, proper condition of tilth or mechanical condition, and thirdly the elements of plant food.

*By Mr. McMillan :*

Q. I suppose in your analyses you can only state the total amount of ingredients or plant food in the soil. You cannot speak as to the immediate fertility of the soil?—A. I shall be glad to speak on that subject in a minute or two.

In British Columbia there is a large quantity of fish offal produced and there are also on the shores of that province large amounts of seaweed that could be collected. In these two substances we have those elements which would be necessary to increase the fertility of the bench soils I have just referred to. In the fish waste there are notable quantities of nitrogen and phosphoric acid, in forms which could be made readily available, while in the seaweed there is an excellent store of potash. By utilizing these materials which now go to waste in large amounts every year, representing thousands of dollars of plant food; by the intelligent application of these materials, I say, the light soils of British Columbia to which I have referred might be made to produce much more than they do now, especially when we consider the very favourable climatic conditions that prevail in that province.

*By Mr. Carpenter :*

Q. Is there a sufficient quantity of fish waste available?—A. I am informed that there are hundreds of tons of fish offal from the canneries that is more or less wasted every year. The same is more or less true of the Maritime provinces. On both the east and west coasts of Canada there is room for economy in this matter.

British Columbia, like Ontario and the Eastern provinces, also contains certain soils known as muck soils. These are rich in humus and nitrogen, but need thorough drainage and an application of lime or wood ashes to make them productive for farm crops generally. We are now conducting a series of experiments towards the improvement of these soils. Eventually they will prove very valuable.

#### DETERMINATION OF AVAILABLE PLANT FOOD IN SOILS.

With reference to the question put by Mr. McMillan a moment ago, I may say that until lately, soil analysis consisted in a determination of the total quantities of the constituents of plant food present. In other words, we ascertained the quantity of nitrogen, potash and phosphoric acid, which were dissolved by a hot strong hydrochloric acid from the soil. Through the recent investigations, however, of an eminent English chemist, Dr. Bernard Dyer, and the results he has obtained, we now have a method whereby we can ascertain, approximately, the amounts of plant food more or less immediately available for crop use. Dr. Dyer found that the sap exudations of plants had a solvent effect on the plant food in the soil, and that this effect might be stated in terms of citric acid. He expressed this by saying that the sap had an acidity which was equal to that of a one per cent solution of citric acid. This was the result of very extensive research. Dr. Dyer examined over 100 plants in more than 20 different orders, and his conclusion was that a one per cent solution of citric acid would represent the solvent action of the sap exudations on the mineral constituents of the soil. He, therefore, said, if this be so, we treat our soils with a solution of one per cent of citric acid and from that solution obtain the potash, nitrogen and phosphoric acid dissolved out of the soil, we shall have determined the amounts that are more or less immediately available for plant use.

This work I have begun in connection with my other analyses of soil, and in the report now in press will be found the results of the treatment of certain soils by this method. I intend as far as possible in the future to use this method in conjunction with the other methods of chemical analyses, which, hitherto, have only ascertained the total amounts of plant food. One interesting result in this connection I might briefly draw your attention to. It relates to some data that we have obtained that show the "total" compared with the "available" plant food in soils at different depths. These data result from the examination of a soil, of which samples were taken at successive depths of 6 inches. A soil was sent from British Columbia by the Provincial Department of Agriculture, consisting of three samples, the first represented the upper 6 inches of soil, the second a depth between 12 inches and 18, and the third a depth between 18 and 24 inches. We found that the "total" potash varied from 22 to 25 in the three soils. In other words, the "total" potash was fairly uniform in amount throughout the soil to a depth of 24 inches, but on making a determination of the available potash,

## Agriculture and Colonization.

that is to say, of that which was soluble in a one per cent solution of citric acid, we found that the amount decreased as we went further down. Thus in the upper 6 inches of the soil, 2.2 of the "total" potash present was available for plant use, in the second sample, that which was immediately underneath the surface soil, only 1.36 per cent of the "total" potash was available for plant use, and in the sub-soil, or that between the depth of 18 and 24 inches, .64 only of the "total" potash was available for plant use, showing that in the sub-soil there was only about one-quarter of the available potash that there was in the surface soil, although our analyses showed quite as much "total" potash present. With the phosphoric acid, the same is true, though not quite to such a marked extent, nor are gradations so regular. In the upper soil there was 5.66 per cent of the total phosphoric acid available for plant use, and in the sub-soil 4.9 per cent. These results are of particular interest and of considerable importance, because they give an explanation why surface soils are more fertile than sub-soils. An examination of the data that have appeared in our past reports makes it clear that often there is no less a total amount of mineral plant food (potash and phosphoric acid) in the sub-soil than in the surface soil; by further examination with the citric acid solution, we might have proved that the surface soil contained a much larger proportion of plant food in a form immediately available or soluble, so that it could be taken up by the crop, and hence its productiveness. Undoubtedly the fertility or productiveness of surface soils is closely connected with this amount of available plant food. That has been my whole contention in connection with the theory of economic manuring: to supply plant food in available forms. The inert forms of soil food are available to a very large extent by means of the ordinary farm operations of ploughing, harrowing and so forth. It is due to the atmospheric agencies that this plant food is converted from its insoluble conditions into forms in which it is more or less available. Consequently, judicious culture is just as efficient and important in the light of the discoveries made by modern science as it was held to be before these discoveries were made.

*By Mr. Carpenter :*

Q. In a soil for farming purposes is there much to be gained by analysing sub-soil down to a depth of 20 and 30 inches? Is that depth reached by the ordinary plant?—  
A. In the first place the ordinary plant goes down very much further than most of us imagine. We can find roots of clover, Indian corn and many other farm crops more than 4 feet below the surface. Then if a sub-soil is very poor, it is well to know it, so as to avoid ploughing deeply, which would mix it with the better soil above it. Then if a sub-soil is rich in potash or phosphoric acid, it might be advisable to plough deeply so as to mix it with the surface soil, and make it available for plant use through the agency of the atmosphere. I fear that on this interesting subject I must not take further time, more especially as I wish to make some general observations on soil treatment which may be of value.

### GENERAL TREATMENT OF SOILS.

Our results show, I believe, that the farmer can follow out certain economical methods to enhance the productiveness of many soils without entailing any great expense. First, I would recommend the more extensive growth of the legumes. On former occasions I have pointed out why these are particularly advantageous to be used as crops, both for turning under and for feeding purposes, simply because they are the only plants, as far as we know, which are able to assimilate the free nitrogen of the air, and nitrogen is an element which is costly when it has to be purchased, but is nevertheless absolutely necessary for our ordinary farm crops. We would therefore have our farmers understand the value of the legumes, that is to say, of clover, peas, and beans, in furnishing very cheaply soil nitrogen for succeeding crops of cereals and roots. Green manuring, that is to say, the ploughing under of a green crop, increases the fertility of the soil in two ways, mechanically and chemically. It adds to the soil a large amount of what I might call readily

digested plant food, and at the same time by its decomposition in the soil, it sets free locked-up mineral elements. While referring to the matter of green manures, it would be probably wise for me to mention that in my report for 1895 I give the analyses, as regards the nitrogen content of clover of one year's growth, and of two years' growth, of the nitrogen contained in the leaves, in the stems, and in the roots to a depth of 4 feet. These results were obtained in connection with an experiment which was inaugurated by the director of the farms, and I dare say he brought this matter somewhat at length before your attention. However, you will be interested to learn that we found that the first year's growth, comprising leaves, stems and roots to a depth of four feet, contained, per acre, 172 pounds of nitrogen. The second year's growth (leaves, stems and roots) in our experiment gave 116 pounds of nitrogen per acre. All the nitrogen in the clover crop may not be taken from the atmosphere. If a soil is rich in nitrogen the clover shows but very little ability to use this power which it has through the agency of bacteria, of assimilating atmospheric nitrogen, but if we assume that a fair crop of clover will take from the atmosphere 70 to 75 pounds of nitrogen per acre, and the value of that nitrogen to be between 10 and 15 cents a pound, you will see that we have a clear gain in assimilable nitrogen, approximately, of the value of \$10. This of course is in addition to the vegetable matter, or humus, and the store of plant food which has been rendered available by the growth of the plant supplied by the clover when ploughed under. When possible it is always most profitable to feed the first cutting to animals. It will prove a nutritious food, and the resulting manure will be rich in nitrogen. The mechanical benefits which are derived from this method of fertilizing may be epitomized as follows:—The amount of humus which is supplied to the soil by turning under a green crop serves to increase the retentive power of the soil for moisture. We are more and more beginning to understand that the productiveness of the soil is as much dependent upon its ability to hold moisture as upon any other feature. Consequently, anything that will serve to increase the retentive power of light soils for moisture will be of benefit and will increase the fertility of the soil. Then again the presence of the humus serves to regulate the soil's temperature against extremes of either heat or cold, another matter of great benefit to crops. Further, it opens up and mellows soils, that is to say, that it improves the mechanical condition of it, so that the air and the moisture may freely permeate and the roots penetrate throughout the mass of the soil. And lastly, by its decomposition it furnishes carbonic acid gas, which acts as a solvent just in the same way, or a similar way we will say, to the root sap upon the mineral constituents or the inert rock matter of the soil.

*By Mr. Carpenter :*

Q. Have you made a comparative estimate of the value of barnyard manure and a crop of clover per acre?—A. The two manures are scarcely comparable. In the first place, barnyard manure has a value assigned to it from the amounts or percentages of nitrogen, potash and phosphoric acid which it contains. I do not mean to say that the whole value of barnyard manure rests solely upon these amounts or percentages, but nevertheless the chief value of barnyard manure is regulated by the amount of potash, phosphoric acid and nitrogen which it contains. On the other hand, in the case of clover, we have this:—The only distinct gain to the soil arises from the fact that it adds to the soil a large amount of nitrogen gleaned from the atmosphere. The other constituents—the potash and the phosphoric acid—which the clover crop contains have been derived from the soil. They nevertheless are more available than they were in the soil because they have been digested by the clover plants, and assimilated into their tissues; consequently, when we turn the crop under, these constituents are more or less soluble and readily available for the use of future crops. So, although we may have increased the fertility of the soil by turning under clover, with potash and phosphoric acid, we have not increased the total amount of potash and phosphoric acid there. The distinct gain is in nitrogen. We cannot therefore expect any very close comparison between these two fertilizers. A dressing of 10 tons of barnyard manure will contain about as much nitrogen as an ordinary crop of clover per acre. There are soils that would be

## Agriculture and Colonization.

for this reason, that it was particularly deficient in humus or vegetable matter—a heavy clay soil for instance. Or it might be an exceedingly light soil, that we were considering, or a soil which was not in any way deficient or below the average in phosphoric acid or potash but needed vegetable matter and nitrogen. We can understand that in such cases clover would be an advantageous manure to use. On the other hand if our soil and the crop we are manuring—because we have always to take that into consideration—required available forms of potash and phosphoric acid, the barnyard manure would give us very much better results. However, the point principally lies in the fact that on most farms barnyard manure is not produced in sufficient quantity to properly fertilize the fields, under such circumstances green manuring should be adopted. In connection with that matter of green manure, I think it is always well to bear in mind that it should be supplemented with some manure which will supply the other elements of fertility. For instance, I always advise the application of wood ashes. They contain one of the essential elements of plant food, potash, and they are obtainable in most parts of Canada very cheaply. I have brought this matter of the value of wood ashes before this committee on previous occasions. However, I may add this,—that the clover while it can obtain its own supply of nitrogen from the air under favourable conditions, is a plant which makes large demands for potash. It responds well to potash fertilizers. Manuring consequently with wood ashes or with kainit, muriate of potash, sulphate of potash, or some other form of potash, will give excellent returns. When the clover is ploughed under this store of potash is not lost, it is there for future crops.

*Value of Wood Ashes.*—It seems to me a pity that our people do not realize more than they do the value of wood ashes. The commercial value of potash is between 4 and 5 cents a pound. Our wood ashes, I suppose, contain an average of from  $5\frac{1}{2}$  to 6 per cent of potash. They are parted with for a mere song, a bushel of ashes in exchange, it may be for a bar of soap, or a tin pail, or something of that character, worth but a cent or two. These wood ashes go over to the States and are greedily bought by the farmers in the Eastern States at 25 or 30 cents, knowing that they get very good value for the money. To my mind it seems like killing the goose that laid the golden eggs to part with this source of fertility at such a ridiculously cheap rate.

*By Mr. Pridham :*

Q. How would rape do ploughed down? Is it very easy to obtain?—A. There are other green manures besides clover—rye, buckwheat, and rape. These are all excellent in supplying a large amount of humus or vegetable matter, and also from the fact that they have converted by their growth a large amount of insoluble plant food into forms assimilable. But there is this distinction between rape, and buckwheat and rye, and so on, on the one hand, and clover on the other hand,—that the former have not taken anything from the atmosphere; there is no distinct gain. By the use of one of the legumes we can supply the soil with the most costly of the fertilizing elements in a very cheap way.

To revert for one moment, before I leave the questions of soils, to these suggestions for general treatment, I would point out that in addition to wood ashes there are many soils in Canada which would be benefited by the application of lime. I do not wish to be understood to imply that our Canadian soils are deficient in lime, but there are undoubtedly many—and I say this, drawing the conclusion from the data we have amassed during the past few years, there are many which could be benefited by an application of lime in some form, either as such or in the form of marl or gypsum. Undoubtedly the injudicious use of lime without the concomitant use of other fertilizers would be injurious, because the first action of lime is to render more available the soil's store of plant food; hence the tendency, in time, by repeated applications would be to exhaust the soil if applied alone. If, however, the other elements of plant food are given in addition we could increase the fertility of soils. This deduction is not only from the results of analyses but from the experience of practical farmers who have been advised by us in this matter.

*By Mr. Carpenter :*

Q. How many bushels to the acre would be a fair dressing of lime?—A. On some soils two tons of lime would give good returns though in some cases six and eight tons may be used. I should be in favour of applying the lime in small quantities, that is, not too much at once, and especially so in connection with heavy clay soils. I do not think it would be at all wise to dress land heavily with lime, but from time to time to have it present in some form or other in the fertilizers we use; not forgetting that it must be combined with other forms of fertilizers.

*By Mr. McMillan :*

Q. What fertilizers would you use in connection with lime?—A. Any fertilizers that would supply nitrogen, potash and phosphoric acid, e.g., barnyard manure, potash salt and superphosphates.

Q. My experience is that lime is a very dangerous constituent to mix with manure?—A. I do not mean to mix with the manure before applying the manure to the land. It would be very poor economy and bad method to mix sulphate of ammonia with wood ashes, but nevertheless we can apply both to the soils and get good results. It would be folly to mix lime with any manure rich in nitrogen, especially barnyard manure. When mixed in the soil no deleterious effect would follow.

*By Mr. Sanborn :*

Q. Do you use any lime on the Experimental Farm?—A. There is lime used, I believe, but I cannot give any results of the effect of lime on the soils at the Farm without reference to the report.

*By Mr. Carpenter :*

Q. Would you recommend sowing plaster on the land?—A. Yes; especially for clover and other leguminous plants. Clover, pease and beans all belong to one botanical family known as the leguminosæ, and we have found ground gypsum is particularly beneficial for the growth of such crops.

*By Mr. McMillan :*

Q. What soils would you apply gypsum to particularly?—A. All soils, in the first place, which are deficient in lime. That, of course, can be ascertained by analysis. When the percentage of lime falls below one per cent it is certain that an application of lime would be beneficial. Agricultural chemists are generally of the opinion that the lowest margin should be placed at one per cent.

Q. What makes me put this question is because my land is a heavy clay loam. We have used gypsum frequently and never derived any benefit, in comparison with a light soil from which great benefit is derived?—A. That is true of light soils. There is a more ready response to fertilizers in light soils. Heavy soils are exceedingly retentive. Probably lime on the heavy soil would give you better results than gypsum. Looking to the future and permanent results you should improve the tilth of heavy soils, and for this there is nothing better than a judicious application of lime which flocculates the clay and helps, in conjunction with the turning under of green manure, to bring about that mechanical condition from which the best results are obtained. As soon as the mechanical condition of your soil is improved you will get the benefit.

Q. There is one thing about getting this soil into fine tilth and that is to never plough it in a wet state?—A. That is quite true.

*By the Chairman :*

Q. What do you think of the use of salt on light soils?—A. The value of salt is a disputed question. It does not furnish any food which ordinary soils are deficient in. As you know, it contains sodium and chlorine and most of our soils contain quite

## Agriculture and Colonization.

sufficient quantities for plant requirements. The benefit from salt seems to lie in that it sets free potash which is one of the essential constituents of plant food, and in this way acts indirectly as a fertilizer. It has also some beneficial effects on the mechanical conditions of soils.

### NATURALLY-OCCURRING FERTILIZERS.

Our work on the naturally-occurring fertilizers of Canada has been continued during the past year. These include the accumulations or deposits found in the various parts of Canada, and comprise swamp muck, peat, marl, gypsum, marsh, river and tidal muds. The samples received have all been examined and in the report now in press their composition and value is stated. I have on former occasions discussed at length the value and the best methods of using these fertilizers which are designated as naturally-occurring fertilizers, so perhaps it will be unnecessary to-day to re-traverse the ground. One or two new substances closely related, however, have been examined, to which I might briefly call attention.

*Bracken Fern.*—The first that I might mention is the bracken fern. In many parts of Canada, and especially in British Columbia, large tracts of land are covered with an enormous growth of bracken fern. The question has naturally arisen as to the amount of plant food which these ferns take from the soil, what value they have as fertilizers when ploughed under; and thirdly, what value when used as a litter. We have found for this latter purpose they can be used to advantage. The air-dried bracken fern has a considerable absorptive capacity for liquids. A sample of the air-dried bracken fern from British Columbia was analysed and showed that it contained mineral matter or ash to the amount of 135.6 pounds per ton. Of this 136 pounds, 30  $\frac{1}{2}$  pounds consists of potash and about 8  $\frac{1}{2}$  of phosphoric acid. Of nitrogen contained in the humus of vegetable matter of the fern, there were nearly 26 pounds.

You will notice that it is somewhat exhaustive in its character. It contains a large amount of plant food, in other words, and therefore should not be allowed to grow wild. Its growth must impoverish the soil. Where it is found, it certainly will be advantageous to cut it and dry it and use it wherever there is liquid manure to absorb. When the manure which has been absorbed in it has rotted the fern litter, the plant food which the latter contains throughout its tissue is set free, and this, as I have already shown, is present in somewhat notable quantities.

*Moss Litter.*—In connection with that matter of absorbents, I wish to mention that we have during the past year instituted a research into the absorptive capacities and the composition of moss litter. Undoubtedly you are aware that in the older countries moss turf has been used for many years in stables. In fact, throughout Europe, I think it has been recognized as possessing a high value for absorbing liquid manure as well as for absorbing the gases which are liberated in stables. In fact, there is quite a large business carried on in the manufacture of this material in Sweden and Holland, and in other European countries. The manufacture of moss litter is extremely simple. The bogs which are covered with the moss which forms the litter are denuded of the material which lies on the surface, and the moss allowed to dry in the atmosphere under the influence of the sun and wind. It is then teazed by a machine provided for the purpose consisting of a revolving cylinder with a tooth roller. The teazed and dry material is then baled under pressure just the same as hay is baled. I shall not go into particulars further than to say that the samples which were examined were sent at the instance of Mr. Wilmot, a member of the House of Commons, and were obtained from bogs in several districts in New Brunswick. Our analysis of the material showed that the moss litter contained from one-half to three-quarters of 1 per cent of nitrogen. That was the principal element of fertility that it contained. With respect to the absorptive capacity,—and of course the value of any sample is directly dependent upon its absorptive capacity,—we found that it varied all the way from 900 to 1,800, that is to say, that 100 pounds of the moss litter could absorb from 900 to 1,800 pounds of water or liquid manure. The samples examined showed considerable variation in absorptive capacity. As a litter it has been found useful, as I have already mentioned, not only in keeping the stables dry, but also free from odour.

*By Mr. McMillan :*

Q. Would gypsum not have the same effect of absorbing the odour?—A. Yes ; it takes up the ammonia. It is very useful for that purpose. But this is a litter as well as an absorbent. It serves a double purpose, and the manure that results from the rotting of the moss litter is rich, and contains its plant food in available forms. I have no data of my own to present in this connection, but those who have experimented with the resulting manure report it as of excellent quality, and giving the very best returns. I think that in the preparation of moss litter there is a possibility, not only of furthering the interests of agriculture directly, but of building up an industry which will be of value to the commerce of Canada generally, because there is an ever increasing demand in the stables of the cities of the world for litter in some convenient form. All the larger cities of the States, New York and Boston and so forth, are using every year larger and larger amounts of this moss litter, and it will only be a very short time before those keeping horses in Canadian cities will find it a more convenient litter than straw.

*By Mr. Carpenter :*

Q. Do you not think it advisable to cut straw which is intended for litter?—A. Yes ; it is.

Q. It goes further?—A. Quite so ; its absorbent capacity is increased.

*By Mr. McMillan :*

Q. Have you ever experimented with pease straw, using it long, just as it is fresh after cutting it? Its absorbing power is three times as much when it is fresh cut as when it is dry?—A. I have never seen the experiment tried, but I have no doubt your observation has been correct.

One peculiarity with regard to the absorptive capacity of this moss is that when it is artificially dried it has by no means the same retentive power for liquids that it possesses when it has been air-dried. We dried some moss litter at a temperature of boiling water, 212° Fahrenheit, and we found that its absorptive capacity was reduced almost to nil.

We have done some work this year in the analysis of what we may call industrial fertilizers, waste products, or by-products, from various manufacturing industries, for example, waste from the shoddy mill, slaughter offal, tankage and materials of that nature. A full account of these appears in my report for 1895.

*Phosphoric Acid in Mineral Phosphate.*—We have also continued our experiments with a view of rendering available the phosphoric acid in mineral phosphate, and in the report just referred to, will be found a summary of the experiments that we have carried on in that connection during the past year. I hope to be able to continue that work, and eventually to be in a position to bring before our people some economical and ready method whereby the phosphoric acid in our finely ground mineral phosphate may be rendered available upon the farm.

*By Mr. McMillan :*

Q. There is one experiment which in my opinion should be made and that is this : Take manure from the stables and lay it out in the open air. Take some at the same time and leave it in a shed, and see what is the difference between the manure prepared in the shed and that prepared in the open air. A large quantity is made in the barnyard, and I am convinced that there is a great loss. It is better inside. We, for a time, made part of our manure inside and part outside, and we considered that it took three loads from the barnyard to make it equal to two from the sheds?—A. Yes. I have under consideration an experiment that I trust will in a great measure answer that question.

One experiment I purpose making in connection with this finely ground mineral phosphate, is to ascertain if the phosphoric acid is rendered soluble by fermenting it with barnyard manure. If we find that the phosphoric acid is thereby converted into a con-

## Agriculture and Colonization.

dition in which it will be soluble in one per cent of citric acid, we shall then have a method which will be practicable for our farmers to use. There is a large amount of low grade apatite or mineral phosphate in Canada, which is practically of no use to us at all—that is to say, the prices are so low that it does not pay to export. I trust that we may be able for these low grade mineral phosphates to suggest some method such as I have spoken of, we shall thus be giving our farmers a very valuable help, because undoubtedly there are many soils which would be benefited by an application of phosphate.

### MISCELLANEOUS INVESTIGATIONS.

A great many miscellaneous—as I might call it—investigations have been carried on during the past year, either in connection with my own work proper or in relation to the work of the other departments of the Experimental Farm system. Assistance has thus been rendered both in analytical work and advice to the Horticultural Department, the Entomological Department and the Dairy Department. You will readily understand that there are a great many problems which arise in these different divisions of experimental agriculture that require for their solution some chemical work. Such, consequently, have received attention at my hands.

*Well Waters.*—The examination of well waters from farm homesteads has been continued and in the report for the current year the analyses of some 65 samples appear. It is to be regretted that, as we extend this work, we only become more and more convinced of the fact that a large number of our well waters throughout the country are very seriously polluted. This matter has been brought before you, and before our people at conventions, and in other ways for the past six or seven years, and I am glad to say that this note of warning and caution which we have been continually sounding, has at last awakened lively interest in our dairymen, in this question of pure water. Not only must we have pure water for drinking purposes for ourselves and animals, but there is an absolute necessity for uncontaminated water for the washing of dairying utensils and general use in the dairy. We know that when milk is contaminated with injurious forms of bacteria or germs, that these arise for the most part through the use of impure water. I believe that the only germ which finds its way into the milk directly through the system of the cow is the tuberculosis germ, so that when cases of typhoid can be traced to the milk supply, as many can be, and have been, the typhoid germ is present from the fact that it has been introduced in some way into the milk after it has been produced by the cow, most probably by washing the milk vessels in the well water containing the typhoid germ.

*By Mr. McMillan :*

Q. What do you consider the principal source of contamination in the waters you have examined?—A. Organic filth; drainage from the barnyard, from the privy, the stables and the barnyard. We have endeavoured to show the enormity of this contamination and pollution, and at the same time to suggest a means whereby this can be avoided in future. In the first place, no well should be sunk in the barnyard, because sooner or later, whether the soil is light or heavy, that soil must become saturated with an excrementitious matter. Finally and naturally this filth will find its way to the lowest level and the well acts as a sort of cess-pit. Farmers must first of all learn to have the well located at a sufficient distance, so that there will be no risk of contamination by drainage. Secondly, we can appeal to them from the dollars and cents standpoint: that this material which is finding its way into the well should find its proper place in the field, because it is really plant food and it is plant food in the most valuable form, because it is soluble and readily available plant food. It should be upon the field as a fertilizer rather than in the well. Of course this points to better constructed buildings, to better care of the manures, to the use of more litter and absorbents. There are very few parts of Canada where there is a scarcity of litter of one kind or another. Where straw is scarce there are deposits of peat and muck, which, when air-dried, as I have shown on former occasions here, has a great absorptive capacity, and not only so, but contains a large amount of plant food in itself. These should be used plentifully, anywhere and everywhere about farm buildings where there is liquid manure to be

absorbed. Then the manure must be preserved more carefully, protected from excessive rainfall which leaches out its best constituents. Attention to this matter will bring about good water and more and better manure for the fields.

*By the Chairman :*

Q. Have you given any attention to the subject as to how far a distance these deleterious agencies may be carried through the soil to the wells?—A. I have not tried any experiments but I can say this: what would be quite a safe distance with a heavy clay soil and under good conditions in the barnyard, would be dangerous if the soil were of a light and sandy character with no proper means for the preservation of the liquid manure. One cannot lay down any hard and fast rules with regard to this matter. The porosity of a heavy clay soil does not in any way equal that of a light and sandy soil. Again, the barnyard and buildings can be kept so clean that practically none of this valuable plant food would be allowed to go to waste or find its way into the well. We should have to consider the circumstances of each individual case. I do not think it would be wise to state any exact number of feet that a well could be placed from a source of contamination, so as to be quite safe.

*By Mr. McMillan :*

Q. A good deal would depend upon the depth of the well.—A. True.

*By the Chairman :*

Q. In the Old Country they will not allow a deep well to be within 200 yards of a burying ground.—A. Yes, and if it were a light and sandy soil I scarcely think that would be sufficient. It is really extraordinary the distance which it has been proven contaminating matter can travel. There are a great many factors to consider. First the porosity of the soil and then the amount of the infiltrating filth and the rainfall. Necessarily a small amount will take a long time to travel a certain distance; multiply the quantity by ten and it will take one tenth of the time to travel the same distance.

While on this subject, I might say that such has been the interest awakened amongst those who are taking an active part in the management of our creameries and dairy associations, that they have asked for a more general and systematic examination of the well waters of those who are supplying milk to the creameries and to the cheese factories. They hope to have a system of inspection which will allow them to compel all farmers supplying milk to them, to have the water examined and pronounced pure before allowing them to furnish milk for these purposes. Such a step is nothing but right. I have always been working towards that end and I only trust I shall be in such a position with due assistance and opportunity to carry out at an early date this request of the dairy associations.

#### ORIGINAL RESEARCH DURING THE COMING YEAR.

I shall close my observations by referring to the lines of original research which I hope to pursue during the coming year. The first is concerned with the economic treatment of muck soils. Something has already been done in this connection, but much remains still to be accomplished. Generally speaking, we may say that such soils should first of all receive thorough drainage, followed by an application of lime, and, if possible, of wood ashes. Lime and wood ashes to furnish those elements of plant-food which are lacking in muck soils. Such soils are not particularly benefited by barn yard manure, because they themselves contain large quantities of nitrogen. We have depicted in the photographs which I now exhibit, the results of some experiments we made toward this end. They will give you an idea of how experiments in this way are conducted. The pots shown in these photographs contain the muck soil under treatment. These pots, severally, are fertilized with varying amounts of potash and phosphoric acid, and were sown with peas. The plants are measured from time to time and at the close of the experiment are photographed and weighed. We have as a result the relative value of the different fertilizers. In round numbers, I might say that treatment with wood ashes in this preliminary examination has resulted in an increase of 50 per cent in the product of growth, peas being under examination.

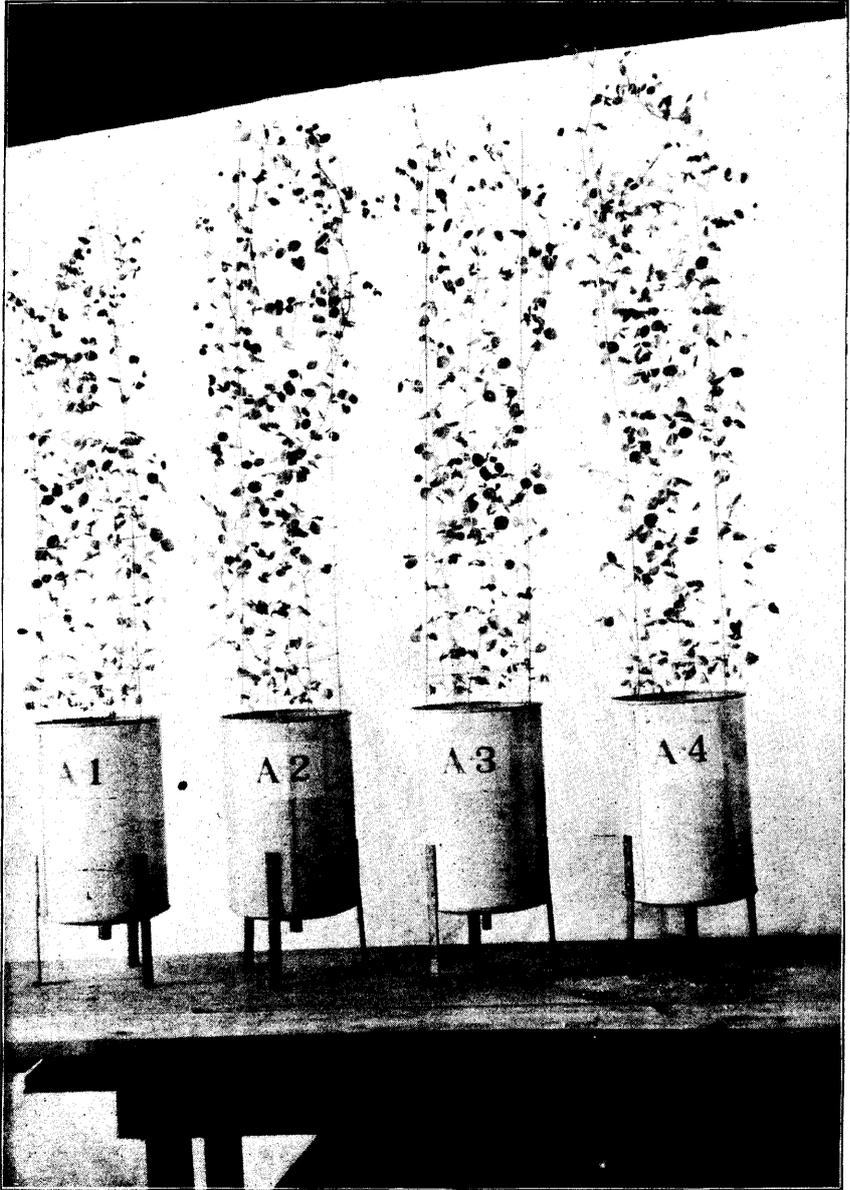


PLATE IV.

## Agriculture and Colonization.

Experiments to illustrate the value of certain mineral manures upon muck soils sown with peas.

		Weight of Produce.
Pot A 1.	Muck soil, no fertilizers . . . . .	21 grams.
Pot A 2.	“ × 5,000 lbs. wood ashes per acre . . . .	32 “
Pot A 3.	“ × Wood ashes, 2,500 lbs.; Marl, 2,500 lbs. per acre . . . . .	28 “
Pot A 4.	“ × 1000 lbs. wood ashes per acre . . . .	35 “

We shall continue the experiments with finely ground mineral phosphate, to ascertain if the presence of fermenting barnyard manure will render its phosphoric acid more available. I trust next year to be able to give the Committee some important information on this point. A further research will be to ascertain exactly the condition of plant food in certain naturally-occurring fertilizers. The question, for instance, of the value of marsh muds in the Bay of Fundy is one concerning which there is great dispute. You will scarcely find two men who hold the same opinion with respect to the value of marsh mud as a fertilizer. This can be explained, to some extent, on the ground that mucks differ in their composition. Some contain notable quantities of lime; others are rich in nitrogen. Some farmers have applied these muds in large quantities; others in small quantities. Sometimes they are applied to light lands; sometimes to heavy lands. Having gained a general knowledge of the total amounts of plant food they contain, we now want to learn in what condition these fertilizing elements exist. It might be well to have a collection made comprising samples from different points on the Bay of Fundy, and then make a systematic examination of the condition of the plant food. With regard to wood ashes, some of the manufacturers of fertilizers have entered a mild protest against wood ashes, saying that kainit and muriate and sulphate are better forms of potash. They say that wood ashes have not the agricultural value that chemists have ascribed to them. I think we should therefore make an investigation with regard to the exact condition of the potash and phosphoric acid in wood ashes. I have already spoken highly of wood ashes as a fertilizer and I need not say such an analysis as I have indicated will be a matter of great importance to our people.

Then, we wish to make a more general and systematic examination of the well waters of farms, especially on those farms producing milk. Such an investigation will result in doing away with a great deal of the poor and tainted milk which now finds its way to our cities, creameries and cheese factories, and means loss to those supplying milk. It should also result in better health on the farms, for our farmers and their families, and also in the better thrift of farm animals.

Several years ago we commenced a research into the relative food values of the native and introduced grasses. We have put into bulletin form the results of the analyses of nearly 200 varieties of grasses. That work has been continued and we trust to be able to publish some further particulars in this important matter.

Another question closely related to fodders is the relative value of roots. This is a question of much interest to dairymen and stockmen and I wish to procure more definite knowledge as to the value of different root crops as fodders.

We should also endeavour to continue our researches in connection with the Babcock test. There is need at the present time for an investigation to settle definitely the accuracy of the Babcock method for determining the value of milk for cheese-making purposes. In past years we have already done work which has proven conclusively that it is a reliable method and a cheap one for ascertaining the percentage of butter fat in milk. There can be no doubt of that fact at all, but the question has arisen whether the percentage of fat represents the true cheese-making value of the milk. The one who has done the greatest amount of work in this matter, and consequently is an authority on it, is Dr. Van Slyke of New York. He says, conclusively, that the fat is a direct indication of the value of the milk for cheese-making, because the curd increases with the butter fat

and is not a constant amount, as some claim. These, then, are the more important lines of research which we hope to take up this year in addition to the regular work.

*By Mr. McMillan :*

Q. Are you making any experiments to test the value of timothy or clover at different periods?—A. We have already done much in that connection with grasses, and the general result of our work has been to show that the grass has its highest nutritive value just after the flowering period, that is as the seed is forming. If it is further allowed to mature the grass loses in food value. Our analyses indicate that the right time to cut for hay is just after the flowering period, in the majority of instances.

*By Mr. Carpenter :*

Q. I would suggest that you should add to your work the question of reclaiming the worn out lands in the older provinces. We know of many such lands and you would be doing a grand work for our people if you could point out a cheap and easy method to accomplish this?—A. I shall give the question my earnest attention. I trust I have been able to show to the members of the Committee the large field of work that is open to us in these chemical investigations. What I have this morning indicated has only been an outline of what we have done and what our possibilities are in regard to this work in the future. In closing, I do not think I can do better than to recall to the minds of the Committee what I said last year regarding the need for more help in the laboratory.

“The ever-increasing demands upon our time will necessitate in the near future an enlargement of the scientific staff in the chemical division. The work has for some time past outgrown the possibilities of the present staff, which consists of myself and an expert assistant. If we are in any way to keep abreast of the work which is asked of us, it will be absolutely necessary that there should be further expert and analytical assistance in my division.”

That statement is more true this year than last, and its repetition may be urged with greater emphasis than on that occasion.

Having examined the preceding transcript of my evidence, I find it correct.

FRANK T. SHUTT,  
*Chemist, Dominion Experimental Farms.*

## Agriculture and Colonization.

Mr. D. DERBYSHIRE, of Brockville, President of the Ontario Creamery Association, was present at this meeting, 2nd April, and, on the invitation of the Chairman, addressed the Committee as follows:—

Mr. Chairman and Gentlemen:—I got a pressing invitation from the warden of Lennoxville to appear with other gentlemen from the Eastern Townships before the Honourable Mr. Foster with regard to a matter connected with our winter dairying business, so I came up to Ottawa for that purpose, and on arriving in the city I heard that Mr. Shutt was speaking at a meeting of the Agriculture Committee this morning, and I was very anxious to hear him. That is the reason of my presence here. I came to listen and not with any intention of saying anything. But as your Chairman has kindly invited me to address the committee I may say that our dairy business has been recently brought very much to the front.

### SUCCESS WITH WINTER MADE CREAMERY BUTTER.

As you are aware, we have during the last few years been putting forth an effort to make fancy winter Canadian creamery butter, and we have been successful in this matter beyond what we expected. Of course, when we commenced to make winter butter, the first thing that the local press took up was that it would have a stable flavour, and the quality would not be right, and people began to think that this must be true, as it was so often repeated, without examining our butter or knowing anything with regard to it themselves, from their own experience. Then when we came to have some Canadian winter creamery butter, naturally we found nobody cared to buy. So we came to the Dominion Government to beg for assistance to place this Canadian creamery winter butter on the British market and sell it for just what it was, "Canadian Creamery Butter." We were successful in this. The then Minister of Agriculture, Mr. Angers, readily took hold of the idea, and that butter placed on the British market sold as high as butter that we found coming from other countries. That established a market for it in Great Britain, so that this year we have been able to sell our butter at the highest price in the British market and sell it regularly to those customers we sold it to last year, and we have been able to do that without any assistance from the Government. Therefore the business may be said to have been successfully established. Our cheese business was made successful by co-operative methods, and we found that if we were going to be successful in the butter business we would have to adopt the same method with butter that we did with cheese, that we would have to make it in creameries by co-operative methods, with the use of the best machinery, and under the supervision of talented people instructed in the art of making fancy butter. You understand that butter made in the old way in the farms is really worth nothing now-a-days. It may be that 12, 13 and 14 cents a pound is being got for it by storekeepers. It is peddled in all sorts of ways and shoved into the back room in a wheel-barrow, but while it is getting from 12 to 14 cents, our fancy creamery butter is selling at from 21 to 22 cents.

*By Mr. Carpenter :*

Q. Has it averaged that during the winter?—A. No. It has not averaged that but that is the price it stands at to-day. It has averaged over 20 cents, possibly 21

Q. And on the other hand store butter has averaged about what?—A. 13 cents, I believe. So that the making of this ordinary butter is a great loss to the country, and what we want to do is to commence this system of making Canadian creamery winter butter in a thorough and systematic way, under the very best conditions, with the most favourable method of handling milk and manufacturing butter by co-operative means

## CANADA'S CONTRIBUTIONS TO ENGLISH TOTAL IMPORTS OF DAIRY PRODUCE.

You understand that at the present time we supply \$16,000,000 worth of the fancy cheese out of \$26,000,000 that is bought by England, and that at the same time we have only about \$800,000 of the butter business in the British market out of \$65,000,000 worth of this product which was brought into England last year. We find by past experience that these people are willing to buy from us if we are willing to cater for their wants. We have been successful to a certain extent, in 1895, because in place of sending 32,000 pounds of creamery butter during the season of open navigation in 1894, we have sent in 1895, in the same time, 69,000 pounds. This we have been able to do through the assistance of the Canadian Government in giving us cold storage on the vessels, and the refrigerator compartments on the cars. Thus we were able to send more than twice the quantity by means of the assistance we received, and I think that is a very satisfactory result. I believe from the preparations going on at the present time that we will be able to double the quantity again in 1896.

## IMPORTANCE OF FINE QUALITY.

Then there is another thing, we will be able to send a finer quality of butter that will be better adapted for the market. We find from time to time, even from week to week, that the shipments that we send over are giving better satisfaction, that we are catering with increased success to the tastes of the people over there. I believe that there is a large market in Great Britain for us, provided that we take hold of it energetically, as I am sure our Canadian people will do. There is nothing we have taken hold of with regard to this matter that we have not pushed to the front. I believe we will not be found wanting now that the Government propose to give us a fast Atlantic service, provided with ample and efficient cold storage accommodation for our dairy products. If they will go further and give us some assistance in the next winter, for the manufacture of Canadian creamery winter butter, we will push this to the front and get \$16,000,000 for our butter as well as for our cheese, thereby making every industry in this country prosperous on account of the large amount of English money that we will be able to bring into this country. That is the main feature of the dairy business that I wish to bring before your attention, and I thank you very much for the opportunity of addressing you.

*By Mr. Campbell :*

Q. Is this new fashion of making butter not more expensive than the old way?—  
A. In the old way it is made by the people on the farm, and as they do it themselves they think it does not cost anything. But I assure you that it costs a great deal more than the new and improved method of manufacturing. For instance, in the old or ordinary way of making the butter on the farm, there is possibly 20 per cent of the cream lost, because they do not take it out of the milk. They think they take all the cream out of the milk but they do not. They put the milk in cold rooms not adapted for making butter or raising cream, and while they think they get all the cream out, as a matter of fact they do not. Now, in the factory, the milk is skimmed by means of a separator and every particle of cream is taken out of it. In this way they make 20 per cent more out of the milk than they would on the farm. In the next place, in the factory we make an article that we can export and get a good price for. The English people will not have Canadian dairy butter at any price. There is no demand for it. In butter made on the farm, in the old way, there is not only a loss of 20 per cent in getting the cream from the milk, but the butter is not saleable as an article of food for export to Great Britain, and that is the real market we have to look to.

Q. Is it more profitable to make this into butter or into cheese?—A. It is more profitable into butter, in the winter time.

*Competition.*—Now, any one knows that if any dry goods merchant in the city of Ottawa has over one half of the dry goods trade of the city and has 13 or 14 other stores competing against him—as there are 13 or 14 other countries that are

## Agriculture and Colonization.

trying to send cheese to Great Britain—that this man must have in the first place a first class stock, he must have a first class place in which to show his goods, and he has got to have very nice people to wait on the customers when they come in. He must do that if he expects to hold the half the trade against 13 others who are looking for the same customers. Consequently, we cannot afford to make any change in the winter time nor in the fall nor in the spring, but we have to make this cheese from May to November when the finest quality of goods may be produced, and send these as Canadian cheese to the old country. We must hold our reputation there. You must not make any less cheese but more cheese of a fancy quality, so as to enable us to place ourselves more strongly in the affections of the British people as a cheese producing country, and at the same time place this butter right at the front and get that as an additional market for the farmer, which they must have. This money must be taken in order that we may make an industry in this country prosperous. We have got to do it. We shall welcome any assistance you can give the farmer, anything you can do to build up this butter and cheese industry, because the farmer must be made prosperous and then every other industry in the country will prosper.

*By Mr. Sanborn :*

Q. Is there no danger of over-production in butter?—A. We have heard for over twenty-five years that there was a danger of over-production. Now, last year we made 53,000 early cheese, what we call heavy bread cheese. We make that heavy bread cheese in the season of the year when the market becomes chilled. We want to make this a fancy quality of cheese. We don't want to send that quality of cheese from this country to the old country as a Canadian product, but we want to send this just in the time when we can make the finest quality, and if we send them the best style of goods that anybody can produce, there is not a particle of danger of over-production. The market is there for us to go right in and possess the land. There are sixty-five millions they pay for butter. What are you going to do? Are you going to let other people supply that market? Not a bit of it. We are Canadians and we are going to have that money every year.

Q. We will have to compete with all the world for it?—A. Yes.

Q. We have got to produce as cheaply as other nations?—A. And so we can, if we adopt the methods. If we cheapen the cost of production which we can easily do by building silos, growing corn, selecting the cows—wiping out those unprofitable servants which have not been profitable in the past and would not be if cheese stood at 15 cents a pound. If we reduce the cost of the production of milk and make a larger quantity of this butter and cheese we are going to have this market.

Q. That is fine in theory, but how are you going to put it in practice?—A. It is going to be put into practice in each section.

Q. It is all over?—A. We have men who have made money this winter. Messrs. Dargavel and Murphy made big profits from May to November. They made winter creamery butter once in a little factory at Elgin, and this year they got over \$7,000 additional money that was centred in that little community. Mr. Dargavel, a leading merchant, says that \$1,000 would cover every solitary dollar of butter that was sold previous to this year. There is \$6,000 of additional money, which makes every one of these farmers well off, so that they can walk into town and pay their debts. They have got the money in their pockets to do it with. It makes them feel stout and strong and honest.

*By Mr. Livingston :*

Q. Has the assistance rendered by the Government been sufficient to place this industry on a good footing, or do the dairymen require more assistance?—A. We require more assistance. What the Government have done so far has been of great benefit to the country, and has assisted and helped this industry wonderfully. We want better accommodation, we want a swifter line of steamers, we want larger and better refrigerator compartments for getting our butter to the Old Country, and if they can afford to give us any assistance in manufacturing this butter, we want it, we want everything we can get.

Q. Do you mean so much per pound?—A. Yes. That is a matter for Mayor Morris. I am to get my instructions from him.

Q. Because I understand you have been getting very profitable prices this year?—A. They have been profitable. The butter we made this year from November up to now has been a paying investment to the farmers, and they have made money, where they have been able to avail themselves of sending their milk to the winter creameries.

Take Wellman's Corners, established by the Government as a dairy station, to see what could really be done. The other morning they telephoned me that they had received that morning 23,000 pounds of milk. What do you think of that, in March? That was delivered by the farmers in a vicinity where a thousand pounds was a big quantity a year ago, in that same creamery. Now this business is going ahead.

Q. This may have been milk for a week?—Not a bit of it; they were delivering every day.

Q. 23,000 pounds is a good lot?—A. It is a good lot for this time of the year. If the farmers are able to send \$1,300 worth of milk in the summer and in the winter to this creamery, the children won't leave the farm, the wife won't appear in an ordinary bonnet to church, but the people will feel happy and good natured, because they have got the money.

*By Mr. Campbell :*

Q. What assistance do you want?—A. I do not feel at liberty to forestall what Mr. Morris, the warden of Sherbrooke county, proposes to ask of the Government this afternoon, but I will tell you what we want in Ontario. What the Ontario Creameries Association would like to see is a faster line of steamships. We want larger refrigerator compartments and more of them so that we can get our butter to the old country fresh and in the finest condition in summer as well as winter, so that indeed we can go in and possess the land.

*By Mr. Sanborn :*

Q. And drive somebody else out?—A. Yes, and we will drive them out. Why should we not sell our butter to England as readily as Denmark does? We have driven out our competitors with our cheese and we can do it with our butter.

*By Mr. Campbell :*

Q. Do you want a bounty on butter?—A. That is what we want.

*By Mr. Carpenter :*

Q. How many pounds of winter milk will make a pound of butter?—A. About 20 pounds on the average. Some of them make it with 18 pounds.

Q. What is the average charge of the creameries?—A. Three cents a pound for making.

Q. Ready for export?—A. Ready for export.

The CHAIRMAN.—I may explain to the committee that Mr. Derbyshire is one of the oldest creamery men in Canada. I have known him for a great many years and he is certainly one of the first men in the country in this particular line. Anything he says on this subject ought certainly to have more importance attached to it than anything coming from a man of less experience or less intelligence.

The preceding statement by Mr. Derbyshire, President of the Ontario Creamery Association, is hereby certified correct as taken down by the committee's stenographers.

J. H. MacLEOD,  
*Clerk to the Committee.*

Agriculture and Colonization.

THE EVIDENCE

PART II

IMMIGRATION AND COLONIZATION



# Agriculture and Colonization.

COMMITTEE ROOM No. 46,  
HOUSE OF COMMONS,  
SATURDAY, 18th April, 1896.

The Select Standing Committee on Agriculture and Colonization met this day at 10.30 a.m., Dr. Sproule, Chairman, presiding.

Mr. A. M. BURGESS, Deputy Minister of the Department of the Interior, was present by request, and, on the invitation of the Chairman, addressed the Committee as follows:—

Mr. Chairman and Gentlemen,—The recent Immigration Conference at Winnipeg has not only invested the subject of immigration with somewhat fresh interest, but it has also revealed the fact that there prevails throughout the country a very general lack of information as to the methods adopted by the Department in the expenditure of the limited appropriation made by Parliament for the conduct of this branch of the public service. In consequence of this, it occurred to me that it might be well to submit to this Committee a brief statement of these methods, not so much for the information of the Committee, because I am confident from the interest they have displayed on this whole subject during the years it has been under the control of the Department of the Interior that no such explanation is necessary so far as they are concerned; but the publication of this statement in the Committee's Report will tend to throw a great deal of light upon the subject, so far as the press and the public are concerned, which can, at all events, do no harm, and in many quarters may do some good.

In the first place, it may be well to lay before the Committee a statement of the expenditure authorized by Parliament for immigration purposes, year by year, from Confederation down to the present time.

## EXPENDITURE ON ACCOUNT OF IMMIGRATION, YEAR BY YEAR, FROM CONFEDERATION DOWN TO THE CURRENT FISCAL YEAR.

Year.	Amount.	Year.	Amount.
1867-68 . . . . .	\$ 36,049 76	1881-82 . . . . .	\$215,339 24
1868-69 . . . . .	26,951 80	1882-83 . . . . .	373,957 71
1869-70 . . . . .	55,965 99	1883-84 . . . . .	511,208 83
1870-71 . . . . .	54,004 20	1884-85 . . . . .	423,860 90
1871-72 . . . . .	109,953 90	1885-86 . . . . .	257,354 93
1872-73 . . . . .	265,717 79	1886-87 . . . . .	341,236 39
1873-74 . . . . .	291,296 57	1887-88 . . . . .	244,789 09
1874-75 . . . . .	278,776 99	1888-89 . . . . .	202,499 26
1875-76 . . . . .	338,179 10	1889-90 . . . . .	110,091 76
1876-77 . . . . .	309,352 90	1890-91 . . . . .	181,045 38
1877-78 . . . . .	154,351 42	1891-92 . . . . .	177,604 82
1878-79 . . . . .	186,403 06	1892-93 . . . . .	180,677 43
1879-80 . . . . .	161,213 32	1893-94 . . . . .	202,235 52
1880-81 . . . . .	214,251 05	1894-95 . . . . .	195,652 97

Those are the actual expenditures, not merely the appropriations, for the years I have mentioned. For the current year the appropriation is \$130,000.

*By Senator Perley :*

Q. How much do they amount to?—A. \$6,230,002, that is since 1867. From this it will be observed that the appropriation of \$130,000 for the current fiscal year is the smallest that has been made since 1871-72, with the exception of the one year 1889-90,

and having been reduced from about \$200,000 for the immediately preceding year, I can assure the Committee that it has been very difficult for the Minister and those acting under him so to direct the affairs of that branch of the Department as to maintain in a fairly efficient state the machinery for the promotion of immigration from the several fields which had previously been occupied, and yet carry on the work within the limits of the money at our disposal. I have no hesitation in telling the Committee that, in my opinion, if the reduction were to be made permanent, it would be necessary for the Department to abandon some of the fields which at the present time we are attempting to occupy. This statement I make with the knowledge of the head of the Department, and I am authorized by him to say that he concurs in this conclusion.

EXPENDITURE OF THE APPROPRIATION FOR THE CURRENT YEAR.

Every member of the Committee is aware that out of the appropriation of \$130,000, the Department is called upon to maintain the immigration office at Liverpool, including the salary and expenses of the agent and five officers, and the travelling expenses and all other expenditures which they may incur in the performance of their duties, with the rent of the building and the taxes thereon, and the cost of heating, lighting, insurance, furniture, maintenance and caretaking.

*By Mr. McGregor :*

Q. How much is that?—A. I am just setting out the various services in which the expenditure is made.

Q. How much is spent for that office?—A. I did not make out that calculation, but it can easily be done.

Q. That is what we want. It would be interesting to know how much we are spending, and who are getting it?—A. For each office?

Q. Yes?—A. The Public Accounts show that, and also the Auditor General's Report. It is only a question of totalling up the figures. In the Auditor General's Report the cost of each office is given, the statement he publishes being obtained from my Department.

*By Mr. McLean (King's) :*

Q. They are all stated in the Auditor General's Report?—A. Yes, and therefore I did not think it necessary to repeat them this morning.

*By Mr. McGregor :*

Q. You had better put it there?—A. Very well. The Department has also to pay the cost of postage, telegrams, stationery and printing, and all the other miscellaneous expenses attaching to the maintenance of an office of this kind, usually classified under the heading of "Contingencies." The same statement is true in regard to the office at Bristol, and the office at Glasgow, where there is an agent and one clerk. The agency in Ireland at the present moment is vacant, but the same remarks may, nevertheless, be applied to it, with the exception that, latterly, no office rent has been paid, the agent being required to spend the equivalent of his office rent and expenses in travelling around the country.

In Scotland we have Mr. W. G. Stuart, popularly known as "Baillie" Stuart, occupying the northern part, with headquarters at Inverness; Mr. Peter Fleming, the southern counties, with headquarters at Dundee; and in England Mr. E. J. Wood, whose work is confined to the central and northern counties, with headquarters at Birmingham. So far as the southern part of England is concerned, a similar service is to all intents and purposes rendered from the High Commissioner's Office, from which point lecturers are arranged with, &c. I am glad to say that in a large proportion of cases these lecturers render their services free of charge, but in relation to their work there are considerable expenses in the way of advertising, printing and occasionally the rent of a

## Agriculture and Colonization.

hall. The object of this class of service is not only to excite the general interest of the public in the question of emigration to Canada, but to maintain that interest by personal appeals to the affected classes, and, wherever practicable, our agents follow up the work of the lecturers by interviews with persons likely to become good and satisfactory settlers, who in this way might be induced to make choice of Canada in preference to foreign countries or some of the other colonies.

I take this opportunity of acknowledging the very important assistance rendered us by educated, intelligent and disinterested gentlemen of various professions, but chiefly clergymen, teachers and those interested in educational advancement generally, who have delivered free lectures upon historical and geographical subjects connected with Canada. This kind of work has been carefully fostered by the High Commissioner, by whom indeed it was initiated, and he has collected in his office in London, for the use of people engaged in this work, no less than thirty sets of stereopticon slides produced from photographs of places and things in all parts of Canada, relating chiefly to agricultural and industrial pursuits, which tend to add greatly to the popularity of the lectures and serve to attract the attention of the intelligent classes, in a way which probably work conducted more directly in the interest of immigration would not do.

Incidental to this work, a great amount of printing and advertising has to be done, but, in regard to both classes of expenditure, I must say that within the past twelve months we have done much less than is desirable in the public interest simply for the lack of the necessary money with which to pay for it. As an example of our methods in this work I may mention the Handbook of Canada, the printing of which formerly cost us, for an edition of 80,000 copies, \$5,219.92, or \$65.25 per thousand. The cost of this work has been greatly reduced within the last two years as the results of methods adopted, some—and the most important of them—at the suggestion of the Queen's Printer, and others at the suggestion of the chief of the Immigration Bureau and myself; and an edition of 50,000 now costs the Department \$2,610, or \$52.20 per thousand, a saving of 20 per cent. A synoptical edition of this work has been translated into French, and it will also be translated, if we can afford it, into the other European languages as well. Meantime, we are utilizing in the last mentioned countries, pamphlets published under the supervision of Mr. Dyke, specimens of some of which are produced. We found these pamphlets defective in some particulars, and have sent carefully revised proofs to Mr. Dyke with a view of having new editions published. Up to the present time no copies of the new editions have reached us, and I am therefore not in a position to produce any specimens of them.

I submit a pamphlet specially prepared by Mr. Auguste Bodard, our agent in France and Belgium. Mr. Bodard was a resident of Canada for a long series of years, knows the country well, and the result of his observation and experience has been that he has produced what, I am satisfied, will be regarded as a very satisfactory and creditable presentation of the advantages to be derived by the people of France and Belgium if they select Canada as a field for settlement. Mr. Bodard is due in Canada in a short time with a personally conducted party of settlers.

### BONUS TO STEAMSHIP AGENTS,—THE UNITED KINGDOM.

In addition to the agencies, permanent and itinerant, to the circulation of printed information in regard to the country, to the advertising, lecturing, &c., above referred to, it should be mentioned that on the recommendation of the High Commissioner an arrangement was made, by Order in Council of the 6th January, 1893, for the payment to booking agents in the British Isles, of a commission upon all tickets to Canada sold by them. As the Committee will readily understand, a great many people who are in the mood to emigrate, have not really made up their minds to what part of the country they will go, when they consult the local steamboat agent about the purchase of a ticket. He is usually the representative of nearly all the steamship and railway lines, and in this way may be said to have an equal interest in them all, but the ticket from the selling of which he can derive the largest profit is naturally the one he is most interested in selling. On the other hand, the intending emigrant is likely to be largely influenced

in his choice of a field for emigration by the amount it may cost him to get there. Bearing these two facts in mind, the High Commissioner thought, and the Government agreed, that it would tend greatly to promote the interests of Canada, the colony to which the cost of transport is the smallest, if the inducements to the steamship agent to sell a ticket were made as great as if he sold a ticket, for example, to one of the most distant of the Australian colonies. Therefore, for every ticket sold to an ocean adult passenger from any point in Great Britain and Ireland to Winnipeg, or any point in Canada west of Winnipeg, the steamship agent receives from the Government a bonus of \$1.75, which would render his commission upon the sale of an immigrant ticket to Canada, as large as if he sold a ticket for more money to one of the Australian colonies.

The amounts paid, year by year, since this arrangement went into effect, have been as follows :—

1892-93.....	\$ 1,395 42
1893-94.....	3,521 60
1894-95.....	2,156 86
1895-96, (7 months to 29th February, 1896).....	916 94
	\$ 7,990 82

The bonus is not paid until the party to whom the ticket has been sold makes use of it and his arrival in Winnipeg has been certified by the Commissioner of Dominion Lands, who is our chief immigration officer in the west.

#### EUROPEAN CONTINENT.

On the European continent we are, as the members of the Committee are probably aware, debarred from carrying on any active work in any of the German States. The same statement will apply to Russia and Austro-Hungary. We are, as a matter of fact, receiving immigrants from all these countries, most of whom are of a very desirable class, but they either come upon their own responsibility or through the indirect influence of the steamship agents, who receive a bonus of \$5 for every ocean adult passenger who reaches Winnipeg. This arrangement has been in force for several years past. Under it, the undermentioned sums have been paid since the transfer of immigration to the Department of Interior :—

1892-93.....	\$ 7,235 36
1893-94.....	10,931 40
1894-95.....	5,485 26
1895-96 (7 months to 29th February, 1896).....	3,460 21
	\$27,112 23

In France and Belgium, Mr. August Bodard, to whom reference has already been made, has been representing the Department for the last three and one-half years. It is perhaps rather early to come to any decided conclusion as to the results of his work, but so far they appear to be satisfactory. Quite a number of French and Flemish colonies have been formed in Manitoba and the Territories, and they consist, to a very large extent, of intelligent farmers who, when they become accustomed to the soil and climate of the country, and understand the methods of agriculture applicable to their new conditions, are likely to do very well for themselves.

An allowance of \$1,000 a year is made to the Canadian Commissioner in Paris, for the promotion of immigration work. This includes a subvention to the newspaper, *Paris-Canada*, which devotes a great deal of space to our interests.

## Agriculture and Colonization.

Under Mr. Fabre's supervision and direction, Mr. P. Foursin has established a colony near Wolsely, Assiniboia. This colony is very largely a private enterprise, the money which has been expended in bringing the settlers to that region and establishing them upon land having been advanced by private parties. It is too early in the history of the colony, yet, to be able to say decisively what its success is going to be, but so far it promises well.

### ICELANDIC.

The Icelandic immigration has fallen away considerably of recent years. All the people in the country, apparently, who are able and willing to move having already emigrated to Canada. Times have also improved in Iceland, and the inducements to emigration are not as strong as they were. The authorities also, for the first time in the history of the country, so far as I am aware, are making active and continuous efforts to prevent any more people leaving. For many years, we were accustomed to send Mr. Baldwinson, our Icelandic agent in Manitoba, over to the island during the winter, and he invariably returned in the spring with a large personally-conducted party. When he and the agent of the Government of Manitoba visited Iceland in company, about two years ago, such difficulties were thrown in their way by the authorities that it has not been thought advisable to send Mr. Baldwinson back again. The Icelanders already in Canada, however, are so numerous and so successful that no efforts of the Danish Government or of the local Icelandic authorities are likely to be successful in permanently restraining the emigration to this country, which is quite certain to resume its flow soon.

### SCANDINAVIAN.

There is nothing, so far as I can learn, to prevent the Government of Canada from establishing an emigration agency in Sweden, Norway or Denmark, from which countries we get so many of the very best class of agricultural settlers. A good deal of correspondence has taken place between the Department and the High Commissioner's office with a view to establishing an agency or agencies in one or all of these countries. The reduction in the appropriation, however, has prevented the experiment from being tried for the present, and we have therefore to content ourselves with such services as the steamship agents may, consistently with the laws under which they are operating, be able to render, in order to earn the bonus of \$5 for each adult immigrant booked to Winnipeg, and duly certified, as already mentioned, by the Commissioner, as having arrived.

We also advertise the advantages of the country in the Scandinavian newspapers on a limited scale. If we had the money to do it, a very much larger expenditure in this way, would, in my estimation, be justifiable. The Scandinavians already in Canada have also, especially of late, been writing very favourable letters to the local press and to their friends. We send papers containing these letters to parts of Germany and Scandinavia where they are likely to do most good, but I have reason to fear that occasionally, especially in Germany, these newspapers do not reach their destination. Means are found to prevent their being delivered.

Out of the vote of \$130,000 we have also to pay the expenses of successful farmers on this side who have emigrated from the other, and whom we encourage occasionally to go back to their former homes for the purpose of satisfying their friends and acquaintances as to the actual measure of success they have attained in farming. This is a kind of expenditure which we would gladly extend, if the money at our disposal would permit of it, especially so far as relates to continental European countries.

### UNSUITABLE CLASSES WARNED.

In relation to the work we are doing on the other side of the Atlantic, I ought to add that we have exercised the greatest possible care to discourage people from coming to Canada who are not likely to make good settlers. In other words, what we have

endeavoured to do has been to encourage quality, not quantity. I called attention in my annual report of last year to the extraordinary proportion of the immigration of the United States which never goes beyond the boundary of the State of New York. If I remember rightly, it was 45 per cent, which means that a very large number of people who are reaching that country from the other side of the Atlantic, are clerks and shopkeepers, men of the kind for whom neither we nor they really have any room. I might say that if we were simply anxious to get numbers from the other side of the Atlantic, it would be, in my opinion, a comparatively easy thing to do. However, we discourage people of that kind, and offer encouragement to none but people who are likely to engage in farming if they come.

GOVERNMENT'S CAREFUL PROVISION OF AMPLE MEANS FOR SECURING THE HEALTH, COMFORT AND GENERAL PROTECTION OF IMMIGRANTS, UPON ARRIVAL IN CANADA, UNTIL SETTLED.

On this side of the Atlantic, too, we pay out of this limited appropriation the expenses of what I submit is a very thorough system of taking care of the immigrant and seeing that he is properly dealt with, from the time he arrives in Canada until he is finally located on his homestead in Manitoba or the Territories, or employment of some description has been found for him, as his circumstances may call for. First of all, there is the immigration agency at Halifax. Unfortunately, about a year ago the building used for the reception of the immigrants on their arrival at that port was, with the buildings of the Intercolonial Railway at the deep water terminus, burned down, and although the Department of Public Works and the Department of Railways have together been doing their best to have a new building ready for our purposes as quickly as possible, the work of reconstruction has not yet been completed. Meantime, by the generous co-operation of the Intercolonial Railway authorities, arrangements have been made which permit incoming immigrants to land with the least possible inconvenience and discomfort.

All the salaries and expenses of various kinds connected with this agency are charged to the general appropriation for immigration, as are the salaries and travelling expenses of the interpreters at Quebec.

It would be hard, I submit, to suggest any improvement upon the methods adopted for the reception of immigrants at Quebec. Our building at that place, on the Louise Embankment, is a model of cleanliness, order and comfort, and Mr. Doyle, the agent, himself a most efficient man, of over 27 years' experience, is aided by a capable staff of interpreters and guardians, including a matron whose sole business it is to see to the comfort of the female immigrants and to care for such as may not be able to leave the immigrant station immediately. On the very next occasion when Parliament is sitting during the season when the navigation of the St. Lawrence is open, I respectfully submit that it would be highly in the interests of the country, and a matter of great importance to the Committee, that its members should visit Quebec in a body, and witness for themselves the efficient way in which the immigrants are handled. It may be pointed out in this connection, that at both Halifax and Quebec, arrangements are made by the department for furnishing to the new arrivals all necessaries in the way of food, at a schedule price which is agreed upon between the caterer and the Department, a price, by the way, which is before approval, submitted to the leading merchants at both points, and certified to be the regular minimum prices for the articles of food included. Facilities are also offered for the exchange of European money into Canadian currency by a broker who is specially selected by the Government for that purpose, and between whom and the Government certain rates of exchange have been agreed upon in advance. It may be mentioned here, that the stipulated price lists of provisions and tables giving the relative values of various European coins and Canadian money are printed on large cards in various languages and posted up all over the immigrant halls, for the information of the immigrants, so that they may be in a position to assure themselves that they are not being taken advantage of.

## Agriculture and Colonization.

As speedily as possible after their arrival, the immigrants are placed on board colonist sleeping cars furnished by the railway companies ; and if, in the opinion of the agent there be any desirable object to be accomplished thereby, an official, who speaks the language of the party, accompanies it as far as may be thought necessary from the port of landing, so as to see that the people are all comfortably settled down, that they are in good health, that they are using to the best advantage the facilities for cleanliness and preparation of food which are furnished for them by the railway companies, and if either they or their women or children should suffer in any way from the results of the journey, to have medical attendance and comforts procured for them. This last, of course, is an authority which is used by the attendant only in cases where absolutely necessary, because the expense of that sort of attention is great.

At Montreal and Port Arthur every immigrant train is visited by an agent of the Department and accompanied part of the way, and in cases of Scandinavian parties of considerable size, the interpreter who is stationed at Ottawa also visits the train and assists and advises his fellow-countrymen.

On arrival at Winnipeg the immigrants are met by a competent staff of officials, speaking the various European languages, and there again the arrangements for their comfort in the immigration hall are excellent. They are not encouraged, however, or even permitted to make any more than a temporary use of the Government buildings, but encouraged to commence work and strike out on their own account immediately on their arrival in the country. In every instance where they are looking for homesteads, reasonable assistance is rendered them, and local farmers speaking the language of the party concerned are employed and paid by the Department to show them over the vacant and available agricultural lands in the respective districts. The advantage of this system is found to be that it saves the Department the expense of keeping guides in permanent employment, who would be at the service, after all, of but a comparatively small proportion of the arrivals, and would cost the Department more than the present system does. There is also the inducement that if the immigrant is a desirable one, his guide has a personal interest in procuring him a suitable homestead in his own locality. The plan has been found to work very well, and is very economical. I might also add that it has the advantage of giving to the local farmer guide, a little ready money at a time when it is likely to be of very great use to him.

*By Senator Perley :*

Q. How long after does he get the money ?—A. As soon as the service is completed, immediately he returns from the trip. I might say that money to pay expenses of this kind is placed at the disposal of the agent from month to month according to an estimate he furnishes. He accounts from month to month for the money placed at his disposal, and sends forward an estimate of the money he will require for the following month.

In what I have said above I have dealt almost exclusively with European immigration. We are also carrying on operations in the United States which are productive of excellent results, and which could be extended with great advantage if we had the money to do it. We have three salaried officers, namely, Captain Holmes who is our chief agent in the United States and who goes about wherever useful work can be done ; Mr. P. F. Daly who manages our Immigration Bureau at Chicago ; and Mr. C. O. Swanson who works among the Scandinavians, principally in the New England states. In addition to those we have one temporary agent on salary working in Michigan, and we have some sixty commission agents who are paid by results.

Ever since the enforcement of a strict quarantine against cattle from the United States, we have been at the expense, jointly with the Department of Agriculture, of caring for any cattle brought across the line by settlers during the quarantine period of ninety days. The share of the expenses in this relation which had to be paid out of the immigration appropriation each year since the arrangement was effected, and the payments for veterinary inspection, have been as follows :—

## EXPENDITURE FOR CATTLE QUARANTINE.

Season 1893.....	\$ 5,089 95
“ 1894.....	1,750 80
“ 1895.....	3,627 65
	<hr/>
	\$ 10,468 40

## VETERINARY INSPECTORS' FEES.

1892-93.....	\$ 991 06
1893-94.....	1,964 07
1894-95.....	2,976 15
1895-96, (9 months to date).....	1,185 85
	<hr/>
	\$ 7,117 13

*By Senator Perley :*

Q. Does that go to the North-west Mounted Police veterinaries?—A. No, to local veterinaries; none of it goes to police veterinaries. All we do is to recoup the mounted police appropriation for what extra service we call upon them to do. That is, of course, it costs a good deal more to keep men at out of the way places like St. Mary's River and the other places where we have the quarantine stations, and we simply recoup the mounted police for the cost of maintaining these men and the outfit.

In giving details of our arrangements for the reception and care of immigrants, I ought to have added that if within one year after their arrival they fall ill and are unable to pay for themselves, we pay for their maintenance and medical treatment in the hospitals in Manitoba and the Territories. I may also mention that an outbreak of small-pox amongst immigrants a couple of years ago, led to a very heavy expense, and to the necessity of establishing a preventive hospital in the neighbourhood of Port Arthur, the cost of which we are to share with the Provincial Government of Ontario and the Canadian Pacific Railway.

What I wish particularly, however, to impress upon the Committee is that all the services which I have endeavoured to outline above have had to be met this year out of an appropriation of \$130,000, and, as I have already indicated, the extent of the field which we are attempting to occupy must be seriously curtailed if the appropriation is not restored to its former figure, at least.

## IMMIGRATION LITERATURE AND AGENCIES.

*By the Chairman :*

Q. Have you any copies of the pamphlets that you distributed?—A. Yes. I have a complete set of them here.

Q. Printed in the different languages?—A. Yes, there are pamphlets in French, German, the Scandinavian languages and English. There are quite a number of them, as you will see.

Q. Have there been any new pamphlets brought out of late?—A. We are always getting out new material. There are some standard publications like the "Handbook of Canada," which we try to freshen up every year. We get the provincial authorities to revise and rewrite the paragraphs respecting the advantages they offer to immigrants, and we add to and change portions ourselves from time to time, taking away the materials that have become stale or may not be very appropriate.

Q. You did not give us the result of the operations of late years—the number of immigrants who have been brought to the country?—A. No, I have not. I dealt with that subject very fully, as the Committee may remember, in my annual report some

## Agriculture and Colonization.

years ago, and in the course of my report on that occasion, I stated that I did not think it was possible to keep any account of the people who are going and coming, especially as between Canada and the United States. The length of the boundary line is so enormous and the facilities for crossing so great; there is such a continuous going and coming, that it would be, in my opinion, as reasonable to try to count the sands of the sea as to keep an account of the emigration from Canada to the United States or from the United States to Canada.

Q. You are getting a lot of immigrants from European countries. Have you any idea of them?—A. Yes, we have complete statistics in regard to them. We get the steamboat manifests, which always certify as to numbers, ages, sexes, destination, &c., of immigrants, as the Emigration Act requires.

Q. Have you a memorandum of that with you?—A. No, nothing in addition to what I had in the annual report. Up to the end of last season, in fact up to the beginning of January—that is to say three months ago—a complete statement is contained in the annual report, and there is really nothing of importance to be added since then. The spring immigration is just commencing, but during the months of January, February and March, very few people arrive in the country. I can easily add to this statement the statistics contained in the annual report.

Q. I think it would be desirable to have the statistics added, because we have always done so, and it seems to me it would make your statement more complete?—A. Very well, it will be very easy to do that.

Q. I think you said you had no permanent office open in Ireland now. Was the agent removed from there?—A. No; he resigned at the close of last summer.

Q. No other has been appointed?—A. No other has been appointed yet.

Q. You had two agents, you said, in Scotland?—A. We have two temporary agents. We have also a permanent office in Glasgow, the point of the departure of the steamers from Scotland. The business of the agent there, of course, like the business of the agent at Liverpool, is largely seeing and answering the inquiries of people who are about to leave the country, more than directly promoting emigration.

Q. Well, you have, besides, two permanent working agents, have you not, one in the south and one in the north?—A. Yes.

Q. How many have you in England?—A. Only one in England of that description.

Q. Where is he located?—A. At Birmingham. As I explained in the course of this statement, the south of England is largely taken care of in that way by the High Commissioner's office.

Q. And have you a permanent agent in France?—A. We have Mr. Bodard, but you could hardly call him a permanent agent. He has been sent to France on a temporary engagement, but if his work turns out satisfactory, no doubt he will be continued.

Q. Have you any agent in Germany?—A. They won't allow us to have any agent in Germany.

Q. The Government regulations will not permit it?—A. No.

Q. I think you said that in Norway and Sweden there is no objection?—A. Well, I think not. We have been corresponding with the High Commissioner in that relation. I have no doubt that if the Government of Canada were to ask to have an agent appointed in one or all of the Scandinavian countries, the request would be complied with. It seems to be questionable, however, how much an agent could do if he were appointed. I do not know what they would let him do. They certainly do not allow the steamboat agents to do much to influence emigration. They put them under heavy bonds to simply confine their operations to the selling of tickets, without giving any information or advice except what the people who are buying the tickets may ask for.

### JUVENILE IMMIGRATION.

Q. Have you had any representations from the authorities throughout the country with regard to the Barnardo Home boys; I have read a good deal in the press about it?—A. Yes, thinking that perhaps that question might come up this morning, I

brought with me a series of papers regarding juvenile emigration generally, consisting, first of all, of a circular which we sent out to the children's homes asking for information. I suppose it would be hardly worth while reading to the Committee a list of the people to whom we sent it, but they consist of all in Canada who are maintaining homes for emigrant children when they arrive here, such for instance as Miss Rye, Dr. Barnardo's Home, the Quarrier Home at Brockville, and so on. The circular asked them to answer the following questions:—

“On what terms are children from your home placed out and are those terms set forth in any duly signed documents?” “What measures do you take to ascertain that the applicants for children are able to sustain the responsibility?” “Do you keep in communication with the children until they attain some particular age?” “Do you make inspection of the children after they have been placed?” “Do you keep records of the children?” “Are you placed in possession of any of the past history of a child before it has reached Canada?” “If you learn that a child is ill-treated, what action do you take?” “If the employer makes complaint against a child what action do you take?”

I might read as a specimen the answers sent by one gentleman, the Rev. Lord Archibald Douglas, who is acting for the Salford Protection Society, an English Roman Catholic Association. I take his case because it happens to be the one immediately before me. To the first question he says: “That young children are placed out for board, lodging, schooling and clothing. With regard to older children, they are placed out for some agreed wage.” In regard to the second question; that is to say, as to the measures they take to ascertain that the applicants for children are able to sustain the responsibility, they do not actually demand any signed documents, but he says: “We are going to draw for the guidance of those to whom we give the children a memorandum of the conditions on which they must receive them and upon which they will be left to them.” The next question asked is, “Do you keep in communication with the children?” The answer is, “Yes, we make a special effort until they are 16, but we are always glad to correspond with them as long as they themselves may desire. We are only dealing with boys. If we brought out any girls, we would do so for several more years. We keep records of the children and know all about their history. We have them trained in our orphanages and, before they are received there, their cases are thoroughly gone into. The next question is, “If you learn that a child is ill-treated, what action do you take?” The answer is, “We remove the child and replace it.” Then the next question is, “If an employer makes a complaint against a child, what action do you take?” The answer is, “We should take back the child and replace it elsewhere.”

We have answers to the same series of questions from all the different bodies and organizations sending juvenile immigrants to Canada. They are of much the same tenor, but, if anything, more satisfactory than those I have just read.

*By the Chairman:*

Q. What assistance does the Government give to these associations?—A. They pay a bonus of \$2 per head of the children, which is about equivalent to the cost on the other side of the Atlantic of the certificate of medical examination, which they are required to produce.

Q. Have you any record of the numbers that were brought to Canada during the last year or in recent years?—A. Yes, that is all contained in the Annual Report. I will add the figures to the statement I have submitted, as already arranged.

#### AN IMPERIAL STATE PAPER.

I might explain to the Committee that at the request of the Imperial Government the Minister, Mr. Daly, prepared, during the last year, a memorandum of the advantages which Canada offers to agricultural immigrants. This memorandum was made an Imperial state paper, and printed for the information of the British Parliament. The Imperial Government has also asked us to forward reports regarding the crops of the

## Agriculture and Colonization.

several provinces, and we are in communication with the local governments with a view to getting that information. This is all part of a new policy adopted by the Imperial authorities with reference to the colonies.

Q. There has been a conference in Winnipeg, lately, on the subject of immigration. What relation had it to your Department, or had it any connection?—A. It had no connection with our Department; it was purely voluntary.

Q. Was it started by the Provincial Government?—A. No; by private individuals, following the same lines of a movement made by the people of Minnesota, who had an immigration conference in St. Paul, during the past winter. The object of the conference was largely to enlist the active co-operation of private individuals with the Government in the work of immigration.

*By Senator Perley:*

Q. They have made application for a certain sum of money to be placed at their disposal?—A. I do not think they have specified a certain sum of money. They have asked for assistance, but have not specified how much they want nor how they propose to apply it. As far as I am able to understand, they had no definite plan of operations formed when they were here.

Having examined the preceding transcript of my evidence, I find it correct.

A. M. BURGESS,  
*Deputy Minister of the Interior.*

### APPENDIX TO MR. BURGESS'S EVIDENCE.

*By order of the Committee, vide p. 216, 223.*

#### IMMIGRANT ARRIVALS IN CANADA.

I make the following extracts from my Annual Report to the Minister of the Interior for 1895:—

The number of people arriving in Canada by way of Halifax and Quebec during the past six years, and declaring their intention to settle in the country, was as follows:—

1890	24,409
1891	26,894
1892	27,810
1893	29,455
1894	20,680
1895	18,617

There was a falling off for 1895 of 2,000 as compared with 1894. The percentage of decrease, however, was far greater during the early part of the season than it was later on, which I think may be taken as a somewhat hopeful sign. The High Commissioner, in dealing with the subject, while admitting that he does not for a moment intend to infer that the movement from Great Britain to Canada is as large as he would like to see it, maintains that we have had a very fair share of the *bona fide* emigration, the settlers being of a good class. The difficulties in the way of obtaining tenant farmers are fully and well described in the High Commissioner's report, and I am convinced that all that can be done at present is to maintain the interest in Canada which has been created and to keep in touch with the agricultural community—the means taken to this end being, in my opinion, well conceived and well carried out.

While there has been a slight falling off in the immigration to Canada, the statistics go to show that the steamship passenger business between Europe and the United States has experienced a distinct revival. The report of the Bureau of Statistics of the United States Treasury, issued in November, 1895, gives the following as the total immigrant arrivals in the United States for the periods mentioned :—

1st July, 1892, to 30th June, 1893.....	497,656
“ 1893 “ 1894.....	311,605
“ 1894 “ 1895.....	276,136
“ 1895, to 30th Nov., 1895.....	147,980

The first eleven months of the year 1895 show a decided improvement, however, which the figures quoted do not indicate, having reference, as they do, to the fiscal period. But the High Commissioner and our European agents are unanimous in the conclusion that the increase in arrivals from Europe at United States ports is no indication of a revival of *bona fide* emigration. It is explained that the low steamship rates prevailing during last season induced a large number of workers in the United States to visit the Old Country, the return fare being about £4, and now that there are indications of increased business activity and these people are returning, their numbers go to swell the reported immigrant arrivals.

#### STEAMSHIP RATES.

The steamship rates from European ports to points on the continent of America generally were very much lower during the past season than they have been for many years, but the companies have recently come to an understanding on this subject, and have not only restored the rates to the standard of the last few years but have considerably increased them, the advance being altogether about \$15 per ticket. What the effect of this on the emigration of next year may be it is hard to determine. The High Commissioner and our European agents do not anticipate that it will be harmful; but the railway authorities on this continent seem to take the other view, and in correspondence which has taken place with them, have expressed the fear that the increase in the rate will go a long way to counterbalance the good effect which we had hoped would be produced by the plentiful crops of the past season. It is of importance to note that under the new arrangement a slight discrimination in favour of Canada has been agreed upon. The High Commissioner, with the best means at his disposal of coming to an accurate conclusion, takes a hopeful view of the situation, remarking that trade is reviving in Great Britain, which is always in favour of increased emigration.

#### FARM PUPIL BUSINESS.

I think it important to quote verbatim, for the purpose of emphasizing, if possible, the following observations of the High Commissioner :—

“The farm pupil business still continues to flourish, I am sorry to say, notwithstanding all our efforts to put a stop to it. Within the last year, one or two associations have been particularly active, but several cases have come under my notice in which difficulties have occurred owing to the promises made to the young men not having been carried out. Innumerable warnings have been issued in the press, and that, of course, is the only means by which the matter can be kept before the public. I am now arranging to again call attention to the matter.”

#### IMMIGRATION APPROPRIATION.

The High Commissioner concludes his report with a paragraph which I also think it important to quote in full :—

“I have only to assure you in conclusion that I take the keenest possible interest in the promotion of emigration to Canada, and that I shall continue to do all that I can in that direction. I have no hesitation in saying that I regard the filling up of the

## Agriculture and Colonization.

vacant lands in Manitoba and the North-west Territories, as well as in the other provinces of Canada, as one of the most important matters—if not the most important—that can engage the attention of the Government of which you are a member. You know we have been handicapped considerably for some time past in regard to the smallness of the funds that are available for emigration purposes. I do hope the Government will be able to induce Parliament to put aside annually a much larger sum for immigration work, and that an even larger proportion of it than usual may be placed at my disposal, for it is in this country and on the continent that expenditure is needed. If we ever expect to get a large emigration we must keep Canada continually before the world, and especially before those sections of the population which we desire to reach.”

### THE REPATRIATION MOVEMENT.

The secretary of the Repatriation Society at Montreal, which receives an annual subvention from the department, reports that 1,850 people registered their names at his office during the eleven months from January to November, inclusive; that more than a dozen special excursions were organized by the society to take these people out to regions in the province of Quebec suitable for colonization; and that most of the people referred to have actually become settlers in the districts thus visited. The society is doing a two-fold work in diverting intending emigrants from their purpose by showing them the available places for settlement near home and in their own country, and by inducing as many as possible of those who have already emigrated to the States to come back to Canada.

The Reverend Father Morin is as usual doing good work in connection with this movement and makes an interesting report. He states that fifteen families came in from Kansas and twelve from Minnesota, altogether one hundred and forty-four souls, as the result of a journey he made last winter to the United States, and in addition to this, thirty families have joined his colony from other portions of the United States and eastern Canada. Father Morin gave eighteen lectures in the States last winter, besides visiting a great many people in their homes.

### IMMIGRANT ARRIVALS.

The whole number of arrivals of the immigrant class at the ports of Quebec, Halifax and Montreal during the first ten months of the present year, was 23,363, as compared with 25,653 for the corresponding period of last year, or a decrease of 2,290. Of the persons coming into the country between the 1st of January and the 31st of October last, 17,231 declared their intention of becoming residents of the Dominion of Canada; 18,923 during the same period of 1894 made this declaration. The persons who signified their intention of making their homes in Manitoba, the North-west Territories and British Columbia, numbered this year, for the period of ten months mentioned, 4,901, which is a decrease of 1,749 as compared with the corresponding period of 1894. As has been explained in previous reports, the immigration agents at the ports of landing count the number of persons arriving by the ocean steamers, and obtain from each a declaration as to whether he intends to remain permanently in the country or not, and the province in which he proposes to reside. No attempt is made to keep trace of immigrants arriving from the United States, except in so far as they become settlers on homestead lands.

## NATIONALITIES OF HOMESTEAD SETTLERS.

I submit a statement showing the nationalities of the settlers taking up homesteads during the first ten months of 1895, as compared with the corresponding period of the previous year.

Nationalities.	1894.		1895.	
	No. of Entries first 10 months.		No. of Entries first 10 months.	
Canadians from Ontario.....	446		312	
do do Quebec.....	59		54	
do do Nova Scotia.....	17		15	
do do New Brunswick.....	8		—	
do do Prince Edward Island.....	10		2	
do do British Columbia.....	23		14	
do do Manitoba.....	81		107	
do do North-west Territories.....	64		23	
		708		527
Persons who had previous entry.....		386		382
Canadians returned from the States.....		185		97
United States.....		514		432
Newfoundland.....		1		1
New Zealand.....		1		1
Australians.....		1		2
English.....		296		261
Irish.....		18		23
Scotch.....		64		76
French.....		99		81
Belgians.....		26		15
Italians.....		—		2
Austro-Hungarians.....		74		46
Germans.....		78		44
Hollanders.....		2		2
Danes, other than Icelanders.....		10		7
Icelanders.....		27		15
Swedo-Norwegians.....		53		20
Russians, other than Mennonites and Poles.....		136		67
Mennonites.....		3		4
Poles.....		1		9
		2,683		2,114
Number of souls.....		8,244		6,147

## Agriculture and Colonization.

Underneath will be found a statement giving the number of entries made, respectively, during the calendar years 1893 and 1894, and the first ten months of 1895, by persons coming from the various states and territories of the American Union. In examining the figures for the present year it must be borne in mind that they relate to the first ten months only.

States.	1893.		1894.		First 10 months of '95.	
	Number of Entries.	Number of Souls.	Number of Entries.	Number of Souls.	Number of Entries.	Number of Souls.
Arkansas	1	1				
California	7	22	14	32	4	8
Colorado	8	22	3	3	1	2
Connecticut	3	3	2	4	1	1
Dakota	120	340	121	378	74	263
Florida			1	4		
Idaho	27	83	22	55	33	127
Illinois	10	22	12	44	4	9
Indiana	2	4	1	1	2	13
Iowa	4	9	13	36	12	41
Kansas	12	37	43	146	52	172
Kentucky			1	1	3	5
Maine	3	6	3	9	2	15
Massachusetts	9	45	23	82	4	9
Michigan	93	296	61	175	23	90
Minnesota	87	266	209	650	102	377
Missouri	6	6			2	2
Montana	20	52	18	51	4	7
Nebraska	139	423	78	260	46	153
Nevada	1	1				
New Hampshire	5	10	6	32	1	4
New Jersey	7	19	6	18		
New York	24	57	25	77	11	45
Ohio	4	18	7	17	6	13
Oklahoma					1	1
Oregon	30	92	22	46	19	80
Pennsylvania			10	27	6	16
Rhode Island	1	5	4	10		
Tennessee					1	4
Texas	2	5	1	1	2	5
Utah	50	137	15	56	26	101
Vermont	6	15			5	11
Washington	105	254	105	294	63	165
Wisconsin	29	101	18	52	12	39
Wyoming	3	9	1	5	7	44
State not given			5	22		
	818	2,360	850	2,588	529	1,822

The following is the statement of expenditure extracted from the Departmental accounts :—

## CANADIAN AGENCIES.

	\$ cts.		\$ cts.
Brandon.....	724 80	Prince Albert.....	119 40
Calgary.....	3,263 85	Quebec.....	11,067 90
Duck Lake.....	28 14	Red Deer.....	423 15
Edmonton.....	1,513 79	Regina.....	931 90
Estevan.....	203 50	St. John.....	957 48
Halifax.....	4,841 42	Wetaskiwin.....	625 20
Kamloops.....	182 25	Whitewood.....	188 40
Minnedosa.....	5 00	Winnipeg.....	7,232 39
Montreal.....	4,392 49	Supplies for Moravian settlement, South Edmonton.....	300 00
New Westminster.....	151 65	Yorkton.....	26 25
North Bay.....	1,388 25		<hr/>
Ottawa.....	1,420 29		41,295 50
Port Arthur.....	1,308 00		

## EUROPEAN AGENCIES.

	\$ cts.		\$ cts.
Birmingham.....	1,709 89	London.....	1,992 46
Bristol.....	1,100 76	Paris.....	1,719 05
Dublin.....	2,063 28	Miscellaneous expenditure, Great Bri- tain.....	1,846 39
Dundee.....	1,716 86		<hr/>
Glasgow.....	3,201 87		23,865 19
Inverness.....	1,659 13		
Liverpool.....	7,855 50		

## GENERAL EXPENDITURE, INCLUDING SERVICE IN UNITED STATES.

Grants, services and travel.....	\$ 20,866 79
Bonuses.....	9,521 60
Veterinary inspection fees.....	2,777 75
General expenses.....	83,708 39
Printing, advertising, &c.....	13,653 75

A. M. BURGESS,

*Deputy Minister of the Interior.*

# Agriculture and Colonization.

## RECOMMENDATIONS BY THE COMMITTEE.

The following resolutions were adopted by the Committee as recommendations for the promotion of the agricultural interests referred to in each :—

### No. 1.—EXPORT OF CHILLED MEATS.

Moved by Mr. Roome, seconded by Mr. Macdonald, (King's),—“That this Committee recommend the Government to take such steps as are necessary to carry out the plan that has been laid before the Committee by Mr. Jas. W. Robertson, Agricultural and Dairy Commissioner, to establish a trade in dead meat between Canada and Great Britain, so as to place Canadian meats on the British market as “The products of Canada.”—*Adopted.*

### No. 2.—SPECIAL ISSUE OF EVIDENCE.

Moved by Mr. Wilson, seconded by Mr. Cargill,—“That this Committee recommend the printing of one hundred and fifty thousand—150,000—copies of the evidence of Mr. Jas. W. Robertson, before the Committee on the 20th and 21st of February, instant, for distribution during the present session of Parliament.”—*Adopted.*

Committee Room 46, 21st February, 1896.

It was ordered by the Committee that the last preceding resolutions, (1 and 2), be made the subject of immediate report to the House.

### No. 3.—A GENERAL SYSTEM OF COLD STORAGE.

Moved by Mr. Carpenter, seconded by Mr. Roome,—“That this Committee realizing the absolute necessity of adopting some system of cold storage for handling the perishable products of the country, so as to secure their being placed in the hands of the consumers, either here, in Canada, or in the outside markets of the world, in the best possible condition; and having listened with very much interest to the plan just now outlined by Mr. William Johnson of Montreal, representing “The Dominion Cold Storage Company,”—RESOLVED that we would hereby recommend that the Government give this matter their careful consideration.”—*Adopted.*

Committee Room 46, 25th March, 1896.

### 4.—COMPLIMENTARY VOTE TO THE CHAIRMAN.

Moved by Mr. Cameron, seconded by Mr. McMillan,—“That this Committee hereby tender their cordial thanks to Mr. Sproule, for the energy with which he has conducted the business of the Committee and for his impartial fairness in discharging the duties of the Chair.”—*Adopted.*

## INTERIM REPORTS.

## FIRST REPORT.

FRIDAY, 7th February, 1896.

Mr. Sproule, from the Select Standing Committee on Agriculture and Colonization, presented the First Report of the said Committee, which is as follows :—

The Committee recommend that the House authorize them to employ a short-hand writer to take down such evidence as the Committee may deem proper.

## SECOND REPORT.

FRIDAY, 21st February, 1896.

Mr. Sproule, from the Select Standing Committee on Agriculture and Colonization, presented the Second Report of the said Committee, which is as follows :—

The Committee recommend that the House adopt such measures as may be found necessary to carry out, on the lines indicated by Mr. J. W. Robertson, Dominion Agricultural and Dairy Commissioner, before the Committee, the establishment of an export trade in chilled meats from Canada to Great Britain, so as to place Canadian meats upon the British markets, as “the produce of Canada.”

The Committee recommend also, that the House authorize the printing of one hundred and fifty thousand (150,000) copies for distribution, of the Dominion Agricultural and Dairy Commissioner's evidence before the Committee on the 20th and 21st of the current month.