REPORT OF THE SCOTTISH COMMISSION ON AGRICULTURE TO CANADA

1908

Topley, Photo MEMBERS OF THE COMMISSION AT OTTAWA

[redacted]e Compliments of the Scottish Agricultural

Commission to Canada,

secretary.

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SCOTTISH COMMISSION ON AGRICULTURE

TO

CANADA

1908

WITH NUMEROUS ILLUSTRATIONS

EDINBURGH AND LONDON
WILLIAM BLACKWOOD & SONS
1909

DOMINION PARLIAMENT BUILDINGS, OTTAWA

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R. Patrick Wright, F.R.S.E., Principal, West of Scotland Agricultural College, Glasgow.

THE COMMISSION AT WORK, OTTAWA EXPERIMENTAL FARM

TABLE OF CONTENTS

NIAGARA FALLS

INTRODUCTION

A FEW words may be requisite to explain the origin of the Commission which is responsible for the following Report. In 1904, Mr John Sinclair (then Member of Parliament for Forfarshire, now Lord Pentland and Secretary for Scotland), formed the project of sending a number of his farmer constituents to Denmark for the purpose of studying the causes of the remarkable agricultural success achieved by that small European State. The project grew in Mr Sinclair's hands until what was first intended to be a county representation of farmers, became a fair representation of the whole of Scotland. The results of the visit were published in a Report which has enjoyed a wide circulation, and, we are encouraged to believe, has spread much useful knowledge regarding the application of the co-operative principle to the working-up and marketing of agricultural produce.

Two years later, 1906, Mr Sinclair was good enough to enlist the interest of the Irish agricultural authorities in the work done by the Commission to Denmark. A party to visit Ireland was formed, including the majority of the original members with considerable additions. This Irish visit was immensely facilitated by Sir Horace Plunkett and the staff of the Irish Agricultural Organisation Society, with the result that the observations of the Commission covered practically the whole area of work so wisely and profitably directed towards the revival of Irish agriculture. The Report subsequently published had a cordial welcome from the press and public.[1]

The project of a visit to Canada, also fostered by Mr Sinclair, was more exacting than either of these. It demanded not less than two months' absence from Scotland. In Canada the region to be traversed was of a vastness outside European measurements, the variety of conditions great. On the map Canada is a confederation of States stretching from the Atlantic to the Pacific and forming a political unity. Under the farmer's eye the unity disappears: the visitor passes from mixed farming to fruit culture, from fruit culture to dairying, from dairying to wheat growing, and back again. New experiences crowd upon him as he leaves fair Prince Edward Island, with its trim fields and pleasant homesteads, for the rich dyke-lands and golden orchard valleys of Nova Scotia; or, as he enters New Brunswick, with its busy port of St John, its magnificent water highway and its capital of Fredericton reminiscent of the Georgian era; or, as he journeys through the alternating arable and timber lands of New Brunswick to the cheese and butter-making districts of Quebec; or, as he moves from Quebec to the

[1] "Farming in Ireland." Wm. Blackwood & Sons. 6d.

peach farms and vineyards of Lower Ontario—thence to leap, as it were, over a thousand miles of scrub, to the great prairie, and after traversing the seemingly endless levels of yellow wheat to emerge from the gorges of the Rockies and the Selkirks into a new world on the Pacific slope. Follows from this diversity of natural feature a diversity of soil, rainfall and temperature, and a corresponding diversity of methods of cultivation; follows also a difficulty which the succeeding pages doubtless reflect—difficulty of dealing adequately with the subject in a Report that aims at being more than a traveller's rapid narrative and less than a cyclopaedia. Regretfully we have been obliged to pass lightly over many places and features worthy of fuller treatment because to pass otherwise than lightly was not to pass at all. Canada from the agriculturist's point of view supplies matter for a dozen reports. It is a chain of differing territories and differing conditions within a single nation.

The scope of the tour rendered memorable an experience that on a more limited plan would still have been singularly interesting and valuable. It is, we believe, the fact that no previous body of visitors from Scotland has had an equal opportunity of becoming acquainted with all the provinces of Canada, particularly with the very attractive Maritime Provinces. For this comprehensive scheme of visitation the members of the Commission must confess themselves deeply indebted to the Honourable Frank Oliver, Minister of the Interior, who added to our obligation for the excellent arrangements made at his instance that of many personal courtesies. We retain a grateful sense of journeys in which forethought for our wishes and our comfort was evident at every step.

But to make fitting acknowledgment of the welcome accorded us at every resting point in Canada is impossible. This page would be congested with names if we were to mention a tithe of those to whom we owe thanks. In every province Ministers, and Members of Parliament, Dominion or State, were assiduous in furthering our desires to obtain the maximum of information in the minimum of time. All along the route the Mayors, the Town Councillors, the Presidents of Boards of Trade and other leading citizens were waiting with hospitable intent. Canadians have the art of making Scotchmen feel that the further they are from home the nearer they are to their kindred.

Of the assistance lent us by the official representatives of agriculture we cannot speak too highly, members of the staffs being deputed to travel with us that facts might be readily available. It may not be improper here to say that we were much impressed by the ability and earnestness shown by the departmental officers in the work of organising and bringing science to bear on Canadian agriculture.

To Dr Saunders, and the superintendents of the various Experimental Farms, our indebtedness is great; at Ottawa, Brandon, Indian Head, Lacombe and Agassiz we had interesting days. To the Principals of the Agricultural Colleges which so notably distinguish Canada—to Principal Creelman at Guelph, to Principal Robertson

at St Anne de Bellevue, to Principal Cumming at Truro, and others, as well as to the accomplished members of their staffs, we are under heavy obligations.

The Honourable Sydney Fisher, Dominion Minister of Agriculture, not only entertained us at his beautiful home farm at Knowlton in Quebec, and smoothed our way with an unfailing considerateness that has left an abiding sense of gratitude, but also put at our service, throughout considerable portions of the tour, Mr J. A. Ruddick, the Dairy and Cold Storage Commissioner, and Mr G. H. Clark, the Seed Commissioner, whose stores of knowledge were opened to us with a fullness and a courtesy beyond all acknowledgment.

From the time of our arrival at Rimouski to our departure from Quebec, we had the unsparing attention of Mr Blake Robertson. The members of the Commission desire to place on record their consciousness of his anxious care for their comfort and convenience, and their indebtedness to his wide familiarity with the Dominion.

It remains to say, that by the kindness of the expert officers in Ottawa, the large body of facts and statistics in the Report has been checked and brought up to date.

SUNSET ON LAKE SUPERIOR

CANADA

Canada is an immense country, something similar in size to the Continent of Europe. It contains 3,745,574 square miles, and extends from the Atlantic seaboard to the Pacific coast, and from the international boundary line on the south to the Arctic Sea in the far North. Its chief industry is agriculture, based on a system of occupying ownership. Agriculture employs more people than all other Canadian industries combined, and the value of agricultural produce is greater than the value of the aggregate of all other products. The agricultural belt from which Canada thus reaps her greatest harvest crosses the country in a track 3500 miles long and several hundred miles broad, and it divides itself into well marked out areas.

1. Maritime Provinces

Maritime Canada consists of Prince Edward Island, Nova Scotia, and New Brunswick. Prince Edward Island has a population of 103,259, and a superficial area of 2184 square miles. Of this, 503,579 acres are under agricultural crops, 6077 acres under orchards and gardens, and 284,741 acres under pasture. The chief products of the Island are—hay, oats, wheat, and potatoes. Dairy products are now coming to the front and will bulk largely in the agricultural returns of the future. Nova Scotia is less densely populated and much greater in extent. It has a population of 459,574, and a superficial area of 21,428 square miles, about one-third of which is in forest. There are 883,472 acres under ordinary agricultural crops, 54,051 acres in orchards and gardens, and 1,135,246 acres in pasture. The main crops are—hay, oats, wheat, turnips, potatoes, and fruit. New Brunswick is more sparsely populated, but it is much more extensive than either of the other two provinces. The population is 331,120, and the area 28,000 square miles. Of this, 1,087,626 acres are in agricultural crops, 16,290 acres in orchards and gardens, and 689,681 acres in pasture. Hay, oats, potatoes, and buckwheat predominate. Dairying and fruit-growing are promising to develop. In all three provinces a limited trade is carried on in draught horses, cattle, sheep, and pigs. Mining in Nova Scotia and lumbering in New Brunswick are important industries.

2. Quebec and Ontario

Quebec and Ontario are the original Canada. The former has a population of 1,648,898, and an area of 341,756 square miles, more than half of which is forest and woodland. There are

5,250,405 acres devoted to a variety of agricultural crops, and there are 2,782,537 acres under hay. Horses, cattle, pigs, and poultry are being kept in increasing numbers. The dairy trade of the province is a great trade, keeping in operation no less than 2806 factories. Ontario, the most populous and the most advanced in some respects of all the provinces from an agricultural point of view, has a population of 2,182,947, and a superficial land area of 220,508 square miles, over 100,000 of which are in woodland. The agricultural acreage is disposed of thus :—9,764,724 acres under agricultural crops, 326,290 acres in orchards and gardens, and 5,248,180 acres in pasture. The main agricultural crops are—hay, oats, wheat, barley, peas, potatoes, turnips, and Indian corn. Fruit is a source of much revenue, and the dairy trade, which operates 1284 factories, is one of the most profitable branches of agriculture in the province.

3. North-west Provinces

The North-west Provinces are Manitoba, Saskatchewan, and Alberta. They contain a population of 808,863, and their total area is 577,921 square miles. The southern part of the provinces embraces the whole of the prairie region, which extends to 200,000 square miles, and runs nearly 900 miles east and west, and from 100 to 400 miles north and south. Needless to say, the great crop of the North-west Provinces is wheat. In 1908, 5,624,000 acres were under wheat, and the return was 91,853,000 bushels. But the area under oats and barley, particularly in the older settled parts of the provinces, is also extensive. According to the 1908 figures there were 2,772,300 acres in oats which yielded 96,718,000 bushels, and 873,300 acres in barley which yielded 22,926,000 bushels.

4. British Columbia

British Columbia is the greatest in size and the most mountainous of all the provinces. It runs 760 miles from north to south, and 470 miles from east to west. It contains 236,922,177 acres of land, of which only 10,000,000 are arable. It is estimated that fully ten per cent. of the remainder is suitable for cattle ranching and fruit-farming. All kinds of crops are grown, but the backbone of agriculture is dairying, particularly in the rich delta lands, and fruit-growing among the mountains of the interior.

Such is the country which on 7th August 1908 we sailed from Liverpool to explore.

THE HON. FRANK OLIVER (MINISTER OF THE INTERIOR)

THE WANDERINGS OF THE COMMISSION

Rapid Jottings en Route

We arrived at Rimouski, Quebec, in the afternoon of 13th August 1908. We were met by Mr Blake Robertson of the Immigration Department, who had been delegated to take charge of the arrangements during our trip through Canada; by Mr Clark, Chief of the Seed Division of the Department of Agriculture, who had been appointed by that Department to travel with us during the first part of our journey; and by Mr Condon, a railway official, who was to look after our transportation while travelling on the Intercolonial Railway. The special train, consisting of two carriages, splendidly got up, which the Canadian Government had put at our disposal, and which was to be our home from the Atlantic to the Pacific and back again, was waiting for us at Rimouski. We steamed out of the station about six o'clock at night on our long journey. The country on either side of the line was poor, fit apparently for nothing but the growing of timber. Darkness, however, was upon us before we had got far, and sight-seeing was out of the question. We had entered New Brunswick in the night, and before five o'clock next morning had arrived at Point du Chene, bound for Prince Edward Island, which the Canadian Government had decided should form part of our field of operations.

Prince Edward Island

We were pleased that the smallest and one of the most delightful provinces of the Dominion was to be our starting-point, for it made our investigations more exhaustive than we had anticipated. Leaving Point du Chene at 6.45 A.M., we sailed across Northumberland Strait to Summerside in Prince Edward Island. On our arrival, the Premier, the Minister of Agriculture, and other important personages were waiting for us, and that rare hospitality began which overshadowed us every day and every week of our long and pleasant pilgrimage Many farmers' rigs had been requisitioned, and soon we were experiencing our first ride in Canadian buggies over roads which are the sport of frost and thaw unknown in Scotland, and are as a result indescribable to a Scotsman. After a drive of six miles we reached a butter-and-cheese factory, which, though not entirely, is to some extent run on co-operative lines. The farmers themselves hold shares in it, though not all the shares. They are paid 4d. per gallon for their milk, and they get back the separated

milk or whey. The factory treats the milk for a specified sum, which, after paying the working expenses, represents the shareholders' dividend. The profit goes to the farmers. After lunch, provided by our hosts, we drove to Freetown, where a special train was waiting to take us to Charlottetown, the capital of the island. It was about 4 P.M. when we got there. Quite a number of citizens were awaiting our arrival, and after some preliminary arrangements were made, we set off in different directions—the stock men to see stock ; the dairymen to see dairies ; some went to see general farming ; and some to see fruit. The steadings of the island, so far as we thus had an opportunity of examining them, were not

AL FRESCO LUNCH, PRINCE EDWARD ISLAND

up to date. The stables and the byres were paved with wood. The stalls were somewhat undersized. The cubic space was much below the cubic space in Scotland. But then less cubic space is needed in a country where the thermometer falls to sixteen degrees below zero in winter, and where the cattle are outside mostly in summer. The land was a light loam on red sandstone, such a soil as there is in the Lothians of Scotland. It is to some extent run out. Much, however, might be made of it, especially when you consider that it sells at from £6 to £10 per acre, and that it is in close proximity to the great markets of America, though, in reckoning up its possibilities, the climatic conditions must not be forgotten. Besides, there is unrest in the air, and that to some extent accounts for the existing condition of things. The New England States are attracting the young men of Prince Edward Island just as the towns are attracting the rural population of every country, and the lure of the western prairie is attracting them more

WILLOW TREES AT GRAND PRE

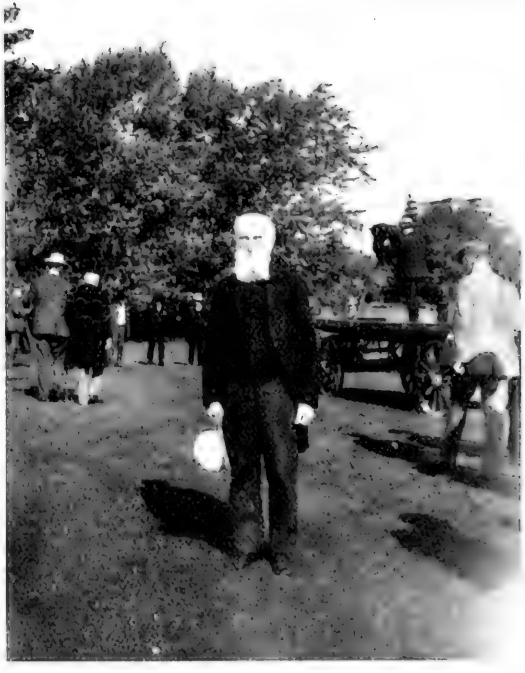
EVANGELINE'S WELL

than the New England States. The week we visited the island 1100 people left for harvesting in the west. Some would not come home again, and not a few of those who came home would not rest satisfied until they returned permanently to the plains.

Nova Scotia

We left Charlottetown at 8.20 on the morning of 15th August for Pictou, Nova Scotia. We had intended at once to join our special train at Pictou and proceed to Truro. The Provincial Government, however, had provided lunch for us in the Wallace Hotel, at which Mr Macgregor, the member for the county of Pictou, represented the Government. The lunch over, a number of representative men accompanied us to New Glasgow, where we saw the great coal mines of Nova Scotia. From New Glasgow we took train to Truro. At the station we were met by Professor Cumming, the Principal of the Agricultural College, who, in thorough business fashion, set about getting the Commission into the carriages that were waiting for them, leaving introductions and everything else for after consideration. In the same systematic business-like way stock and crops were examined. Subsequently we were entertained to dinner by the College authorities, and had an opportunity of discussing what we had seen. At 9 o'clock, accompanied by Prof. Cumming and Mr Pearson, the Member for the District in the Provincial Parliament, we left for Halifax. Next day was Sunday. There was no programme and we spent the day in town. Early on Monday morning we left by special train for the Annapolis Valley, which is really composed of five valleys—the Gaspereau, Avon, Cornwallis, Pereau, and Annapolis. Our first stop was at the town of Windsor. On arriving at the station we were taken to see the dyked-in marsh lands. The tide rises sixty feet in the Bay of Fundy. Sweeping up, it carries much material which settles down as sediment and is left by the returning tide. The old French settlers erected dykes to keep the tide back as the Dutch have done in Holland, but not before many feet of rich soil had been deposited, which without any other fertiliser has gone on bearing heavy crops of hay ever since. Sometimes, when the soil becomes exhausted, at long intervals these dykes are opened and the land is renewed. We actually saw the process going on in the vicinity of Windsor. We were out in the country for something more than an hour. On reaching the station we took train to Grand Pré. Fifteen minutes was not long to explore Evangeline's country, but it was all the time available. We saw at least the site of the old village where Evangeline and her lover lived on the fateful night when the Acadians were taken to the church hard by and thence to the not distant shore to await their deportation to the exile from which they never returned. From Grand Pré one section of the party visited the Hillcrest orchards, and the orchards at Wolfville, Greenwich, Port Williams, Starrs Point, and Church Street, lunching at the Seminary Hotel as the guests of the Mayor of Wolfville and the staff of Acadia University. The rest of the Commissioners left

SIR FREDERICK W. BORDEN, MINISTER OF MILITIA



THE HON. R. W. SCOTT, SECRETARY OF STATE

Grand Pré by special train for Kentville, the headquarters of the Dominion Atlantic Railway. There they divided into two sections. One section went with Sir Frederick W. Borden, Minister of Militia, to visit his orchard and his district. They were entertained by Sir Frederick. The other section visited some farms in the vicinity of Kentville where Mr Dodge, one of the members of the Provincial Legislature, acted as their host. They left Kentville for Berwick at 3 o'clock. Met there by representative farmers they were driven nearly twenty miles through one of the best parts of the valley, passing on the way Aylesford and Auburn. Kingston was reached at 6.30. Here they caught up the other Commissioners who had joined the train at Kentville, and together they made for Middleton, where the train was put into a siding for the night. The following morning a visit was paid to Annapolis, a town of 1000 inhabitants founded by the French in 1605, where as usual we received much kindness. Digby was reached in time to catch the boat which crossed the Bay of Fundy to St John, and thus ended our too brief stay in Nova Scotia.

New Brunswick

New Brunswick is more famous for its timber and its game than for its agriculture. But it has agricultural interests too. Unfortunately the limitations of time prevented us doing justice to them. In the afternoon of our arrival at St John we had only an opportunity of paying a short visit to the New Brunswick Cold Storage Company's premises, and the Falls on the St John river caused by the high tide in the Bay of Fundy. Next day we left for Fredericton, eighty-four miles up the St John River. The Canadian Government, with much wisdom, mixed work with pleasure. No better holiday could be spent than the day we spent on this great Canadian waterway. It is broad and majestic, and the hills on either side are covered with a variety of trees in which the spruce seems to predominate, and every now and again there are hamlets and isolated houses of artistic design, painted in various colours, peeping out from among a profusion of foliage. The hills disappear as you get nearer Fredericton, and the arable land increases. The river in winter overflows its banks and leaves a silt on the land which adds greatly to its fertility, so much so that the farmers grow hay on it year after year without any other fertiliser. In addition to stock-farming, market-gardening and fruit-growing are carried on. In fact, the valley of the St John is the fruit belt of New Brunswick. The produce is taken mostly to St John. The river insures cheap transport. It was about 5 P.M. when we reached Fredericton. City magnates, Provincial and Dominion Parliamentarians, and University men vied with each other to do us honour. We drove, an imposing procession, with a piper in full highland costume leading the way, to the University, which was examined, and from the top of which we had a magnificent view of the town, which stretches nine miles by four, and contains only a population of some 9000 inhabitants. It was not the first pretty Canadian town we

had seen, but perhaps it was the first that convinced us of the wide spaces, and the long avenues overhung with trees, and the lovely lawns, and the artistic houses that characterise the beautiful cities of Canada. Beyond the city, far as the eye can reach, there is forest —spruce, pine, cedar, hemlock—some at least of which seed themselves and grow upon the earth as heather grows upon our highland hills. After leaving the University we went to see some farms, six or seven miles distant. A banquet by the citizens in our honour closed the day's work. Early next morning we left Fredericton by special train for Woodstock. Members of the Provincial Parliament and of the City Council were at the station, and at once we set off in different directions. We found the land to be of varying quality, and some of the farms were getting back to the wilderness

STEAMER ON ST JOHN RIVER

out of which they had been carved. We saw one particularly desolate place. The farmhouse was tenantless; the byres were empty. The call of the west is as irresistible in New Brunswick as elsewhere in Eastern Canada. But here also were prosperous farmers, thriving industries, and the signs of a progressive life.

Quebec

The night of the second day in the Province of New Brunswick saw us making preparations to leave for Quebec. We ran through the State of Maine, reaching Knowlton at 7.30 next morning. At 9 o'clock, the Hon. Sydney Fisher, Minister of Agriculture, made his appearance, and gave us a hearty welcome. Accompanied by Mr Fisher, we drove to Mr Whitman's farm in the vicinity of Knowlton, where we inspected his cattle and examined his byre,

which was, like most Canadian byres, floored with wood and not up to the sanitary requirements of our own country. It had one novelty, a sky railway inside the byre for carrying the food along the main passage and also for carrying out the manure. Leaving Mr Whitman's farm, we drove towards the hill. On our way up we passed much woodland, composed largely of maple trees, from which maple syrup is extracted. On the top we got a very fine

THE HON. SYDNEY FISHER'S COUNTRY RESIDENCE, KNOWLTON

view of the country, a well-wooded country, with Brome Lake in the hollow. Descending the hill the creamery at Knowlton was inspected. It is, if we may put it in that way, like the Prince Edward Island Creamery, already described, a cross between a private and a co-operative creamery. The owner charges the farmers $2\frac{1}{2}$ cents per lb. of butter made. The profits are divided among the farmers according to the quantity and quality of the milk supplied. After a passing visit to the library at Knowlton we proceeded to Alva Farm, the country residence of Mr Fisher. A few hours were spent in congenial company. Mr Fisher had brought to meet us, Judge Lynch, Sir Melbourne Tait, Chief Justice of Quebec, Mr George Foster, Lawyer, Montreal, Dr Fletcher, Botanist, Ottawa (since deceased), Dr Robertson, Principal of Macdonald's College, St Anne de Bellevue,

Mr C. H. Parmelle, M.P., and his own father and brother. After lunch served on the lawn we visited the farm buildings, which are more up to date than anything we had so far seen. Nor were his cattle —Guernseys and French-Canadians —behind the best of their kind which had come within our observation. Towards evening, accompanied by Mr Fisher, we left his railway siding en route for Montreal.

It was intended that the forenoon of next day should be spent in Montreal. This, however, was not possible, for some of the Commissioners. At 9 o'clock, seven of them, along with Mr Fisher, proceeded to a farm, four miles from Montreal. One feature of this farm, which extends to 60 acres, and is rented at 800 dollars, was the melon patch, measuring 1½ acres. On this patch the farmer grew 32,000 melons, which yielded a gross return of something like £2000. A visit was also paid to Messrs Trenholme's dairy in the same district. The byres, which housed 150 cows, were floored with concrete and had an air space of 800 cubic feet per cow. The rest of the Commissioners remained in town, only to be convinced that a forenoon is much too short to explore even the most outstanding features of Canada's greatest city. At 12.15 they left for Macdonald College. Mr Fisher and his party joined them at Montreal Junction. Reaching St Anne de Bellevue, the Commission was met by Dr Robertson and driven to the College. At the outset, the doctor gathered the Commissioners together in a classroom and explained the design of the buildings and the general policy of the College. The different rooms were afterwards inspected and at one o'clock we sat down to lunch as the guests of Dr Robertson. During lunch, we had ample opportunity of obtaining information on all points of interest. Subsequently, we visited the different sections of the farm—the poultry section, the horticultural section, and the live-stock section, and then it was time to go. Accompanied to the station by Dr Robertson and quite a host of professors, we left for Ottawa.

Ontario

We had now reached Ontario, the wealthiest province in the whole Dominion. It was one of the first settled provinces, and agriculture in consequence has reached a comparatively advanced stage in its development. It was meet that much time should be spent in this province if we were to see the best that Canada could show us of her agriculture. We entered the province on Saturday, 22nd August, and we did not leave till 2nd September. Our first day was a Sunday and it was spent in the capital, which gave us an opportunity of hearing one of Canada's famous preachers. In the afternoon we met at our hotel informally, the Hon. Frank Oliver, Minister of the Interior, and the Hon. R. W. Scott, Secretary of State and acting Premier in the absence of Sir Wilfred Laurier. Between times we got a pretty fair idea of Ottawa, one of the beautiful cities of the Dominion. An early start was made on Monday morning in good company, for we had with us some of

Canada's most notable public men. We had Mr Fisher, Mr Oliver, Mr Scott, the Hon. William Paterson, Minister of Customs, and Dr Rutherford, Live Stock Commissioner. Our destination was the chief experimental farm of the Dominion Government, a couple of miles outside Ottawa. We were met on the outskirts of the farm by Dr Fletcher, who was then chief assistant to Dr Saunders, the Director-General of all the Dominon experimental farms. Dr

FARMHOUSE AT GRIMSBY

Fletcher introduced us to the different professors and we proceeded to examine the farm, its crops, and its stock—horses, cattle, pigs, poultry—all admirably housed. After lunch, the work carried on at the farm was explained by Mr Fraser and Dr Fletcher. On returning to Ottawa, we visited large sawmills on the banks of the Ottawa River. From the sawmills we proceeded to our hotel, bade Mr Fisher good-bye, and left Ottawa for Brockville.

Brockville is in the vicinity of the Thousand Islands, and our friends at Brockville were not sure whether we would prefer to see the Islands or the agriculture of the district. Acting on the wise principle, which we never disputed, of business first and pleasure afterwards, they decided to leave the Islands for another time and

show us the country, particularly as it is, if not the centre, at least one of the centres in Ontario of the dairy and cheese trade. We were first taken to a cheese-curing establishment at Brockville Station. It was started by the government for the purpose of demonstrating the advisability of curing cheese in an even temperature of 60 degrees, and in the result gave high satisfaction.

From the cheese-curing establishment, we took train to a cheese factory, owned by a private individual, who charges the farmers from $1\frac{1}{8}$ to $1\frac{1}{4}$ cents per lb. for turning their milk into cheese. The profit is divided among the farmers. It is estimated that half the cheese factories in Ontario are run on this principle and half on a purely co-operative basis. A hurried visit was paid to another factory of the same kind. An examination of farm steadings and stock filled in the remainder of the time at our disposal. Our Canadian friends seemed to have discovered the principle of perpetual motion, and were experimenting with us. At any rate, they were sometimes most anxious to give every flying minute some new sight, some new impression to keep in store. And so we just got back to Brockville in time to start for Belleville. Nor could we do more than rush round a part of the country there in the late afternoon, and dine and talk with politicians and farmers when darkness had made exploration impossible. We should have liked to stay over the highland games on the morrow, which the good people of Belleville believed, we had, among other things, come to see. But it was impossible, not only because we had to be at Guelph next day, but because everything was so arranged that a day's delay upset arrangements weeks ahead. We were at Guelph up to time the following day. Prof. Creelman, the Principal of the Agricultural College, and the visible expression in flesh and blood of business capacity, was there up to time too, and we drove to the College, where we examined the cows—Jerseys, Ayrshires, and Shorthorns, the store and fat cattle—Hereford, Shorthorns, Aberdeen Angus, and Galloways; the horses, Clyesdales and trotting mares with foals. Meanwhile, our poultry expert was among the fowls, and the scientific members were with the horticulturist and Mr Zavitz, Professor of Field Husbandry, asking them many questions about the experimental plots. Luncheon and tea were somehow or other squeezed into the day's work, and it was well on in the afternoon before we left to see a farm some miles out at which Clydesdales were made a specialty. On the way we passed through a good agricultural district, the farms on which averaged 100 acres, and sold at from £12 to £15 per acre. It was night when we finished our inspection of the Clydesdales. But our arrangements permitted us to sleep at Guelph and yet be at Stratford up to time next morning. Our attention there was first directed to a fine herd of Ayrshire cattle belonging to Mr William Ballantyne. From his farm we proceeded to a cheese factory owned by his brother, at Black Creek. While it is owned by him it is co-operative in a way like all the other factories we had visited. Mr Ballantyne charges the farmers $1\frac{3}{4}$ cents for every pound of cheese. He hauls their milk but he returns

no whey. He has refused to do that and his father refused to do it before him. The reason is that he believes the tins, if not properly washed, might be contaminated and would contaminate the milk when next sent. His cheese factory was the best we had yet visited. The utensil used for stirring the cheese in the vats was driven by machinery. The whole place was clean, tidy and up to date, but the floor instead of being of concrete was of wood. Mr Ballantyne feeds hundreds of pigs. His piggeries are wooden buildings, floored with wood, and the pigs have no bedding. They are crosses of the Tamworth, Yorkshire, and Berkshire breeds. They are sent to Montreal and shipped to England.

We now turned the horses' heads to St Mary's. But twenty miles through a good agricultural district intervened. It is both a dairy and a beef-producing district. The farmhouses and steadings are substantial and the roads the best we had seen. Farms extend as a rule to 100 acres, and are rented at from 12s. to 16s. per acre, and land sells at from £16 to £20 per acre. We reached St Mary's about two o'clock, and had almost immediately to start with the St Mary's men to see their district. It is wonderful how much country one can cross with a pair of good horses, not to speak of a motor car, which recognises no speed limit. We did the St Mary's district, and were able to attend a reception given by Dr and Mrs Mathieson before the 5.30 train left for London. In London we were mere birds of passage on our way to Ingersoll, which we reached the morning after we left St Mary's. The local people had as usual made all the necessary arrangements, and we drove to the premises of the St Charles Milk Condensing Company, Limited, which owns one hundred and forty-six factories for condensing milk in the United States and Canada. The Ingersoll Company is supplied with the milk of one hundred and eighty-seven farmers, whose farms are situated within a radius of ten miles of the factory. We were anxious to see the dairying district in the immediate vicinity, which supplied the company with milk. An examination of two farms, one of 200 acres and another of 150 acres, and a more general inspection of the country as a whole convinced us that there were in this district as good farms as we had seen in the province. We did Ingersoll in the forenoon, including, we should have mentioned, the Ingersoll Packing Company's premises which has provision for killing 300 pigs per hour, and reached Woodstock at 12.30. Half an hour later we were driving towards cheese factories similar to those already visited, and farms of different sizes, valued at about £16 per acre. We examined Mr William Donaldson's farm, at which fat cattle are made a specialty, and Messrs Macdonald's farm, where shorthorns are bred. On our way back to town we called at a dairy farm of 100 acres owned by Mr A. J. Davis, an old Guelph student. He keeps twenty-five Holstein cows. Some give from 1000 to 1200 gallons of milk per year. The average he estimated at from 700 to 800 gallons. We got back to Woodstock travel-stained,—who could be anything else motoring over roads with inches of dust on them,—but not too travel-stained apparently to be worthy of a reception—the second held in our honour in two

days—at the house of Mr G. Smith, M.P., where we met many charming Canadians. Mr Smith was born on the farm of Mr Speir at Newton, near Glasgow.

Next day, our field of operation was to be in the Brantford district. Soon after our arrival, motor cars and carriages appeared at the station. The party was divided into sections. One section went to see store and fat cattle, another section to see dairy farms, another to see mixed farms, another to see fruit and vegetable farming. More than one section was able to visit the Bow Park Farm, a farm of 960 acres, three miles from Brantford. It was once the property of the Hon. George Brown, and was the farm to which the first shorthorn cattle were brought from Scotland. On our way

SNAKE FENCE, INGERSOLL

back to the station we had an opportunity of visiting the house where the telephone system was discovered by Professor Bell. In the evening we attended a banquet given by the Mayor, and subsequently a public meeting, where we met two hundred farmers and others from the surrounding district.

We reached Niagara Falls about seven o'clock on Sunday morning. We had ample opportunity of visiting the Falls, both from the Canadian and the American side. The Horse Shoe is the more imposing Fall. Looking over the rounded part of the Shoe from the Canadian side, you have a fine view of the rapids tossing the water into froth as far as the eye can reach. The spray, possibly because of the direction in which the wind was blowing, was coming over on the promenade, and ladies were sheltering themselves behind their umbrellas. Farther along, the road was soaked as it

might have been after a thunderstorm. The picture is one of the mightiest exhibitions of power in nature, but it is marred and defaced. A place which should have been left untouched by man has been turned into sites for factories and workshops, whose chimneys blacken with smoke the heavens above and the earth beneath.

We were early astir the following morning. It was to be a big day in the greatest fruit region of Ontario—the Niagara Peninsula. We explored it from St Catherine's to Hamilton. The first farm visited extended to 75 acres. The owner, a fruit-grower himself, was the son of a fruit-grower, and manages his place well. His farm, though larger than farms are in this district as a rule, was otherwise typical. From an inspection of various farms we turned our atten-

NIAGARA RAPIDS

tion to the fruit stores at the station and then to the wine factory, a mile or two out from the town. It was noon when we got back to the station *en route* for Beamsville. At Beamsville we were met by many farmers and fruit-growers. Mr Smith, the member for the district in the Dominion Parliament, who is a fruit-grower and preserver, was there. We paid a visit to his canning factory, where tomatoes were being canned. From the factory we proceeded by electric car through the district to Hamilton. We made halts at many orchards on the way. We may mention two. They are not typical of the holdings throughout the whole belt, but they are typical of the holdings in the Grimsby district. One is occupied by a Perthshire man, who had no experience of fruit-growing before he came to Ontario two years ago. He bought ten acres planted with fruit trees, mostly peach trees, at 1200 dollars per acre—a great price surely, even when one takes into account the com-

modious house on the ground. The other orchard was owned and occupied by a gentleman who was once a farm student with Dr Gibb. He had been four years in the province, and has fully 60 acres of land. He paid 10,000 dollars for twelve acres, and 200 dollars an acre for the rest. He has built a large house on the ground. We got tea inside and there were thirty of us. That gives some idea of the size of the house. Towards Hamilton the soil is of a gravelly nature and is more suitable for early vegetable growing than for fruit culture, and it is used much for this purpose. We left Hamilton in the evening for Toronto. Next day the municipal authorities of Toronto drove us round the city in motor cars, a city whose streets are so long that they seem to have no beginning and no end. After doing the city we drove to the Toronto Show, which is becoming the great live-stock show of Canada, where we spent the greater part of two days.

It was now 2nd September, and we had been eleven days in Ontario. At 10 P.M. we left for the west. Before morning we had passed the far-famed Muskoka Lakes. By breakfast time we were passing through a desolate country, composed of great boulders of rock, interspersed here and there with scrub. After breakfast, we reached Sudbury on the Canadian Pacific Railway from Montreal to Vancouver. The scenery, however, had not changed save that in some places the trees were larger, an indication that there was less rock and more soil. Now and again the monotony of the picture, seen mile after mile and hour after hour, was relieved by a lake or river or clearing in the forest, where one or more log cabins had been built. One feature of the landscape is miles of long, bare poles, which were once living trees. They indicate the track of the forest fires, quite a number of which we passed on the way. At Woman River we learned that a bridge had been burned down ahead of us, and that it would be necessary to turn back and reach Winnipeg by another route. We got back to Sudbury at 11.30 P.M., ignorant of what our movements might afterwards be. Two routes were possible. One crossed the lakes to Port Arthur and the other by the Sault Ste Marie Railway to St Paul and Minneapolis, and thence to Winnipeg. At Sudbury we found a paper posted up with the information that our train was to go to Winnipeg by way of St Paul and Minneapolis. It was a long detour but it seemed the quickest way to Winnipeg.

Manitoba

Just as the sun was setting, we crossed the international boundary at Emmerson, and entered Manitoba, the first of the three great prairie provinces. It is not quite forty years since Manitoba had only 17,000 inhabitants. It is always difficult in a new and growing country to get at exact statistics of population, but it must to-day have half a million people. In 1881 it grew about two million bushels of grain. In 1907, the output had reached one hundred million bushels. Entering the province from the south we got a

fair idea of the Canadian prairie, flat as a table, the levelness broken only by settlers' houses, scattered haystacks, and a few trees standing up on the sky-line. But we were not privileged to see much of the province south of Winnipeg, for darkness sets in shortly after sunset and the sun had set as we crossed the boundary line. It was 9.30 when we reached Winnipeg, and the Town Council, the Provincial Parliament, and nine Scotch Societies were represented at the station. Headed by two pipers we marched to the Royal Alexandra Hotel. On reaching the hall of the hotel we were warmly welcomed in no less than eleven speeches from the sons of Canada, to which two of our party replied. It was now nearing midnight but the flower show had been kept open for our special benefit, and those of us who were able to go visited the show.

Winnipeg, where we spent our first Sunday on the plains, is the gateway of the west and destined to become one of the very greatest of Canadian towns. It came into being as if by the touch of a wizard's wand. Only forty years ago, in the place where it now stands, there stood Fort Garry, the little Hudson Bay station. To-day Winnipeg has a population of 125,000 inhabitants, and the boundaries of the city, and its population, and its trade are increasing at such a rate that it makes it difficult to measure its size far less to set any limits to the possibility of its development. But our mission was not to investigate the development of the cities of the west, it was to study the progress of Canadian agriculture, and so early on Monday morning we were on the prairie, which runs without a break to the Rocky Mountains. Our first stop was at Portage la Prairie, fifty-seven miles west. Portage is on the bald-headed prairie, and it was one of the first settled places in Manitoba. Seventeen or eighteen years ago there was not a tree round a farm steading. To-day there is scarcely a homestead where the buildings are not protected by belts of maple, elm, or willow. Out from the town we stopped at the farm of Mr Frank O'Connor to see a threshing-machine at work. His engine was a 22-horse-power engine, and he could thresh from 1500 to 1600 bushels of wheat per day. He not only threshed the wheat on his own farm of 500 acres, but he hired out his threshing-machine to other farmers. Our next halt was at the farm of a Mr M'Vicar, who came from Kiltearn in Scotland fifteen years ago. He was a school-teacher there and is now well up in years. He has 320 acres, 120 in wheat, 40 in oats, and 50 in barley. He has the remainder in pasture and summer fallow. He keeps ten cattle, five cows, and six pigs. What rotation he has, and he has not much, is for the purpose of cleaning his ground. He and his four sons practically do all the work. We had intended visiting a stock farm, but there was no time, and we had to drive back to the station, which we left at 12.45 for Carberry. From Portage westward there is a good deal of scrub, principally poplar, until Magregor is reached. Then the land is well-wooded on both sides of the line. Interspersed with the wood are large grain fields, dotted in harvest-time with huge piles of straw which are burned, as the farmer keeps no stock. We stopped at Carberry and went out into a well-settled country, where the log-cabin has given place

to substantial residences, sheltered from the prairie winds by belts of trees, and where the land sells at from £9 to £12 per acre. The soil is a black, sandy loam, much lighter than the soil at Portage. The farmers grow wheat and oats and hay, and keep cattle and pigs. The usual custom is to get two crops of wheat, then oats, then barley seeded with timothy, and back again to wheat. On our return to Carberry we were entertained to dinner by our friends. It was 9 P.M. when we left *en route* for Brandon. What a succession of banquets! There were some days when most of our meals were banquets—last night, dinner with the good people of Carberry: this morning, breakfast with the citizens of Brandon. Brandon is not like Winnipeg, lying flat on the level prairie. It is built on the rising ground on the south side of the valley through which the Assiniboine flows. The town and the suburbs are well-wooded. The valley is narrower and the hills are not so high, but otherwise it is not unlike the valley of Strathmore, as seen from the foothills of the Grampians. We motored to the experimental farm, where Mr Murray, the superintendent, explained the work that was being done. Experiments had been carried out to decide which varieties of wheat did best. Experiments had also been made with stock. Cattle had been successfully kept all winter in the open, even when the thermometer fell to 40 or 50 degrees below zero, and had done as well as those fed inside and at much less cost. It was difficult for us to believe this, but we were assured that it was a fact, made possible by the growth on the cattle of an exceedingly thick coat of hair which gave the necessary protection. Probably as interesting an experiment as any was the experiment carried out with the view of proving that trees could be grown on the prairie. The avenues of trees throughout the grounds all grown within the last twenty-seven years are standing testimony to the success of the experiment. The crops on the farm, so far as we were able to see them, were exceedingly good. But then the farm, situated in the valley of the Assiniboine, is composed of fertile land. The Commission was divided at the experimental farm. Some of them went north and some south of Brandon, thus having an opportunity of examining the rich and the poor soil of the country. The poor soil is very poor and scarcely worth cultivating. On the other hand, the richer soil, north of the experimental farm, is exceedingly good, and is bearing, after years of wheat-growing, from 18 to 20 bushels of wheat to the acre.

Saskatchewan

After leaving Brandon, we made direct for Saskatchewan. They say in that country that those who drink of the water of the Saskatchewan River may leave the country but will never rest satisfied till they come back again. Be that as it may, Saskatchewan is rapidly filling up. Our first stop was at Indianhead. It was 7 P.M., when we got there, but motor cars were waiting for us, and we drove by the light of the cars, the fading light of a swiftly setting sun, and a full moon, through the experimental farm, which

was started twenty-one years ago. One thing at least the farm has demonstrated, and that is, that trees can be grown here as well as on other parts of the prairie. We drove round the farm through avenues of well-grown Manitoba maple, cotton tree, and willow. We could also see in the fading light that large crops of wheat and oats were being grown. From the experimental farm we were driven to the Forestry Station, the first, we believe, in the Dominion. From the Forestry Station we went to a hotel in town and met quite a number of farmers with whom we discussed agricultural affairs. At nine o'clock we were entertained to dinner. An address was presented to us by the Town Clerk, and the Mayor, in the name of the town, gave us a welcome to the province. Mr Mackay, the superintendent of the experimental farm, explained the work he was doing. He told us that at one time the difficulty with farming was the want of moisture. The rainfall is 17 or 18 inches. He recommended the farmers to grow wheat for two years and then fallow, leaving the stubble the first autumn 1 or 2 feet long, so that it might retain the snow and thus conserve moisture. He advised them to burn the stubble the following spring, and without ploughing, but after discing or harrowing, to sow wheat again, devoting the third year to summer fallow to get rid of the weeds. This scheme has been very successful, with the result that large crops, averaging 27 bushels of wheat to the acre, are grown. The superintendent of the Forestry Station also spoke, explaining the object of the station, which was created to prove that trees could be grown—trees for shelter, for fuel, and for beauty.

By Wednesday morning, 9th September, we had reached Regina, the capital of Saskatchewan, where we were entertained to breakfast. Then we motored out into the country. The land is black loam as usual, and somewhat heavy. It is typical prairie land. There are practically no trees and the levelness is only broken by the settlers' homesteads, some of which were of the smallest and most meagre description. One farm we visited contained 1000 acres. It was owned and occupied by a settler from Ottawa. He paid thirty dollars per acre for his first 600 acres, which is about the price of land both in this district and in the Indianhead district. He expected to make this year £2000 of profit. We do not know whether or not his expectations were realised. He was at any rate satisfied he could do far better on the prairie than in the eastern provinces.

It was about twelve o'clock when we got back to the cars. At 1.30 we reached Moose Jaw, where the party was divided. Most of the Commissioners stopped at Moose Jaw. They were met by leading citizens and driven in different directions to see the country in the vicinity of the city. Subsequently they examined an elevator adjoining Moose Jaw station. These buildings are unsightly to look at but very serviceable. The cart goes into the elevator loaded with grain. The planks on which the wheel rests are lowered towards the back end of the cart and the grain runs out and down through a hatchway. By an elevator, which is really an endless revolving chain, with buckets on it, the grain is carried up to the cleaner. It is weighed

immediately it leaves the farmer's waggon and again after being cleaned. From the cleaner it is taken by an elevator to bins above. From these bins, it is carried outside the elevator and dropped into waggons on the railway line, which is always alongside of the elevator. In the evening the Commission was entained to a " smoker."

Alberta

During the night of 9th September, the Commission left Moose Jaw for Alberta, a province double the size of Great Britain and Ireland, with only a population of about 200,000 and containing great variation of soil and climate. The southern part through which the Commission was to travel is called "Sunny Alberta." and but for the fact that part of it is a semi-arid region, it would be the best part of all the prairie provinces. Medicine Hat was reached at 10 A.M. next day. The natural gas system, belonging to the Canadian Pacific Railway Company, was examined. The afternoon was spent at a horse-ranch, eight miles from the city, owned by the Canadian Land and Ranching Company Limited. The manager rounded up the stock and gave the Commission every opportunity of obtaining information in regard to the ranch. Lethbridge was reached early on Friday, 11th September. After a brief stay a detour was made to Raymond, the centre of the beet industry, where irrigation, beet-growing and sugar-manufacturing were the subjects of investigation. A little farther on a halt was made at Magrath, and forty miles south-west another halt at Cardston. Both towns are centres of fall wheat-farming. The fall wheat is sown in August and the land is fallowed every alternate year. As fall wheat ripens a fortnight earlier than spring wheat it has much more chance to escape autumn frost. Besides, the crop is heavier. One large field in the Cardston district, which called for special attention, was estimated to yield from 45 to 50 bushels per acre. Returning to the cars about 5.30, the Commission got back to Lethbridge at seven o'clock, where a pleasant evening was spent at the club. The Macleod district was visited on Saturday forenoon, and a start made for Calgary *en route* for British Columbia.

British Columbia

British Columbia is composed of great mountain ranges and lovely valleys. It is not, therefore, to the same degree as the other provinces an agricultural country, but the climate, which is the best in Canada, enables the farmer to make the most of the land that is available. From Calgary the Rocky Mountains rise in the distance, their lofty peaks covered with snow. They are properly designed Rocky Mountains, being mountains of rock thrown up as if by convulsions, with little timber on them. A short halt was made at Banff, a summer resort in the mountains. The best of the scenery, however, was to come. The Selkirk Mountains, while not so high as the Rocky Mountains, are much more picturesque. They are

well wooded; there is abundance of Douglas fir, Murray pine, spruce, cedar, and hemlock. The trees are not great trees, such as you find in parts of British Columbia. They have not had a chance, forest fires having burned them down time and again. But they are abundant, and they add greatly to the beauty of the scenery. At Field, there is an admirable hotel, which has food steaming hot for the passengers when the train stops. If complaint has sometimes to be made of the service in some of the hotels in Canada, assuredly no complaint can be made as to the rapidity with which food is served in these railway hotels in the mountain ranges of British Columbia. Farther on, there is the loop on the line which attracts the attention of all passengers through the Rockies, though it is not such a wonderful loop as the loop on the line cutting through the Alps from Lucerne to Italy. There is also the Kicking Horse Canon, where the train crosses and recrosses the foaming river. Possibly, however, the sight in the mountains is the Three Sisters, covered with everlasting snow, and the Glacier. The passengers get out at Glacier for refreshments, and to have an opportunity of taking in the wonderful picture. The scenery continues more or less magnificent through the mountains. Revelstoke was reached in the evening of Sunday, 13th September.

We said that the Commission split into two at Moose Jaw, and we have described the wanderings of the main wing. The other section of the Commission proceeded to the Kootenay district in British Columbia, with the view of examining fruit-farming there. It was a long run from Moose Jaw to the Kootenay landing. The country for many miles after Moose Jaw was left behind, was poor country, composed of sand for the most part, on which scrub was growing. It was also an undulating country, rolling like the sea. Farther west, the undulation increased and the ground became more stony, and for many miles no settler's house was in evidence. Just beyond Lake Chaplin was seen the track of a great prairie fire, which covered a distance estimated at sixty miles long by twelve broad. A strange thing had happened. The fire seemed to have swept round a dwelling-house with some acres of ground, and left the house and the ground untouched. The place was, of course, protected by a firebreak, that is, some furrows had been ploughed round the holding, and when the fire reached the ploughed land it was unable to get across. The land remained poor, and in many places there seemed to be much alkali in the ground until between six and seven o'clock when Swift Current was reached. It was 11.30 when this section of the Commission got to Medicine Hat and on board the Kootenay train. By six o'clock next morning, some of them got up in time to see Macleod. From Macleod westward, the country has been developing into a wheat-raising country, and the rancher is being driven out. Land which could have been bought for a few dollars some years ago costs thirty dollars now. Towards the foothills, the higher reaches of the Rockies looked quite refreshing after the plains. A good view of the Crow's Nest Mountain and of Crow's Nest Lake was obtained. At Frank, the Commissioners saw the scene of the great slide of two years ago. Part

of the mountain left its moorings and came down, burying most of the village absolutely, and throwing the stones two miles across the valley. Every now and again a mining town was passed, indescribably dirty, amid the most majestic scenery. If Ruskin had only seen the hovels and the dirt, and the mess man had made of nature, he would have exhausted all the dictionaries of all time to find words forcible enough to give expression to his rage. Forest fires were smouldering here and there on the mountain sides, especially in the district where the great Fernie fire raged. The trees were either burned to the ground or were standing bare, black poles. Hard by the railway a sawmill was a blackened heap, with the funnel of the engine twisted into a shapeless mass. At Fernie there was the blackness of desolation. The town of 6000 inhabitants was swept out of existence, all save a few of the houses. It was only a little more than a month since the fire, and quite a number of the tents which housed the people were still being used, but there were scores of houses—wooden houses, of course—already erected, and others were being rushed up at a great rate, for Fernie is an important mining centre. The people need have no fear of another fire. This one has done its work well, and there will be nothing more to burn for a long time. Beyond Creston, where the railway line turns northwards, the first indication of fruit-farming was seen in clearings in the forest. At Kootenay landing, which was reached about five o'clock, the Nelson steamer was waiting the arrival of the train. Kootenay Lake is a pretty lake, and the sail to Nelson is interesting. Unfortunately, most of it had to be done after darkness had set in. It was far on in the night when Nelson was reached.

At 9 A.M. on Friday, 11th September, in company with a number of the outstanding men of Nelson, the forenoon was spent in visiting the town, and getting facts and figures about its development. The afternoon was spent among the orchards on the banks of the lake, where the land is so limited that the people of the Okanagan tell a story of a man, who, passing along the shore of the lake one day, saw dust rising from the road, and on reaching the spot, found a Kootenay fruit-grower getting to his feet, muttering in his wrath that that was the third time that day he had fallen out of his orchard. The following day was devoted to an exploration of Fire Valley. Killarney, on Arrow Lake, was reached by boat from Robson at five o'clock in the morning. Horses were waiting, and a twenty-six mile ride had to be done before night, partly over a waggon track and partly over a bridle path. Halts were made at different farms by the way, which had been cleared of timber and were under cultivation. The growth was certainly amazing. It would be difficult in any part of the world to surpass the growth of fruit-trees and of clover in the Fire Valley. It was four o'clock in the afternoon when the party got back to Killarney in time to catch the boat for Robson. It was a roundabout way to get to Arrowhead, whither the Commissioners were bound, but as there was no boat going north, they had to take one going south, which was timed to leave Robson early, the following morning, direct for Arrowhead.

The Arrow Lakes are spots of beauty, but the mist often hides them partially from view. Just enough was seen in the early part of the day to show that the country is very rugged and wild. By noon the fog had cleared away, and a fine panorama presented itself to the view. It was a forest and mountain country, with valleys of some extent, apparently piercing the hills here and there. At the lake side there were a few pretty cottages, and quite a number of log cabins sitting in clearings which the settlers were making in the forest. Arrowhead, situated at the foot of a precipitous mountain at the north end of Arrow Lake, came into view about one o'clock. Revelstoke, on the main Canadian Pacific Railway line, was reached at 3.30. Two hours later, the west-bound train steamed into the station with the main wing of the party, and the whole Commission was together again. Dr Saunders, Director of Experimental Farms, had been with the main wing for some days, and those who had been in the Kootenay district had only time for a few minutes' conversation with him, as he was leaving at Revelstoke.

About seven o'clock on Monday, 14th September, we had reached Agassiz, a town which had some little connection with the geologist of that name. A cousin of his, about 1862, sailed up the Fraser River, and, mounting a hill, looked down on the valley below. Thinking it was a good place to live in, he sent men who were with him to clear things up, and later on he came as the first settler, and settled there, and the town built on his land got its name from him. The soil in some parts is silt, and very good. Mixed with the silt there is a deal of sand, and the soil is thus easily worked. The rainfall, however, is somewhat heavy. The main industry is dairying. Fruit-growing is developing, and the region has attractions for resourceful men. A hospitable party of settlers escorted us through a scene of surpassing beauty to Harrison Springs, where we were entertained to luncheon. The farms vary in extent from 10 to 600 acres. Land in the immediate vicinity of Agassiz sells at from 60 to 300 dollars per acre. In the afternoon we drove to the experimental farm. At 8 P.M. we left for Vancouver, which we reached about midnight, and next morning we were driving round the city with Vancouver's notable men, as genial a company as we could have wished. A wonderful city it is. In 1886 it contained 600 inhabitants ; to-day it contains from 60,000 to 80,000. It has a beautiful situation. The streets are wide and long, and the city has been built, like most Canadian cities, on some reasonable principle, the idea of extension being ever kept in view.

In the afternoon we left for Victoria. During the sail, you never lose sight of wooded hills and loftier rugged mountains. It is homelike, reminding one of some of the Scottish lochs. When you get among the islands on the Victoria side, the scenery leaves little to be desired. It was dark before we got into Victoria. Next morning we explored the island as far as that could be done, from 8.30 to 12.15. As the island is 300 miles long by 30 miles broad, the exploration was by no means exhaustive. The island has a delightful climate, with a moderate rainfall. Its proximity to the markets

BLOWING UP STUMPS AT AGASSIZ

FIELD OF STRAWBERRIES, BRITISH COLUMBIA

of the west coast points it out for development along the lines of market-gardening and fruit-growing.

Back to the Atlantic

We had now crossed the continent from ocean to ocean, and were ready to start on our long homeward journey. We had, however, some calls to make by the way. We had to see the Delta country in the vicinity of Vancouver; we had to go south to the Okanagan Valley; a visit had to be paid to the irrigation works of the Canadian Pacific Railway at Gleichen; homesteading south of Maple Creek demanded attention; the park lands in the Edmonton and Prince Albert districts had to be examined; the bald-headed prairie round Saskatoon had to be explored; a day in the Carman district south-west of Winnipeg; and then home as fast as trains and steamer could take us.

Delta Lands

On returning to Vancouver on Wednesday, 16th September, a few of the Commission went to Shaughnessy Heights above the town, to see a steam stumper belonging to the Canadian Pacific Railway clearing the ground of timber at a cost of 150 dollars per acre. In the evening we were entertained at a "smoker" by the citizens of Vancouver. At 8.30 the following morning, we started, along with many of our Canadian friends, for a tour in the delta country. We travelled out of the city by the electric railway. At Eburne we left the cars and were driven round Sea Island, which is about seven miles from Vancouver. In the drive we saw some very fine alluvial land, brought down by the Fraser River. The soil is many feet deep and is used for dairying by white men and market-gardening by Chinese. Judging from the price of produce, it would be a veritable earthly paradise for the dairyman and the market-gardener, but for the fact that the price of land is too high. Much of it is held under leases at from £2 to £4 per acre, and it sells at about £60 per acre. On returning from our drive, we got aboard our cars again, and after a short time arrived at Steveston, where we examined the Columbian Salmon Tinning Company's works. Leaving this factory we crossed the Frazer River. At Ladners we found motor cars waiting to drive us through a rich agricultural district, where the land is as fertile as the Sea Island land, and capable of producing as abundant crops. After motoring many miles through this district, we ascended some hills, and got into a better country from the picturesque point of view. For miles we swept through woodland, with nothing but the long trail of the road in front and rear, a road which ran like a switchback railway, and was not so pleasant to ride over. After more than an hour's run, we reached New Westminster. There was not time, however, to stop. Crossing the Fraser River, we made for Vancouver direct, from which at 5.15 we had a great send-off.

We arrived at Sicamous Junction on the following morning, where we changed for Vernon in the Okanagan Valley. At Vernon Station we were taken in hand by capable men who realized that we had come to see the importance of this district as a fruit centre, and had determined that we should see it. Their fruit exhibition had just been opened, and what better way in a limited time to show us the productiveness of the district than by showing us a collection of all the fruits which it produced. To the show then we proceeded, and were filled with amazement at the magnificence of the fruit exhibits. At noon we were entertained in the show-ground to a delightful lunch, which, among other things, included a Scotch haggis, the first we had tasted in Canada. After lunch, we drove some miles to the Coldstream ranch, which is described elsewhere in this Report. Returning to Sicamous Junction, in the evening we left by the night train for Calgary. Dr Martin and Mr Macintosh, two of the Commissioners, went straight from Calgary to Quebec, *en route* for home. Another section of the party proceeded to Gleichen, to visit the irrigation farm and works belonging to the Canadian Pacific Railway, and returned to Calgary during the night.

Homesteading

So far we had had no opportunity of seeing land which was being homesteaded, and we felt that this part of the subject was too important to be omitted. A party of five was selected, and arrangements made for taking them to see the homesteaders at work south of Maple Creek. On their arrival at Maple Creek, they were met by Mr Roy of the Immigration Department. Equipped with two buggies and one waggon carrying the camp and provisions, and with a saddle horse, the party started in the afternoon, and camped out that night about fifteen miles south of Maple Creek. Next day, a south-easterly course was kept to the east end of Frenchman River, where the camp was pitched the second night. An easterly course was steered the third day, and a much better country was entered than that through which the party had hitherto travelled. By noon, Section 13, Township 7, Range 20, was reached, where the land was extremely good, and the homesteaders' shacks began to appear. A short distance farther on, a stop was made at the shack of M. Bouffet, a Frenchman, who had come out and begun operations only in April. It was found that he had broken up about 25 acres of land, but with the dry summer had been discouraged from ploughing more. The building of a house and a stable and the digging of a well, 25 feet deep, from which he was getting a good supply of water, had taken up the remainder of his time. To the north other shacks were examined, and then the party pitched their tents for the night. Next day, more homesteads were examined, some of the houses being built of wood and some of sod, and then the "Homesteaders" made tracks for Winnipeg. They were impressed with the difficulties which the homesteader had to encounter, but were satisfied that in the part of the country which they had visited, the settlements had been made on good soil,

THE HOMESTEADING PARTY

"RIGS" WAITING FOR THE COMMISSION

and that there was every prospect of the home-steaders, or at least those of them who had grit, succeeding. Success, however, would be more certain if the small farmer had 1000 dollars or more to buy equipment and stock, in addition to which he would need to have 500 dollars to keep himself for fully two years until a return is got, unless he finds work elsewhere in winter.

Those of us who had stayed at Calgary visited in the afternoon of our arrival Mr Turner's farm, about five miles out, with the object of seeing his Clydesdale horses, Shorthorn cattle, and Shropshire sheep. Along with the section of the Commission that went to Gleichen, we stayed in Calgary till midnight on Sunday. By breakfast-time on Monday we had reached Red Deer, and were ready further to prosecute our investigations. Near the town we visited a farm consisting of a half section of good black loam, which the farmer bought six years ago for six dollars per acre, and from which he harvested 45 to 50 bushels of wheat per acre. His rotation is,—fall wheat, then oats or barley, seeded down with timothy and white clover, which he leaves in the ground for two years. Farther on, we turned into a 300 acre farm, owned by a man who settled in Canada in 1885, without any knowledge of agriculture. He bought a quarter section for four dollars an acre. He grows, first year—oats or barley; second and third year—oats or barley; fourth year—summer fallow; fifth year—fall wheat. His average crop of wheat is 35 to 38 bushels per acre; oats, 50 to 60 bushels; barley, 40 to 45 bushels. But he has not all his eggs in one basket. He had fifty head of cattle at the time of our visit. Perhaps the most interesting visit of the day was to a farm owned by a young Englishman, who had had a University education, and no training in agriculture. When he went to Canada seven years ago, he did not know, according to his own statement, the one end of a cow from the other. He bought 160 acres of land for twelve dollars an acre. After breaking up the ground he sowed fall wheat. This was followed by oats and barley, which in turn gave place to oats, seeded partly with rye grass and partly with timothy, which ended the rotation. But he is pre-eminently a dairy farmer, depending for the most part on a herd of pure Jersey cows. He sends his produce to the Government Creamery at Red Deer, and is paid according to the percentage of butter fat. He separates the milk himself, and he keeps a milk record. He seemed to be doing well. One part of the Commission now inspected a herd of good shorthorn cattle on a neighbouring farm, while the others proceeded to Red Deer to examine the Government Creamery started in 1896. It deals with the milk of 130 farmers, manufactures 5000 lbs. of butter per week in summer, and 1000 lbs. per week in winter. The expense of working is about five cents per lb. The farmers get an advance every month, and they are paid the balance twice every year. The butter is sent to the Government Cold Storage at Calgary, and then shipped, along with other butter, to British Columbia, China, and Japan.

Park Lands

On the way north to Edmonton, four of the Commissioners went off at Lacombe to see the experimental farm. They came into Edmonton later on, with glowing accounts of the district and of the good work which the experimental farm was doing. The section which continued the journey towards Edmonton were met at Strathcona by representatives of the city and of the Board of Trade, and driven to a farm, 1½ miles from the town, owned and occupied by a man who came from England eleven years ago. He had then only 1500 dollars, and no knowledge whatever of farming, and only six months to live. He bought some land for eight dollars an acre, and sold some a week or two before we visited his place, for between 100 and 200 dollars an acre. He has comparatively good health now, and a well-stocked and apparently a well enough managed farm.

We were the guests of the people of Edmonton on the following day, and the country from Edmonton to Fort Saskatchewan was explored. It was a big day, counting by miles. We lengthened it somewhat by going on the south side of the River Saskatchewan and returning on the north side. It would in ordinary circumstances have been enjoyable since it gave us ample opportunity of seeing the fine park lands of Edmonton, but the weather had changed in the night. It was bitterly cold, and a biting wind was blowing. Moreover, we had been taken completely by surprise, and had neither sufficient underclothing nor outward wraps. We stopped only once by the way at a farm of 160 acres owned by a Mr Stevens. He bought the farm seven years ago for 22 dollars per acre. His rotation is,—spring wheat, then oats, then barley, and then timothy. He harvests from 35 to 40 bushels of wheat, 60 to 70 bushels of oats, and 35 to 40 bushels of barley per acre. He keeps a Jersey herd, and sends his cream to a creamery in summer, and his whole milk in winter. On reaching Fort Saskatchewan, which by the way is the headquarters of the North-west Mounted Police, a body of finely disciplined and vigilant men, we at once made for the hotel, where lunch had been provided for us. Various speeches were delivered, and it was 3.30 when we got aboard again, with our faces set towards the biting wind and Edmonton. As on the outward journey, so on the homeward journey, we made only one stop by the way. It was at a packing-house belonging to J. Y. Griffin & Company, Limited, which has just been opened. It will be able to kill 1200 cattle and 1800 hogs per day. Its significance lies in the fact that it is located in the centre of an agricultural country, which means that here at his own door the farmer has a market for cattle and pigs. This in turn means that he can rear stock and get into a systematic system of mixed farming, which in course of time must come. The day was closed, as so many days were, by a banquet given on this occasion by the Edmonton Board of Trade.

There is great rivalry between Edmonton and Strathcona. They are both beautiful for situation, standing on high well-wooded ground on opposite banks of the North Saskatchewan River. These

FARM IN THE PARKLANDS, EDMONTON

towns vied with each other as to which was to have the greater honour in entertaining us. The Strathcona people, as we have pointed out, met us when we arrived and showed us round part of their district. The Edmonton people had us the next day. It was the Strathcona people's turn now. We were driven ten or fifteen miles into the country. We stopped at the farm of a Mr Ellett, ten miles from Strathcona. He was a jeweller in London and came to Canada in 1885. He knew absolutely nothing about farming till 1888, when he settled down in this district. He homesteaded 160 acres. In 1890 he bought 200 acres, part of which cost six dollars and part twenty dollars an acre. One hundred acres are now broken up and the rest is in grass and scrub. He sows wheat when he breaks up his land, then oats, then barley, with rye, or timothy, or brome, and he leaves the grass down three years. Sometimes he summer fallows after the oats and before the barley. He keeps forty head of Aberdeen-Angus cattle. He also breeds horses and pigs. After leaving Mr Ellett's farm we turned the horses' heads towards Strathcona, where the Board of Trade, not to be outdone by the Edmonton Board of Trade, entertained us to lunch. Before we had well begun, the Edmonton people had arrived with rigs to take us round the city of Edmonton. It was a kindly rivalry, all to our advantage, and if the Edmonton people were to any extent having the monopoly of the Commission, it must, we suppose, be due to the fact that Edmonton is the capital of Alberta and has a population of over 20,000, while Strathcona, which possibly will one day be the residential part of Edmonton, has only a population of from 4000 to 5000 inhabitants. The afternoon was spent in visiting the old fort of the Hudson Bay Company, the coal mines along the river bank, and the telephone system, which is worked at the central office automatically. Headed by four pipers, the Commissioners, or what was left of them, proceeded to the station as modestly as they could, followed by a crowd of interested spectators, who cheered lustily as we steamed out of the station for Prince Albert.

We cannot speak of the country from Edmonton to Battleford for we passed it in the night. From Battleford to Warman the prairie is rolling and flat by turns. At Warman we were met by the Acting Mayor of Prince Albert, who had arranged that we should leave the train at Clouston and drive to Prince Albert, eleven miles distant. On the way we visited a large farm owned by Mossom, Boyd & Company, Ontario, consisting of three sections. Three hundred and twenty acres are under crops. After breaking the land, the rotation is—first year, wheat; second year, oats; third year, barley; fourth year, summer fallow. Wheat then follows, and the rotation is the same as before. Stock, however, is their great stand-by. They keep 600 head of good Hereford cattle. They also specialise in horses, favouring the Suffolk breed. After examining the stock we drove round the farm, and from the hill-top had a magnificent view. We could see twenty miles in every direction, but the land, save here and there, where homesteads were cleared, was nothing but scrub. Lunch, provided by the Prince

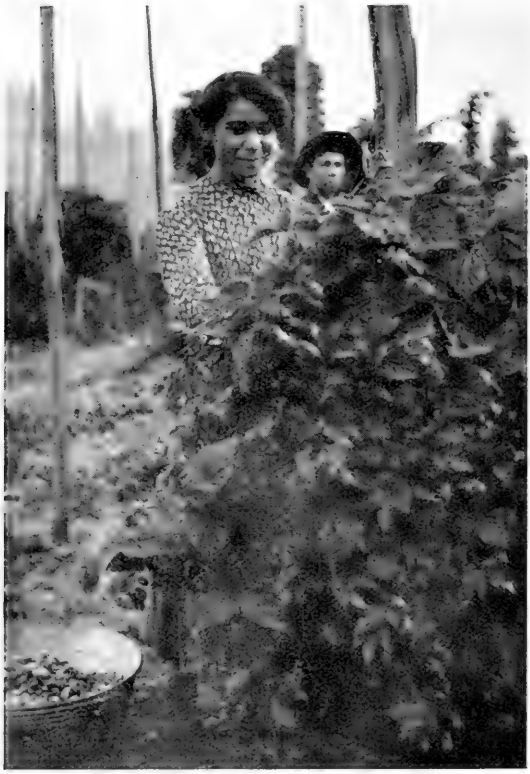
Albert Board of Trade, was waiting for us when we returned to the farmhouse. It was eight o'clock at night before we got to Prince Albert. We had, however, other four hours before midnight, and we spent most of them at a smoking concert got up in our honour.

The Saskatoon district was our objective next day. The town itself has risen miracle-like on the plains. One of the Commissioners looked from the far side of the Saskatchewan River to the town, and realising that it had all come into being in seven years, he declared that it would have taken our people at home all that time to draw the plans. Five years ago there were only 100 inhabitants. Now there are 5000. There is a telephone and electric lighting system, a Municipal Council and a Board of Trade. If the streets are still rough and unmade, a few years will work a revolution, and Saskatoon, we doubt not, will be one of the great prairie towns of Canada. Possibly it owes its existence to the development of the prairie in the neighbourhood. We had a fair opportunity of examining it. It is bald-headed prairie, mainly devoted to wheat-growing. The soil in some parts is a black loam for a few inches, chocolate-coloured below that with a subsoil of marl. Seven or eight years ago there was not a homestead between Lumsden on the Canadian Pacific Railway and Saskatoon. We saw scores of them ourselves that day, and there are hundreds which we did not see. There is no district in Canada filling up more rapidly than the district round Saskatoon.

We had now reached the end of another week. It was Saturday night once more and we were making for Winnipeg. The land alongside the line was on the whole poor land, not well settled. Sloughs were numerous. Brush and scrub prevailed in many places. A good deal of alkali was present in the soil. The settlers, where they did exist, were mostly from the States and from foreign countries. Early on Sunday morning we passed Gladstone. The ground was white with snow. As we got towards Portage la Prairie, the snow turned into sleet and rain. It was wintry-like, with the stooks white and the roads sloppy, and as we entered Winnipeg the air was biting as if it had been blowing over miles of snow.

All things come to an end, and Monday morning saw us begin the last of our investigations as an Agricultural Commission. Part of the Commission remained in Winnipeg to complete some investigations there. The rest proceeded to Carman, a town of about 2000 inhabitants, fifty miles south-west of Winnipeg. After this section got well out of the town they entered what appeared to be a good farming district. It was level prairie, with very little bush. At Sperling the farms seemed to be large. The soil was black loam and apparently rich in humus. In some parts it seemed easily worked, but in others it was heavy. The subsoil was generally clay. At Carman the country is well wooded and long settled. It is a good country for mixed farming, but it must be on the way towards exhaustion for wheat-farming, when you consider that the fertility of the soil, which is a sandy loam on clay, has been reduced by the growing of wheat for twenty or thirty years. We returned to Winnipeg in good time to catch the evening train for Quebec.

We had only a day to explore Quebec and it was raining most of the time, but we managed somehow to get a general idea of the quiet sleepy town of narrow streets and steep braes and broken English. Then it cleared up, and as we put out to sea, we looked back and saw the sun sinking in the western sky. Colours which no pen could describe were on land and sea. It was a fitting sunset to he happy time we had spent in Canada.



SIWASH INDIANS PICKING HOPS AT AGASSIZ,
BRITISH COLUMBIA

LAND SETTLEMENT

THE public lands in Canada now available for settlement are a decreasing quantity. There are none at all in Prince Edward Island, and there are only about one and a half million acres in Nova Scotia, and seven million acres in New Brunswick, a considerable portion of which is unsuitable for cultivation. There are still, however, great stretches in the other provinces which may be acquired on the fulfilment of certain conditions. In Quebec, most of the public lands are sold at figures ranging from thirty-five to sixty cents per acre. The price is payable one-fifth on the day of sale, and the remainder in four equal annual instalments, the unpaid balance bearing interest at six per cent. The purchaser must take possession within six months of the sale, and occupy the land within two years, and he must within four years erect a dwelling-house at least sixteen feet by twenty feet, and clear and have under crops ten acres for every 100 acres of land he holds. In Ontario, an unmarried man over eighteen years of age can obtain a free grant of 100 acres of land suitable for cultivation. The male head of a family, or the female head of a family having a child or children above eighteen years of age residing with her, may obtain a free grant of 200 acres, and may purchase an additional 100 acres at fifty cents per acre. The conditions are: the settler, in the case of the free land, must, save when absent on business or at work for periods not exceeding six months in any year, live on the land for five years, and during that time clear and cultivate 15 acres of land, not less than two of which must be cleared and cultivated every year. He must also build a habitable house sixteen feet by twenty. A settler who buys an additional 100 acres must in five years clear and cultivate 15 acres, but he does not require to build a house or live on the land. The conditions in British Columbia are somewhat different. There, every head of a family, widower or single man, eighteen years of age, who is a British subject, has a right to pre-empt 160 acres west of the Cascade range of mountains, or 320 acres east of these mountains. He must pay one dollar per acre, and make improvements of the value of two dollars fifty cents per acre, and reside during a period of two years on the land.

The public lands above referred to are owned and administered by the provinces in which they are situated. The public lands, on the other hand, in the north-west provinces—Manitoba, Saskatchewan, and Alberta—belong to, and are administered by, the Federal Government. These lands are laid out in townships of thirty-six sections. Each section contains 640 acres, and is divided into quarter sections of 160 acres each. A quarter section may be obtained on payment of a registration fee of 10 dollars and the fulfilment of certain

conditions. The area already disposed of in the shape of free grants extends to nearly 18,000,000 acres. The area surveyed and yet to dispose of extends to 85,900,000 acres. The conditions of the grant are as follows :—

1. Residence

1. A homesteader may perform the residence duties by living in a house on his homestead at least six months in each year during a term of three years. Before applying for patent the entrant must have upon his homestead a dwelling-house worth at least $300. This requirement applies to all entries granted on and after 1st February 1909.

2. A homesteader may, if he so desires, perform the required six months' residence duties by living on farming land owned solely by him, not less than eighty acres in extent, in the vicinity of his homestead. Joint ownership in land will not meet this requirement.

3. If the father, mother, son, daughter, brother, or sister of a homesteader has permanent residence on farming land owned solely by him or her, not less than eighty acres in extent, in the vicinity of the homestead, or upon a homestead entered for by him or her in the vicinity, such homesteader may perform his own residence duties by living with the father, mother, brother, sister, son or daughter, as the case may be.

4. The term " vicinity " in the two preceding paragraphs is defined as meaning not more than nine miles in a direct line, exclusive of the width of road allowances crossed in the measurement.

5. A homesteader, intending to perform his residence duties in accordance with the above, while living with relatives, or on farming land owned by himself, must notify the agent for the district of such intention, and keep him informed as to his post-office address ; otherwise his entry is liable to become the subject of cancellation proceedings.

6. A settler within the pre-emption tract who has acquired a homestead and pre-emption may fulfil the residence duties in connection with his homestead by living on his pre-emption.

7. Sleeping on a homestead at night for a period of six months in the year, while following elsewhere during the day time a trade or calling other than agriculture, will not be accepted as residence within the meaning of the Act, unless the residence of the homesteader is established by his family living continuously on the homestead during such periods of residence and by the homestead being his own sole place of abode during such periods.

8. Residence for six months in each of three years, after homestead entry, satisfies the residence requirement necessary to entitle the entrant to patent, without regard to periods during each year when the residence was done, but absence from the land for more than six months, at any one time, renders the entry subject to application for cancellation.

2. Cultivation

1. The practice of the Department has been to require a settler residing on his homestead to bring a total of at least fifteen acres of the same under cultivation.

A settler performing his residence duties by living in the vicinity of his homestead, either with parents, or with son, daughter, brother, or sister, or on land owned by him, must bring a total of at least thirty acres of the homestead under cultivation.

A reasonable proportion of the cultivation must in all cases be done in each year.

All entries made previous to the 1st June 1908 are governed by the above practice.

2. The following change in the regulations respecting cultivation duties applies to all homestead entries made on and after 1st June 1908 :—

A homesteader who resides on his homestead is required to break a total of at least thirty acres of the homestead, of which twenty must be cropped, before applying for patent. A reasonable proportion of the cultivation duties must be done during each year.

When the duties are being performed under the regulations permitting residence in vicinity, the total required to be broken will be at least fifty acres, of which thirty must be cropped.

In the case of homesteads difficult to break by reason of woods, rock, or the broken character of the surface, the area of cultivation required may be decreased at the discretion of the Minister in accordance with the character of the land.

Pre-emptions

A person who obtains entry for a homestead under the Dominion Land Act of 1908, or under the Provisions of chapter 55 of the Revised Statutes 1906, or any previous Act, and who continues to own and to reside on his homestead, and does not hold or has not assigned his right to, or has not received patent for a pre-emption, may pre-empt any available quarter section lying alongside his homestead or separated therefrom by only a road allowance on payment of a fee of ten dollars. He becomes entitled to his patent on compliance with these conditions :—

1. Resides for six months in each of six years on either his homestead or pre-emption.

2. Erects a dwelling-house on his homestead or pre-emption.

In the case of entries granted on or after 1st February 1909, it is required that the house shall be worth at least 300 dollars before application for patent is made.

3. Cultivates 80 acres of either the homestead or pre-emption or both, a reasonable proportion of which must be done each year.

4. Pays for the pre-emption at the rate of three dollars an acre.

One-third of the purchase money must be paid three years

after date of entry for the pre-emption and the balance in five equal annual instalments with interest at five per cent. from the date of the pre-emption entry.

Patent may be claimed at any time after completion of the duties

OLD AND NEW HOMESTEADS

on paying the price in full, and unless claimed within eight years the pre-emption may be cancelled.

The provision of the "Dominion Lands Act" permitting residence on land in the vicinity of the homestead, does not apply to pre-emptions. The pre-emption law requires residence actually on the homestead or pre-emption; therefore, the entrant cannot hold his pre-emption against cancellation proceedings unless the residence required is performed either on the homestead or on the pre-emption.

DEPARTMENT OF AGRICULTURE

In 1851 a Bureau of Agriculture and Statistics of Upper and Lower Canada was created. Eleven years later, this bureau became a distinct department of agriculture. Various changes in its constitution have been made since then. It now consists of twelve branches under the control of the Hon. Sydney Fisher, as Minister of Agriculture, himself an enthusiastic and practical farmer, who has

THE HON. SYDNEY FISHER, MINISTER OF AGRICULTURE

held office for the past twelve years. In addition to the Central Offices for general administration, comprising the work of the Minister and of the Deputy Minister, who are respectively the political and permanent heads, the department is now divided into seven distinct branches relating directly to practical and scientific agriculture, viz.:—

1. Experimental Farms.
2. Dairy and Cold Storage.

3. Seed.
4. Live Stock.
5. Health of Animals.
6. Census and Statistics Office.
7. Tobacco Division.

There are also five non-agricultural branches which, for convenience of administration, are at present controlled by the Department of Agriculture under the same chief, viz. :—

1. Patent.
2. Copyright and Trade Mark.
3. Archives.
4. Public Health and Quarantine.
5. Exhibition.

The last-named branch is responsible for the representation at the principal international exhibitions of the world, of all the resources of Canada, including agriculture.

We do not in this section propose to deal with experimental farms which have been dealt with elsewhere in this report, nor can we deal with all the other branches of the Department of Agriculture above enumerated. We shall, however, endeavour briefly to deal with a few of the more important of them from an agricultural point of view.

N.B.—In addition to the Federal Department of Agriculture, each province has an Agricultural Department of its own.

I. DAIRY AND COLD STORAGE COMMISSIONER'S BRANCH

This branch, when it came into existence in 1890, was known as the branch of the Commissioner of Agriculture and Dairying. The Chief was Professor James W. Robertson, C.M.G., now Principal of the Macdonald College, St Anne de Bellevue, near Montreal, a man whose initiative genius has done much to encourage agriculture in Canada. In 1895, divisions of this branch were established for dairying, live stock, seed, poultry and fruit. In 1905, on the retirement of Professor Robertson, the branch was re-organised into three separate branches under the heads of Dairying, Live Stock, and Seed. The Dairy and Cold Storage Commissioner's Branch is now under the charge of Mr J. A. Ruddick, a public servant of great experience and untiring energy, who accompanied the Commission through the greater part of Eastern Canada, and contributed in large measure to the pleasure and the profit of the trip, and it consists of the following divisions :—

1. Dairying

This division, which at the outset was a branch in itself, first tackled the dairy trade in Prince Edward Island in 1892, by starting

a co-operative cheese factory at New Perth in that province. Nine years later there were forty-seven cheese and butter factories in the island. About the same time attention was directed to the establishment of winter creameries. Two cheese factories in Oxford County, Ontario, were utilised for the purpose, and the possibility of manufacturing butter in winter-time was demonstrated. Much progress has been made since then. The Commissioner now supplies, free of charge, working plans and specifications to intend-

PRINCIPAL ROBERTSON, MACDONALD COLLEGE,
ST ANNE DE BELLEVUE

ing builders of creameries, the object being to improve the trade from a sanitary as well as an economic standpoint. Cow-Testing Associations have been started, and are rapidly spreading throughout the provinces. The Commissioner supplies men for testing the milk free of charge, wherever twenty or more dairymen form themselves into an association, and provides the necessary equipment for carrying on the work. The results are compiled and published by the clerical staff of the division. All this and much more is being done to foster and develop the industry.

2. Fruit

The Fruit Division administers the Fruit Marks Acts, which have done much to keep up the reputation of Canadian fruit. It endeavours to prevent the spread of infection in orchards, sees to the removal of diseased trees, gives instruction in connection with the grading and packing of fruit, publishes a monthly report of the fruit crop, compiled from information forwarded by more than five thousand correspondents, and concerns itself generally with the development of fruit culture, on scientific lines.

3. Cold Storage

The Government gives bonuses to creameries for the erection of cold stores. These bonuses, which are under the control of the Cold Storage Division, usually amount to 100 dollars, and are only given provided the cold store is erected according to plans and specifications supplied by the Dairy and Cold Storage Commissioner. The result of this grant has been apparent in the increasing number of cold stores erected throughout the Dominion. But cold storage at the creameries was only the beginning of the movement. The next step was an iced car service, and iced cars are now the order of the day. The Government, in the case of butter cars, guarantees to the Railway Company two-thirds of the earnings on a minimum car, plus four dollars for icing. In the case of cheese cars, the Government pays five dollars for icing per car on a limited number of cars per week. A similar sum is paid for icing cars for the shipment of apples consigned to Montreal and Quebec for export. But the object of the Government was not yet attained. It had helped the farmer to manufacture dairy products and grow fruit. It had helped him to carry his products to the port of shipment. It had still to see that they were transported in good condition to the markets of the world, and so the Department of Agriculture was instrumental in establishing a splendid system of cold storage on ships crossing the Atlantic, and recently many thermographs have been used for the purpose of registering the variations of temperature from day to day on board steamships. On the arrival of a steamer in Britain, an inspector removes the charts and mails them at once to Canada. They are photographed, and copies sent to the Montreal Board of Trade, to the shipping agents, and to the engineers of the ship concerned. In this way something approximating perfection in cold storage will be attained. In 1907 the provision of cold storage facilities was carried a step further by the Cold Storage Act of that year, under which subsidies are payable by the government, towards the construction and equipment of public cold storage warehouses in Canada for the preservation of perishable food products, to an extent not exceeding 30 per cent. of their total cost.

4. Extension of Markets

The Extension of Markets Division has a twofold duty to perform. It has to see that all perishable produce is properly handled and

carried in the best possible condition to market. To ensure this, inspectors travel with iced cars, inspectors watch the discharge of the cargo at the different ports of shipment, and see it put on board ocean-bound steamers, and inspectors are present at the unloading on the other side. These inspectors keep in touch with headquarters, and a marked improvement in the handling and transit of perishable goods is thus effected. The other duty of the Extension of Markets Division is to get into touch with firms in European countries, with the view of establishing trade relations in farm products. Undoubtedly, such an organisation is much better able to do this than isolated individuals scattered throughout the provinces, and the justification is found in the fact that Canada is a new country with infant industries, which require to be assisted until they find their feet.

II. SEED COMMISSIONER'S BRANCH

The Seed Branch was, as already mentioned, till 1905 included as a division of the branch of the Commissioner of Agriculture and Dairying, but in that year it was raised to the rank of an independent branch, and Mr George H. Clark, one of the ablest officials in the service of the Government, was appointed Commissioner. Such a branch is of the utmost importance in Canada; for the importation of grain for seed purposes, in the early days made more necessary than it would otherwise have been by deterioration due to continuous cropping, introduced many weeds, which, unlike the cereals, have adapted themselves to the soil and the climate, and taken possession of many a farm. Besides eradicating the weeds, and thus tackling the subject from what may be called the negative side, it was necessary to attack it from the positive side, and produce pure cereals which were suited to the particular and varying climates of Canada. Such is the work which the Seed Commissioner's Branch has undertaken. This it is doing by various agencies. While it has no direct connection with the Seed Growers' Association, it works in conjunction with the Association and subsidises it to the extent of 3000 dollars every year. Investigation work is carried on at the Seed Laboratory, Ottawa, where there is an expert and ten assistants, six of whom do purely test work, three germination work, and one clerical work. In 1907 a Seed Laboratory of a similar kind was established at Calgary to serve the western provinces. The Federal and the Provincial Governments have for some years promoted Seed Fairs, which are largely educational. There are competitions, and prizes are awarded for the best exhibits. But the fairs are also of some commercial importance. Farmers who have seed to buy and sell meet for the purpose of doing business. These fairs are organised by the officers of the Seed Branch, who also act as judges at the competitions. Lecture courses at various centres throughout the provinces are organised. Field competitions of standing grain are held, and prizes awarded according to the value of the grain for seed purposes. The district officers of the Seed Branch also act

as inspectors, under the Seed Control Act, which provides a standard quality of seeds in respect of purity and vitality. The agricultural community is kept informed on all matters of importance by the publication and spread of bulletins.

III. LIVE STOCK BRANCH

Live Stock, like Seed, was till 1905 included as a division of the Branch of the Commissioner of Agriculture and Dairying. In that year, however, it was made into a separate branch, and is at present controlled by Dr J. G. Rutherford. It devotes its time to the improvement of the live stock industry by various means. For example, it supplies lecturers for Farmers' Institute Meetings and Live Stock Judging Schools. The lecturers, wherever possible, use living animals in place of charts and diagrams for demonstration purposes. They explain the points of the various stock, the best system of managing, housing, feeding, and marketing them, the recognised rules for breeding and cross-breeding, etc. At the Agricultural Shows, which are great institutions in Canada, the Live Stock Branch supplies judges, who often deliver addresses at the ring-side, giving reasons for the placing of their awards. Some years ago the branch organised auction sales of pure-bred stock for breeding purposes, with funds provided by the Federal and Provincial Governments, in order to secure the distribution of good breeds throughout the country, a work which is now carried on by Provincial Associations. The branch also sometime ago undertook to supervise the yearly testing of pure-bred dairy stock. The Breed Associations co-operate in this work, and publish as an appendix to their herd books the records of cows which reach the standard of registration in the Record of Performance. Through the instrumentality of the Live Stock Commissioner, all the pedigree records in Canada for pure bred live stock, with the exception of that for Holstein-Friesian Cattle, have been consolidated into what is known as the National Live Stock Records. While the registration of the several breeds continues to be controlled by the respective Record Associations, the work is carried on by a joint-committee elected by these associations in an office provided by the government. The registration certificates before being issued are submitted to an officer of the Live Stock Branch, who approves them for the Minister of Agriculture and affixes to each the seal of the Department.

IV. HEALTH OF ANIMALS BRANCH

Dr Rutherford is also at the head of the Health of Animals Branch. The object of this branch is to prevent diseased animals being brought into Canada or taken from place to place within the Dominion; and its efficiency is proved by the very small amount of disease which is found to exist amongst animals considering the extent of the country. Its work is divided into four sections :—

1. Quarantine

There are eight quarantine stations in the maritime and eastern provinces, three in Manitoba, four in Saskatchewan, three in Alberta, nine in British Columbia, and one in the Yukon Territory. These stations are equipped with the necessary facilities for the housing and care of animals during the quarantine period. A permanent staff is in charge of each. In addition to the quarantine stations, there are forty-one inspection stations, at which animals subject to inspection only, and not to quarantine, are allowed to enter if found free of disease.

2. Field Work

Field work consists in the control and eradication of contagious diseases within the Dominion, and is carried on by a corps of thoroughly trained and experienced veterinary surgeons, the majority of whom devote their undivided attention to this work. Some of these officers are stationed at definite points, while others work from Ottawa, or from the headquarters of the province in which they are stationed. Whenever an outbreak of a contagious disease is reported, an inspector is immediately despatched to make an investigation, and, when necessary, to carry out the provisions of the Animals Contagious Diseases Act, and the regulations made thereunder.

3. Pathological Work

This work is carried on by a staff of veterinary pathologists. It consists of the examination for diagnostic purposes of specimens forwarded from the inspectors of the branch and others. These examinations often necessitate specially detailed pathological and bacteriological investigations with animal inoculations. A laboratory is maintained at headquarters for the preparation of biological products as well as original research, and branch research laboratories have been established at Lethbridge and Vancouver. The original research work comprises the investigation of problems arising from the examination of specimens sent in, the improvement of methods in the preparation and standardisation of biological products, special investigation of obscure outbreaks of disease, and of diseases peculiar to certain localities, and the determining of the bactericidal value and general efficiency of antiseptic preparations.

4. Meat Inspection

Meat inspection was started on 3rd December 1907, under the provisions of the Meat and Canned Foods Act. This Act brings automatically under inspection all abattoirs which engage in provincial or export meat trade. The question of inspection within the boundaries of a province comes within the jurisdiction of the provincial and municipal authorities. There are at present thirty abattoirs in Canada under Federal inspection, necessitating the employment of seventy-three meat inspectors, who, with the exception of a few subordinates, are all specially trained veterinary

surgeons. The executive work of this division is in the hands of a Chief Meat Inspector, who is assisted by one travelling inspector in addition to an officer in charge of each abattoir. The inspection consists of a careful examination of every animal intended for slaughter in the yards or pens of the abattoir before being allowed to enter the killing floor. The inspector makes an equally thorough examination of every carcase. If no evidence of disease be found, the carcase is marked " Approved " with a stamp or label. Should any carcase be found showing any evidence of disease, such as to render it unfit for food, it is immediately marked " Condemned."

V. CENSUS AND STATISTICS OFFICE

This office was brought into existence in 1905 by Act of Parliament. It has to take a census every ten years of the whole of the Dominion, starting from 1911—a census which will not only include an enumeration of the people, but also an account of the whole resources of the country and of all the natural products of land and water. Such a census in a new and growing country is of the utmost importance, not only to the farmers of that country, but to the farmers of every country, for it enables them to measure the development and to meet the competition which must inevitably result from that development. Ten years, however, is a long time to be without a census in the rising provinces of the Far West, and it was provided that in Manitoba, Saskatchewan, and Alberta a census of population and agriculture should be taken in 1906, and every ten years thereafter. We shall thus have a census of the north-west provinces every five years. The Report on the first census was published in 1907. It is a storehouse of facts and figures indispensable to the student of Canadian agriculture.

PERCHERONS

GRANTS IN AID OF AGRICULTURE

THE total sums expended in all departments of agricultural administration in the Dominion are made up of grants derived from two distinct sources, viz. :—

(*a*) Grants by the Federal Government, secured by Special Annual Appropriation Acts; and
(*b*) Appropriations by the various Provincial Governments.

The following Tables (I. and II.) indicate the manner in which these grants are disbursed. It will be seen that the Federal Grants are chiefly applied to the maintenance of experimental farms and to the development of schemes of extensive or national scope. Agricultural education and the maintenance of agricultural colleges and schools are not provided for under the Federal Grants as a general rule, but are supported and administered by the various Provincial Governments.

Table I.—Federal Grants

Extract from the Dominion Appropriation Act of 1908-9, giving the various votes for agricultural purposes and the amount allocated to each service.

No. of Vote	Service	Grant
39	Census and Statistics Office . . .	$30,000
41	Experimental farms	130,000
42	Printing and distributing reports and bulletins of farms	8,000
44	Exhibitions	200,000
46	For the development of the dairying and fruit industries; and the improvement and transportation of, and the promotion of the sale and trade in food and other agricultural products (payments made from this sum not to be subject to the Civil Service Act) . .	125,000
47	To encourage the production and use of superior seeds of farm crops and for the enforcement of the Seed Control Act (payments made from this sum not to be subject to the Civil Service Act)	50,000
48	Towards the encouragement of the establishment of cold storage warehouses for the better preservation and handling of perishable food products	75,000

[*Continued on p.* 62.

Table II.—Appropriations in Aid of Agriculture by the

	Nova Scotia	New Brunswick
	$	$
Grants to Provincial and County Exhibitions	11,200	10,000
,, to Farmers' Institutes	2,600	3,000
,, to Horticultural Societies	11,900	..
,, to Agricultural Societies		8,800
,, to Agricultural Colleges and Farms	22,000	..
,, to Dairy Schools	..	500
,, for the encouragement of the Dairying Industry	..	4,500
,, in aid of Stock Breeding	5,500	..
,, for the encouragement of the Fruit Industry	..	400
,, to provide Bursaries, etc., for Students attending Colleges	..	300
,, for Administrative & Incidental Expenses	7,500	5,000
Special Grants.		
Cold Storage	..	750
Bonuses to Butter and Cheese Factories	..	2,000
In aid of the Poultry Industry	..	..
In aid of Provincial Seed Fairs	..	..
For Colonisation	..	..
Assistance to Grain-Growing Industry	..	..
To Veterinary College	..	..
For Weed Inspection, Game Preservation, and Destruction of Obnoxious Animals	..	..
For investigation into the Meat Industry	..	..
For Bacteriological Laboratory Research Work and Agricultural Education	..	..
To conduct experiments in connection with Farm Crops	..	..
For expenditure in connection with Brands	..	..
To promote the Sugar Beet Industry	..	..
For extension of Markets	..	..
In aid of Departmental Library	..	..
	60,700	35,250

* Includes proportion expended

various Provincial Governments for the Year 1908-9

Prince Edward Island	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
$	$	$	$	$	$	$
6,850	..	..	..	..	26,600	
1,142	60,600	30,272	..	..	8,000	
174	..	109,412	..	..	22,300	
..	52,000			..		
..	17,500	267,217	94,700	..	..	
..	5,500	..		..	..	
400	15,000	55,800	..	*61,579	14,000	
274	..	50,375	..	8,000	4,800	
22	..	63,500	..	..	500	
..	..	..	..	..	1,000	
411	82,700	80,794	..	57,280	3,100	
..	..	..	..	..	..	
..	28,000	..	..	..	..	
..	..	..	..	..	4,500	
255	..	..	..	..	600	
..	..	70,600	..	..	..	
..	..	..	..	56,350	..	
..	..	20,000	..	..	..	
..	..	..	..	28,850	30,000	
..	..	..	..	..	5,000	
..	..	..	..	12,830	..	
..	..	..	..	..	2,000	
..	..	..	..	..	2,900	
..	..	..	..	..	21,464	
..	..	..	..	..	500	
..	..	..	..	..	500	
9,528	261,300	747,970	94,700	224,889	147,764	31,980

Total Grant for all purposes, $31,980

Grand total, $1,614,081.

on the Poultry Industry.

Table I.—*continued from page 59.*

No. of Vote	Service	Grant
49	For the development of the live stock industry (payments made from this sum not to be subject to the Civil Service Act) . .	$45,000
50	Health of animals	300,000
51	Experimental farms — towards establishment and maintenance of additional branch stations	40,000
52	Grant to Dominion Exhibition . . .	50,000
	Total Federal Grants . .	$1,053,000

The salaries of certain officials of the Department of Agriculture are paid out of the Civil Government appropriation, and are not included in the above table.

A CRITICAL MOMENT

AGRICULTURAL EDUCATION AND RESEARCH

THE rural prosperity of Canada, especially of the great Province of Ontario, is undoubtedly due in some degree to the foresight of the Dominion and Provincial Governments in providing Research Institutions and Agricultural Colleges. The agricultural education

PRINCIPAL CREELMAN,
ONTARIO AGRICULTURAL COLLEGE, GUELPH

of Canada, from the rural school to the University, is rapidly assuming a homogeneity and co-ordination worthy of the closest study, and in large measure worthy of imitation in less favoured countries. A complete view of what is being done to increase the prosperity of the farmer, and elevate the social life of the country, can best be

obtained by considering the agricultural educational institutions in the following order :—

1. Rural Schools.
2. Consolidated Schools.
3. Macdonald Institutes.
4. Agricultural Colleges.
5. Farmers' Institutes.

Rural Schools

" Any system of education which aims at, or proposes to help the people who work on the farms, must be a system that will help the elementary rural schools, where the future men and women of the farm will get their formal education." Thus spoke Professor James Robertson before the Select Standing Committee on Agriculture and Colonisation. Professor Robertson is one of the first educationists in Canada, and his statement will admit no denial, for the number of school children who will adopt rural pursuits, and who are of an age to benefit from a longer or shorter course at an agricultural college, would require for their tuition several hundred such colleges; a requirement, at present, completely outwith the range of practical politics. The rural school must, therefore, be the basis of agricultural education. In Canada, as in nearly all other countries, the curriculum of the rural school has been designed on the urban school model to give children a good general education, apart altogether from country pursuits, and in the rural, as in the town school, stress has been laid upon verbal study. A further handicap arises from the small numbers and varying age of pupils in an average country school. One teacher may have charge of fifteen to twenty-five children of five to fifteen years of age, and of as many grades of intelligence.

Previous to the year 1900 attempts to improve the usefulness of rural schools by the introduction of school gardens and out-door study had been made tentatively and intermittently. In 1899 Professor Robertson laid the foundation of a great movement by offering prizes to school children for the largest heads of the best wheat and oats picked on their fathers' farms. The response was so gratifying, that in the following year Sir William C. Macdonald of Montreal offered 10,000 dollars in prizes to boys and girls who would select the largest heads of cereals and from them grow seed of their own. By 1903 the yield of spring wheat thus sown and reaped was 28 per cent. heavier than that of three years before from unselected seed; in oats the increase was 27 per cent. From this beginning arose the Canadian Seed Growers' Association of seniors as well as juniors, an association which by 1906 had bettered the crops of Canada to the extent of 500,000 dollars, and which is in a fair way to produce incalculable improvement on the farm crops of the country. Since 1900, when this very practical and successful attempt to introduce something living and interesting in the schools was made, the history of the correlation of agricultural education from rural school to University has been the history of the Macdonald

MAIN COLLEGE DRIVE, GUELPH

LADIES' RESIDENCE, MACDONALD HALL, GUELPH

movement. In the view of Professor Robertson, if the school trustees in rural areas were to be stimulated by example, the example must come from the towns; therefore, by his advice, Sir William Macdonald founded throughout Canada manual training centres at twenty-one places, attended by 7000 children, and costing 3600 dollars per month for teachers' salaries during three years. At the end of that term the local authorities were free to continue the schools if they pleased. The result of this effort was most gratifying. In every case the local authorities took over the schools and added to them. In Nova Scotia more than twenty school centres of the Macdonald type have arisen, built and conducted by means of local funds. In Ontario, where three Macdonald centres were started, there are now over forty.

A start in the newer education having been made in the towns, and the method proving a success, the country was likely to follow, provided that the new method proved suitable to the country conditions. In the country, provision for nature study, elementary biology, and elementary agriculture was the most desirable change in the curriculum. Professor Robertson and Sir William Macdonald adopted two methods of introducing the new teaching; first, by providing school gardens, and second, by consolidating rural schools.

School gardens were attached to each of five schools in each of five provinces. A trained instructor was put in charge of every group of five, giving one day every week to each school in his circuit, and spending his time in the instruction of the teacher as well as of the pupil. Those gardens have been a great success; and without losing sight of their purely educational objects, most useful lessons have been learned of the advantages of using selected seed, of the methods of protecting crops from insect and fungoid diseases, and of the benefits of rotation of crops. One or two of the concrete results from these school gardens may be briefly noted. At a school garden in Prince Edward Island the children reaped 32 per cent. more wheat from a plot sown from selected seed than from a plot sown from unselected seed, and when barley followed clover, the extra yield was 17 per cent. more than when barley followed a cereal. As remarkable as these results on crops, are the effects on the children themselves. In Ontario uniform examinations for entrance to high schools are held in July. In 1906, in Carleton county, in schools without gardens 49 per cent. of the candidates were successful; from five schools with gardens 71 per cent. of the pupils were successful. Thus it was shown that the work with the hands and in the garden increased, rather than diminished, the capacity for book work at the desk.

Consolidation of Rural Schools

In spite of everything that can be done for it, the rural school must remain inefficient in a sparsely settled district. It is too small and badly equipped, its teacher is almost always underpaid, and is therefore discontented, or a mere bird of passage. The remedy is to consolidate a number of rural schools into one larger

school, and transport the children by waggon twice daily. To test this system and set an example, Sir William founded four consolidated schools in Ontario, New Brunswick, Nova Scotia, and Prince Edward Island, with classes in manual training, household science, and nature study based on work in school gardens. The cost of these schools was 180,000 dollars for three years. This example was at once followed by local trustees (school boards), and consolidated schools are rapidly ousting the small inferior country school. In Nova Scotia alone there are now twenty-two consolidated schools in room of fifty-three schools of the old and inferior scale. Consolidation allows of special teachers for each subject, therefore better teachers; it permits the inclusion of manual training, nature study, agriculture, etc.; it raises the whole system of education at once to a higher standard; and it has increased the daily attendance ratio from 50 to 100 per cent.

Macdonald Institutes

The educational reforms outlined above at once created a demand for specially trained teachers of nature study, agriculture, manual training, household science, etc. Recognising that this demand for teachers must be supplied, Sir William Macdonald provided, at the Ontario Agricultural College at Guelph, two large buildings equipped for the residence and training of teachers. These institutions are a constituent part of the Ontario Agricultural College, and Principal Creelman is head of both, but it will be convenient to consider the Macdonald Institution apart from the College, keeping in mind, however, that the association of training centre with agriculture, and the utilisation of the agricultural staff are essential features of the work.

The following are the departments of the Institute :—

1. *Department of Home Economics*

With two objects in view. The one to bring to the vocation of home-making the same kind of help which the Ontario Agricultural College brings to the business of farming, the other to provide for the training of Home Science teachers for the public schools. This department includes four courses :—

(*a*) Normal course in Domestic Science. (Two years).
(*b*) Housekeepers' Course. (Two years).
(*c*) Home-makers' Course. (One year).
(*d*) Short course in Domestic Science. (Three months).

The subjects dealt with in these courses are too numerous for mention in detail, but they include physiology, hygiene, foods, cooking, sanitation, etc., among the more practical and teaching methods, and child study among the more theoretical. The short courses are distinctly practical, and the shortest course of all, of three months, provides for no examination or certificate. The students of the Department of Home Economics are all women.

2. *Department of Manual Training*

This includes a course for teachers, male and female, a correlated course of manual training with nature study, and optional courses in wood working, wood carving, art metal, basketry, etc.

3. *Department of Nature Study*

This Department is organised and equipped for the training of Canadian teachers in the knowledge of common forms and forces of nature, as a means of training children in observation, expression, and sympathy. The more advanced of the two courses in this Department covers a full year and enables teachers to qualify as specialists in the subjects, and as instructors in elementary agriculture and school gardening. The shorter course covers four weeks in summer, and when taken for successive years qualifies for a Rural Science Certificate. Generally speaking, the longer courses carry with them a certificate which qualifies the holder to teach the particular subject in the schools of Ontario. The fees for Ontario students are, for all Home Economic courses, 15 dollars per term. For optional courses not less than 5 dollars or more than 15 dollars.

The Macdonald Hall is a house of residence for women students of whom 110 can be accommodated at a charge of 3.50 dollars per week. Certain students may defray the cost of the short course in domestic science by serving four months as waitresses or dining-room girls in the Macdonald Hall, at the same time receiving free board and lodging and all student privileges.

The Macdonald Institute and Hall are the first in Canada for the training of teachers on this grand scale, but similar arrangements are in process of delevopment in Quebec, Nova Scotia, and Manitoba. They will be described in due course. The great advantage of combining such a training school with an agricultural college is obvious. The women students are brought into daily contact with agricultural problems by the members of the agricultural staff, who are in many cases their teachers, the trend of their education is in all respects country-wards, the examples used are agricultural, their numerous excursions in the summer bring them close to nature, and the situation of the College in the midst of beautiful scenery brings no town distractions.

Agricultural Colleges

The method by which it is proposed to bring together or correlate the education of a country boy or girl from the rural school to the consolidated school, and thence to the Macdonald Institute in the case of the girl, and the Agricultural College in the case of the boy, now brings us to the agricultural colleges in which a comparatively limited number of the future farmers and farmers' wives of the country can receive a training. The pupils of an agricultural college are, or will be, in large measure, the best of those who have passed

through the lower grades, and they will be more or less familiar with the elements of nature knowledge.

The provision of agricultural education is the function of each provincial government, and the first provincial government to apply public funds to the foundation of an agricultural college was that of Ontario, at present the greatest agricultural province of the Dominion.

Ontario Agricultural College, Guelph

This College was established in 1874 with a twofold object. First, to train young men in the science and art of improved husbandry; and second, to conduct experiments and publish the results. In both lines of work the College has been remarkably successful. Its students have increased year by year until in 1908 they numbered 920. Its experimental work combined with the influence of its students, who have returned to the farm, has greatly affected the agriculture of the province. In twenty years the produce of Ontario land has practically doubled without any appreciable increase of the acreage, and much of this improvement must be credited to the teachers and experimenters of the Guelph College. This institution of world wide fame is situated a mile and a half from the small city of Guelph in a pleasant undulating country of high class arable land. Its buildings are numerous and are magnificently equipped with apparatus, specimens, and teaching materials. Separate buildings have been erected for separate subjects or groups of subjects, and thus the agricultural building, the chemistry building, the biology building, etc., stand alone but adjacent, in a park like "campus" of lawns, shrubberies, and trees, most impressive to the visitor by reason of its extent, its beauty, and its utility. One of the finest buildings of the campus is that of the Massey Hall and Library, a gift of the late Mr Hart Massey. The Hall, which has seating accommodation for 450, is used for roll call, Sunday services and society meetings. The Library, which is housed above the hall, consists of reading rooms and accommodation for 80,000 volumes. A short distance from the main buildings are the barns, stables, and sheds of the farm of 400 to 500 acres, which is attached to the College. The stock-judging pavilion is conveniently situated for the farm and for the teaching staff and students. That side of the College work embodied in the Macdonald Institute has already been touched upon. The purely agricultural curriculum remains to be described.

Two of the requirements for admission are worth noting. One is that every candidate for admission must produce satisfactory evidence that he intends to follow as an occupation either agriculture, dairying, horticulture or some line of practical or professional work connected with these pursuits. A second requires him to produce certificates of having spent at least one year at work on a farm, and of having a practical knowledge of ordinary farm operations, such as harnessing and driving horses, plowing, harrowing, drilling, etc. When it is thought necessary his knowledge will

be tested by an examination at entrance or any subsequent date. It has been found at Guelph that in far too many cases a youth, with no previous knowledge of farm life, would, after two or three years at the College and possibly after a brilliant career, find himself totally out of sympathy with rural conditions and drift into commercial life. Principal Creelman is emphatic on the necessity for practical experience on the part of the candidate for admission. In spite of the fact that the College farm of 400 acres is always before them, and that students are required to take part in farm work, the

MASSEY HALL AND LIBRARY, GUELPH

Principal says, " A College farm is not the place to teach a student how to farm, a boy can go through a College course and take honours and know nothing about farming."

Courses of Study

The College offers five courses of study :—

(*a*) A four years' course leading to the Degree of Bachelor of Science of Agriculture of Toronto University.
(*b*) A two years' course leading to the Associate Diploma.
(*c*) A Factory Dairyman's Course extending over twelve weeks.
(*d*) A Poultry Course of four weeks.
(*e*) A Stock and Seed Judging Course of two weeks.

With the exception of English and mathematics, which are taught in the first year, the subjects are the same as those taught in the old country, but treated in greater detail and by a larger staff. A feature of the course at Guelph is the " apprenticeship " course, or experience in farm work. First and second year students are required to work in the outside departments during certain after-

noons of each week. The work is divided into seven departments, viz.—the Farm, the Live stock, the Dairy, the Poultry, the Horticultural, the Mechanical, and the Experimental. The students are sent in rotation to these departments and are required to take their turn at all jobs of every description. They are paid for their labour (apart from their instruction) and receive from four cents to nine cents per hour.

The cost during two years of the Associate Course need not exceed 75 dollars to 85 dollars a year for a resident who works regularly in the outside departments, and 100 dollars to 125 dollars a year for a non-resident who also works efficiently.

The Field Husbandry and Animal Husbandry Departments of this College are specially worthy of praise. The former has fifty acres of land entirely devoted to experimental work, and has perhaps had more influence upon Canadian agriculture than any other. Students are required to spend much of their time on this field examining crops, noting methods of experiments and their results.

In all American Agricultural Colleges considerable time is spent in judging stock and much attention is given to live stock. The Ontario Agricultural College has for many years been at the forefront of this work, and specimens of fifteen or sixteen breeds of horses, cattle, sheep, and swine are kept for demonstration and teaching. So successful has been the teaching that the Trophy contested for by teams of students from many of the agricultural colleges in America has been won in two successive years at Chicago by the Guelph team.

Short Courses

The short courses are of a highly practical nature, the most popular being the two weeks' course in stock and seed judging, which was attended by 328 farmers and farmers' sons in the past year.

Experimental and Research Work

For more than thirty years the College has been disseminating valuable information obtained by experiments on the farm and in the laboratory. The work of Professor Zavitz on the improvement of farm crops is known to all agricultural experimenters and teachers, and so successful is it that more than 30,000 people are attracted to the College every season chiefly to view the growing crops which are under experiment. The experiment field is under a four course rotation, viz.—grain, followed by a hoed crop which is usually maize or roots, followed by grain, followed by pasture. Each fourth of the whole area is laid out in parallel strips 100 links wide separated by permanent roadways 12 feet wide. Each plot is therefore 100 links long by whatever may be the convenient width for the particular crop or circumstance.

All experiments are carried on for five years before results are published. The extraordinary care exercised to obtain trustworthy

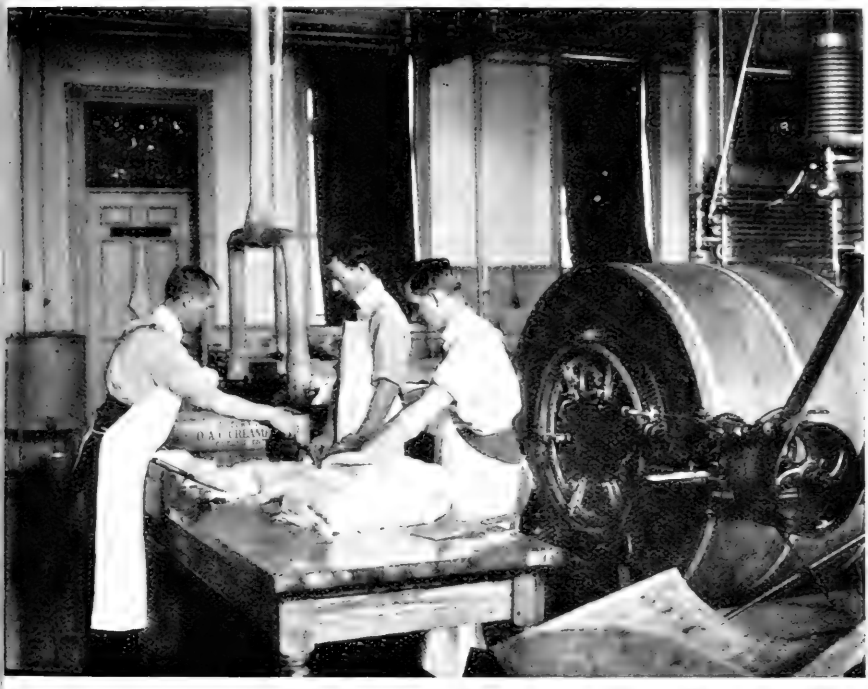
results is most impressive. A specially built large two storey building is devoted solely to the threshing and weighing of grain crops, and special threshing machinery of easily detachable nature, to allow thorough cleaning, is used to prevent admixture of varieties. Some of the most notable results of Professor Zavitz' work comprise the introduction by breeding and selection of varieties of cereals and forage crops much superior to the common kinds; the demonstration of better methods and times of sowing and cultiva-

PROFESSOR ZAVITZ DEMONSTRATING AT GUELPH
(MIDDLE OF PICTURE)

tion; and the discovery of rotations of crops suitable to the districts and the objects of dairy farmers and stock owners. The net results of the work of the Ontario Agricultural College are these. First, improved varieties of crops and better methods of cultivation have been introduced; second, much light has been thrown on the dairy industry and on the prevention of fungoid and insect diseases; third, the Ontario farmer has learned to apply to the College for information as to his business; and fourth and consequently, the College has obtained the unbounded confidence of the provincial government and of the agricultural community.

The Experimental Union

The work of Guelph College cannot be passed under review without mention of the Experimental Union which includes several thousand farmers and former students in its membership. This Association, of which Professor Zavitz is the organiser, distributes varieties of grain, roots, and forage crops to its members for experiment. It conducts field trials of manures and methods of cultivation, and generally does a great deal to bring the farmers in touch with the College and with the latest results of agricultural science. Its reports are published annually and contain the collective experience



MAKING BUTTER, GUELPH

of its thousands of members in all parts of Ontario. The Union is worked from the College and receives a grant from the provincial government.

County Instructors

A more recent development of agricultural education, partly through the College and partly by the direct action of the government, is the placing of a number of young men who have a thorough training as instructors in agriculture in various counties in Ontario. The duties of those instructors comprise lecturing to farmers, conducting classes in schools, giving advice on choice of seeds, uses of

manures, and generally assisting the farmer by every means. So far this move promises to be highly successful.

Nova Scotia College of Agriculture, Truro

This College, though only a few years old, comes next in age to the Guelph College. It is maintained by the Government of Nova Scotia, and is designed to serve the province and to take in students from Prince Edward Island and New Brunswick. The College is not residential and tuition is free to all. The courses here are short, the longest leading to an Associate Diploma obtainable in two years, but a Diploma student is received by Canadian and American Agricultural Colleges as a third year man and can proceed to the degree of B.Sc. without loss of time. The buildings here are good. The live stock pavilion deserves special mention. It is between fifty and sixty feet in diameter, and being lighted by electricity as well as by roof and side lights can be used at any time.

The live stock of the Nova Scotia College are remarkably good, partly because the government has imported a large number of pure bred sires, bulls, and rams for sale to farmers, and some of them are retained at the College. The live stock of the province being admittedly inferior, no better method of assisting the farmer can be imagined than the distribution of good sires and education in good types of which there is an abundant supply at the College. The dairy herd is particularly good, and contains a Holstein cow which produced 18,000 lbs or 1800 gallons of milk in 1907 of 3.1 per cent butter fat. As the average cow of the province is supposed to yield only 300 gallons per annum the effect of this cow and her kind on the students and farmers should be quickly seen. The short courses are similar to those of other Colleges and are well patronised. They include a short course for women on dairying and poultry keeping. A farm of 200 acres, part of which is marsh, of the kind so largely found in Nova Scotia, is well farmed and very clean, a striking contrast to some maritime farms. Most of the work of this College is in its preliminary stages, but under the energetic management of Principal Cumming, who is also the provincial Secretary of Agriculture, it is likely to alter very soon the farming conditions of Nova Scotia.

Manitoba College of Agriculture, Winnipeg

This College, which is only three years old, has already fine agricultural, dairy and residential buildings. A school of Domestic Science is being formed and will occupy one side of the campus. The students number 250 to 300. All students of agriculture must have resided for two years on a farm. The fees and cost of living are for Manitoba students about 110 dollars for residence, books, and tuition from October to March. There are special short courses as at other colleges, the only novel one being a course for farmers held in the autumn just before threshing time, covering two weeks, and dealing with engines, threshing machines, farm implements,

and elementary mechanics in general. The fee is 5 dollars. In connection with the College a convention addressed by the Provincial Premier is held every spring. The farmers who attended the last numbered 400, and the time was spent chiefly discussing dairying, stock, and seeds. The farm of 100 acres is only utilised for growing food for stock which are kept for demonstration purposes, and which comprise specimens of a number of the common breeds. A larger farm will probably be obtained shortly for experimental purposes.

In addition to the purely educational work of the College a great activity prevails for the benefit of the farmer. The Director of Agricultural Societies controls the government grants to fifty Agricultural Societies which must comply with the following regulations among others. Each society must consist of 200 members, must hold an annual show, and spend 50 dollars in prizes in which case it receives 350 dollars for every 50 dollars spent. The College provides judges for the shows. The College further organises farm competitions, which have been very successful, and seed and growing grain competitions under certain conditions. In order to earn the full grant each of the societies mentioned above must hold four Institute meetings in the year. These meetings are addressed by the staff of the College, or members of the staff of the Federal Department, or prominent farmers.

Agricultural Education in other Provinces

A certain amount of useful educational work in agriculture is being carried out in Prince Edward Island by means of lectures in the Prince of Wales College at Charlottetown, and by itinerant instruction. Farmers' sons desiring further education go to the Nova Scotia College at Truro, and the same holds good for New Brunswick, where, however, an Agricultural College or Department of Agriculture in connection with the University of New Brunswick is contemplated. In British Columbia a Department of Agriculture for educational purposes will form a section of the provincial University now being constituted at Vancouver.

Macdonald College at St Anne de Bellevue

The Province of Quebec has no provincial agricultural college maintained by public funds, but it has the Macdonald College at St Anne de Bellevue, probably the best equipped and most modern institution of that kind in the world. This College was founded, erected, and endowed by Sir William C. Macdonald of Montreal, for the following among other purposes. For the advancement of education; for the carrying on of research work and investigation; and for the dissemination of knowledge, all with particular regard to the interests and needs of the population in rural districts. Also to provide suitable and effective training for teachers, and especially for those whose work will directly affect the education in schools in rural districts. The College is situated on a beautiful site twenty

miles west of Montreal overlooking the Ottawa river, and its property comprises 561 acres arranged in three main areas (1) the Campus, with plots for illustration and research in grains, grasses, and flowers, containing 74 acres; (2) the Small Cultures Farm of 100 acres for cereal husbandry plots, horticulture, and poultry keeping; and (3) the Live Stock and Grain Farm of 387 acres.

The buildings are admirably arranged, and in their construction and fitting are beyond all praise, and perfect to the verge of extravagance.

It is questionable if an expenditure of public money on the same scale would be justifiable, but it is fortunate for the province and for the Dominion of Canada, and possibly for the Empire, that such a magnificent donation has taken form and substance to serve as an inspiration and stimulus to agricultural education all over the American continent and the British Empire.

The College is divided into three schools, and a student is enrolled in the one in which the major portion of the work is taken.

1. The School for Teachers, which provides a comprehensive and thoroughly practical training in the art and science of teaching.

2. The School of Agriculture, which aims to provide a theoretical and practical training in the several branches of agriculture.

3. The School of Household Science, in which young women receive training which will make for the improvement and greater enjoyment of home life.

In the School of Agriculture and the School for Teachers the tuition is free to Canadians, in the School of Household Science there is a fee of 25 dollars per session. The charges for board and lodging are, for each occupant of a double room with single beds, 3.25 dollars per week. The courses of instruction are on the same general lines as those described as part of the Ontario College curriculum. The College is affiliated with the M'Gill University from which the higher degree is received. The outstanding feature of this College is the combination from the beginning and not as additions, of three schools, so organised that while each supplies a special training for a definite end, the foundational teaching is the same in all. The roots of the College draw, as it were, from all sources to form a stem of knowledge applicable to the country: knowledge of climate, weather, plants, animals, of simple physiology and physics, in a word, of Nature. On this common stem are grafted three branches, each bearing fruit according to its kind, but each fruit tinged and flavoured by the common stock from which it springs. The advantages of the combination are clear. The embryo rural teacher is never far from rural problems, and always in sight of farming and gardening on the best principles. The student of Household Science is taught the dependence of the farm on the house, and the house on the farm, and the agricultural student, having shared the elementary knowledge with the teacher and the home-maker, takes a wider, finer view of his own occupation and of its social and national importance. Professor Robertson, the presiding genius of the Macdonald College, is an idealist full of practical enthusiasms and common sense. He has planned the College so that it is the expression of modern thought

on the problems of agricultural education, and so that it cannot fail to have a far reaching and permanent influence upon the agricultural and social life of Canada.

Farmers' Institutes

The last but not the least important of the organisations for the education of the farmer is the Farmers' Institute. Those of the Province of Ontario have been established for twenty-three years, are very numerous and are well organised so they may be taken as typical. A farmers' institute is to all intents and purposes a farmers' club, financially assisted by grants from the provincial legislature, and from countries and municipalities, the grants from the first being in proportion to the grants from the two latter. The object of each local institute is the dissemination of agricultural knowledge in its neighbourhood and the development of local talent. Its officers endeavour to bring the rank and file of the farmers into touch with the most successful local men, so that the masses may become conversant with the best and most profitable methods of farming, stock raising, dairying, fruit culture, and all branches of business connected with the industry of agriculture.

The more important regulations governing the money grants are these—the membership must reach a certain specified minimum and each member must pay a subscription ; at least five meetings must be held each year, and all monies received from whatever source must be spent within the district in which the institute operates, and for the following purposes : to defray any expenses of the meetings, to remunerate suitable persons for addressing the meetings, to assist in circulating agricultural literature and periodicals among the members, or to establish a circulating library, or to remunerate the Secretary or others for services rendered. The work of all the local institutes is co-ordinated by the Superintendent, who is an official of the provincial Department of Agriculture and responsible to the Minister of Agriculture. The Superintendent directs and advises the local executives, oversees the administration of the funds, and provides lecturers, who are called delegates, for some of the meetings. The delegates are mainly successful agriculturists who are also good lecturers, and as they are selected each year from those who have been most popular in previous years, along with younger blood, a steady supply of capable men is obtained. All subjects of rural economy are touched upon, and a glance at the Superintendent's Annual Report, which contains many of the addresses, is sufficient proof of the educational value of the work. One of the advantages of membership of the institute is the right to such agricultural publications as the Annual Report already mentioned, the Report of the Agricultural College and Experiment Station, the Report of the Experimental Union, and the proceedings of various Live Stock, Dairy, and Fruit and Poultry Associations.

Women's Institutes

It has been said that the Farmers' Institutes have been of more benefit to the agricultural communities than any other organisation, but it is held by some that the Women's Institutes, which were established eleven or twelve years ago on the same lines, will be even more successful. These institutes are the creation of the Department of Agriculture, and receive grants from the government. Their objects are—the dissemination of knowledge relating to Domestic Economy, including household architecture, with special attention to home sanitation; a better understanding of the economic and hygienic value of foods, clothing, and fuel, and a more scientific care and training of children with a view to raising the standard of health and morals of the people; and the carrying on of any line of work, which has for its object the uplifting of the home, or the betterment of conditions surrounding rural life. Their official publication is the *Home Journal*, and, judging from the reports of work in progress, their effect upon the homes of the people of Ontario must, in time, be productive of incalculable good.

In taking a wide view of the educational work in Canada in assistance of agriculture, two or three impressions bite deep upon the mind of the inquisitor: it is plain, that the Federal and Provincial Governments are alive to the actual cash profit ensuing to the country from technical education, that private individuals of great wealth are remarkably liberal givers to educational objects, and that all literature likely to be useful to the dweller upon the soil is distributed to almost every occupier of land.

STUMP FENCE AND CORN FIELD

EXPERIMENTAL FARMS

Under the care of the Dominion Department of Agriculture, experimental farms have been established in all the provinces of Canada. They owe their inception to the report of a Select Committee appointed by the House of Commons in 1884 to inquire into the best means of developing the agricultural interests of the country.

The Committee reported that in Canadian agriculture at that time very little attention was paid to the proper rotation of crops, the selection of good seed, the best varieties of it, and the proper cultivation of the soil. Farmers had little or no knowledge of the value of manures and their use in keeping up the fertility, with the result that valuable fertilizing material was frequently wasted and the land in cultivation was becoming less productive. Very little attention was paid to the improvement of stock, and the selection and feeding of milch cows, while, owing to the want of skill and the use of proper appliances, the quality of the dairy products, such as butter and cheese, was inferior.

In fact, in all branches of agricultural and horticultural work there was a deplorable want of knowledge. To remedy this state of affairs the Committee recommended that the Government establish an experimental farm or farms where experiments might be carried out in connection with all branches of agriculture and horticulture, and that the results of the work conducted should be published from time to time and fully disseminated among farmers of the Dominion.

The first definite step to establish the experimental farms was taken in 1886. After full information had been gathered regarding experimental stations, then in operation in Europe and America, an Act was passed which provided for the establishment of a Central Experimental Farm and four branch farms. The Central Farm was to be located near the Capital, Ottawa, where it was to serve the provinces of Quebec and Ontario. The branch farms were to be distributed over the Dominion, one for the Maritime Provinces jointly, one for the Province of Manitoba, one for the North-West Territories, and one for British Columbia. Within two years the land for these farms was secured, officers appointed, buildings erected and equipped. The Central Farm was located just outside Ottawa; the branch farm for the Maritime Provinces – Prince Edward Island, Nova Scotia, and New Brunswick—at Nappan in Nova Scotia; that for Manitoba at Brandon; another at Indian Head was assigned to what was then known as the North-West Territories; and one at Agassiz for British Columbia. Development in the west, however, has speedily outgrown the arrangement there. Four years ago the southern part of the North-West Territories

was divided into the two great farming provinces of Saskatchewan and Alberta. But the Department of Agriculture of the Dominion has been equal to the occasion. Indian Head falls to Saskatchewan, and there are already two fully equipped branch experimental farms in the four year old province of Alberta. One at Lethbridge, with a considerable area already under irrigation, is grappling with problems of growing crops by irrigation and the difficulties of "Dry" farming, which are of such importance to the thousands of settlers who are trooping into the new country and rapidly bringing its rich, though somewhat arid land into subjection. The other is in the northern part of Alberta at Lacombe, about 70 miles south of Edmonton, where the conditions differ consider-

THE COMMISSION AT EXPERIMENTAL FARM, MACDONALD COLLEGE

ably from those around Lethbridge, and a different set of problems confront the settler. But the new branch farm at Lacombe gives good promise of help in solving them.

In choosing the sites of these farms, the purpose in view was to have them fairly representative, both as to soil and climate of the larger settled areas in the provinces in which they are placed; and in arranging the work the first consideration was to have experiments and demonstrations that were most likely to be beneficial to the larger number of settlers.

Another factor of great importance in connection with the experimental farms is the organisation for conveying information to farmers. The experimental farms and the staff are really bureaus of information available to every farmer. Evidence of their usefulness in this way is furnished in the rapid increase of correspondence carried on with the farmers in all parts of the

Dominion. The year after the farms were organised the number of letters received was about 8000. Within five years they increased to over 25,000, and during the past ten years 1898 to 1907, the average number received annually was 72,619. In addition to this correspondence over 300,000 copies of reports, bulletins, and circulars are sent out every year. There is thus a constant flow of information going to Canadian farmers from all the experimental farms.

All the work is under the direction of Dr William Saunders, C.M.G., who is responsible to the Minister of Agriculture. He is ably supported by a staff of officers which embraces a Botanist and Entomologist—the late Dr James Fletcher occupied this post at the time of our visit; an Agriculturist, Mr J. H. Grisdale, B.Agr.: a Chemist, Mr F. T. Shutt; a Horticulturist, Mr W. T. Macoun: a Cerealist, Dr C. E. Saunders; and a Poultry Manager, Mr A. G. Gilbert. Each branch farm is managed by a Superintendent who is directed from headquarters. The Central Farm at Ottawa, which is splendidly equipped with buildings, extends to 466 acres, of which 250 acres are devoted to experiments and crops in charge of the agriculturist. The cerealist gets 33 acres; 10 has been set aside for horticultural experiments with fertilisers, while orchards and vegetable grounds claim 45. The Arboretum and Botanic Gardens which contain two specimens each of 3000 different kinds of trees and shrubs, and an equal number of perennial plants, extend to 65 acres: forest belts take 21; grass and fodder testing plots 2; and the remaining 40 acres are taken up with roads, building sites, lawns, etc. To carry on this large establishment thirty staff officials and about seventy labourers are required; and for maintenance 80,000 dollars. Little, except in a general way, can be said here of the work. It will be apparent that it falls to be divided into departments which are reported on by the respective officers, and a brief review of some of it may be interesting and will suffice to give some idea of its nature and scope.

Agriculturists' Department

The chief work in this Department falls under field work and the management of live stock. The former extends to cultivation and manuring of soil, and the growing of all kinds of farm crops; while the latter embraces breeding, housing, and feeding of all kinds of farm animals.

In the sphere of field work experiments have been conducted to determine the best methods of growing various crops, and the cost of producing them per acre and per ton of feed. When it is remembered that this work is carried on for settlers who, in many cases with little or no knowledge of any kind of agriculture, are grappling with the problems of growing the crops best suited to the unknown condition of a new country, no one can doubt the far reaching effect of even this series of investigations alone, as a means of enriching both the individual and the community. Another series of experiments closely allied with these is an attempt to determine how many cattle can be kept on a given area of land.

HOLSTEIN COW AT TRURO AGRICULTURAL COLLEGE

HOLSTEIN BULL AT TRURO AGRICULTURAL COLLEGE

or in other words, the stock bearing capacity of land. This has been carried out on a 40-acre plot; while in another experiment known as the 200-acre farm the object is to measure and demonstrate the farming possibilities of this area of land when a definite system of cropping is pursued and everything managed according to enlightened ideas. These examples sufficiently illustrate the scope and usefulness of the work in this branch.

Equally useful to the agriculturists in a newly settled country are the experiments and the recorded observations made with live stock. The admirable equipment for this class of work at the Central Farm has been, and is fully made use of. Cattle breeding experiments and investigations into the production of beef and milk, date from 1889, when forty-four head of cattle were bought. This purchase included Shorthorns, Ayrshires, Holsteins, Jerseys, and Polled-angus; some of these have been discarded, but at the present time the herd includes Shorthorns, Ayrshires, Guernseys and Canadians.

A brief recital of the experiments in beef and milk production and results obtained will serve to indicate the scope and the usefulness of the work.

Beef Production

Under this heading some of the work carried on has been along the lines of :—

1. *Breeding*

The experiments show that breeding affects very materially the chances of profit from feeding steers. The more typically beef type the breeding stock, the more certain and greater are the profits on the progeny.

2. *Testing various Feeds as to their Value for Beef Production*

Practically every available feed, both rough and concentrated, has been experimented with, but space will not permit of giving results save in a general way. For roughage (bulky food)—corn silage, mangels and turnips are about equally valuable as the succulent part of the ration, clover hay and alfalfa rank first as dry coarse feeds, while for concentrated food corn (maize) ranks very high, although gluten meal is probably its equal. Mixed meals give excellent results. Oats 100, bran 100, oil meal 100, constitutes a very excellent meal mixture.

3. *Testing Values of Rations*

Much has been done by way of testing the value of various rations for beef production. Not to enter into details it may be said that for a 1000-lb. steer under full feed the following ration

has never been surpassed either as to palatability or fattening qualities :—

	lbs.
Indian Corn silage	50
Roots (turnips)	20
Cut straw (oat)	2
Clover hay (well cured)	6
Bran	2
Indian Corn (ground)	4
Oil meal	2

The silage, pulp roots, chopped straw, and meal all mixed together and fed in equal portions night and morning, part of the hay following each feed of chopped forage.

4. *Studying Influence of Age on cost of Beef*

For a number of years a study of the influence of age on the cost of making gains or increasing the weights of steers has been under investigation. The experiments show a fairly regular gradation of cost according to age, that is, the older the animal and the longer on feed the more expensive to make a pound of increase in weight. Average results show :—

	Cost per 100 lbs. increase in live weight.
Steers from birth to 6 months	$2.24
,, 6 to 12 months	4.11
,, 1 to 2 years	5.49
,, $2\frac{1}{2}$ to 3 years	6.17
,, $3\frac{1}{2}$ to 4 years	7.98

In the fattening period early gains are always very much more cheaply put on than later gains. First month gains with three-year olds are not infrequently made at as low a cost as 4 cents per pound, while later gains with the same animal may cost from 15 to 20 cents per pound.

5. *Studying Influence of Methods of Housing on Cost of Beef*

Comparing steers fed loose in box stalls with similar steers fed tied in stalls, and making a study of the number that may best be fed together loose in box stalls, the results would indicate that—

(*a*) Steers fed in box stalls loose do better than similar steers fed tied on similar feed.

(*b*) From eight to ten in a box give better results than a larger number. Steers fed loose together must be fairly uniform as to size and quiet as to disposition.

6. *Baby Beef*

Experiments in baby beef production show a decided advantage in getting steers ready for the block at as early an age as possible rather than in letting them go till three or four years old before having them ready to kill. Steers fed and got ready for the block

under two years old have always left a good profit. Steers kept after that age have shown a loss.

7. *Length of Feeding Period*

Experiments in feeding for a long period compared as to profit with feeding for a short period have shown that if rough bulky food be relatively more plentiful and cheaper than meal, then the "long feed" is more profitable, but where meal is plentiful and roughage scarce, then the "short feed" is likely to be more profitable.

HOW THEY LEAD CATTLE OUT WEST

8. *Influence of Quality or Breeding on Possibilities of Profit in Feeding Operations*

Experiments in feeding lots of an inferior class of steer in comparison with lots of a medium class of steer and lots of a superior class of steer go to show that the superior class give greater returns for feed fed, make greater gains in a given time and sell for a higher price than do the inferior class.

9. *Methods of Feeding*

Feeding steers twice a day rather than more frequently has been found advisable. Feeding a succulent ration has been found to be cheaper and more wholesome than an all dry feed ration. Mixing roughage (bulky food) and meal seems to give better results than feeding them separately. It is advisable to feed some long hay after each chopped feed portion. Clipping, dipping, or washing steers on entering byres in autumn is profitable. Brushing steers down frequently pays.

TOWN OF INDIAN HEAD, SASKATCHEWAN, SHOWING ELEVEN ELEVATORS

Dairy Cattle

Some lines of work were conducted with dairy cattle and the results are as follows :—

1. *Breeding*

Work in breeding for milk production seems to show that :—

(*a*) Superior dairy cows may be found in all breeds.

(*b*) Pure-bred females are not essential to success in dairy farming, but a pure-bred bull should always be used.

2. *Economy of Production of Milk*

Cheap milk production is assured by the use of succulent or juicy feeds, such as mangels, sugar beet, and silage, nitrogenous or flesh and milk forming feeds such as clover and Lucerne hay, bran, oats and oil-meal on well-bred stock in well-lighted, well-ventilated, comfortably bedded stables.

3. *Values of different Feeds, both Rough and Concentrated*

Sugar beets probably rank first as a succulent feed, mangels and silage however, being excellent. Bran, oil-meal, ground oats, shorts, and gluten are the best concentrates.

4. *Influence of Feeds on Quality and Quantity of Milk*

Feeds do not affect the quality of the milk produced so far as percentage of fat is concerned, but may affect the flavour of the milk or the character of the butter. They will also affect the total quantity of fat produced in a given time as well as the quantity of milk produced in the same given time.

5. *Individual Records*

Individual records have been found to be very valuable as a guide in breeding and feeding. Weighing the milk night and morning from each cow served not only to show what a cow is at the end of the year, but is sure to make each cow do better on the average, for the milker cannot help taking an interest in her record and so do his best by her as to feed and care.

6. *Influence of Hours of Milking on Quantity and Quality of Milk*

Whether milking be performed at equal or unequal intervals does not seem to affect the quantities of either the milk or butter fat yielded by a cow, but does affect the character of the milk after each milking. The smaller quantity and the higher percentage of fat has been obtained after the shorter interval. Regularity in hours of milking is essential.

7. *Cost of Feeding*

Cost of feeding should be carefully studied as the experience at the experimental farm shows that saving or improvement is frequently possible, individuals being often fed too heavy or too light a ration for the milk that is being produced or that might be produced at a given time.

Sheep and Pigs

Sheep do not receive very much attention in Canada, and although represented at the experimental farms, little experimental work has been undertaken with them so far. But swine as might be expected from the importance of the bacon trade with Great Britain have been the subject of valuable and interesting experiments. So much has been done by the Dominion experiment farms, the agricultural colleges, and other agencies to improve the breed of swine and demonstrate the best type of bacon pigs, that in Canada swine of exceptional commercial merit, and of greater uniformity are met with, than can be seen in our home markets. All the leading breeds are represented at the experimental farm at Ottawa and experiments are continually under way to determine the breeding and the feeding at the lowest cost of hogs of the most suitable type. The swine, particularly the breeding stock, are kept out of doors in summer, usually in pens on grass or other forage. Portable houses and shelters from the scorching of the sun are provided. By this means they are maintained in robust healthy condition and need little attention. The bulk of the experimental feeding has ranged around such problems as the effect of housing, feeding pigs on pasture as compared with feeding in pens ; feeding whole versus ground grain ; cooked versus raw food ; soaked versus dry food ; boiled versus soaked wheat ; and the value of frozen wheat in pig feeding, an experiment which has shown that the misfortune of frozen wheat need not be so calamitous as it is sometimes depicted, as its value for pig-feeding with pigs at 3d per lb. live weight varies from 30 to 60 cents per bushel. Space forbids even a summary of these results ; but an excellent review of this work has been recently published in bulletin form. To it the interested reader must be referred. There will be found valuable information on the management of pigs, etc., much of it of wide interest and general application.

The Horticultural Division

This division of the Central Experimental Farm at Ottawa was organised in 1887 when experimental work was begun.

Briefly, a few of the main features of the experiments may be indicated. Testing varieties has received a great deal of attention. The variety is at the foundation of successful horticulture ; for without the most suitable variety the grower cannot compete successfully with his fellow-growers. Varieties have been sought for in many quarters by the Department and tried until the number

of named varieties of apples tested up to the present time, including about forty crab apples, exceeds six hundred. Among these have been many Russian apples, because it was thought that they might be hardier than those of American origin. A few of the conclusions reached after about twenty years work in testing the named varieties on the market seem sufficiently interesting and suggestive for recapitulation here.

Summer and autumn apples, *i.e.* apples suitable for consumption in these seasons have proved to be the hardiest. They include most of the Russian varieties. No winter variety equal to such commercial sorts as Greening, King, Baldwin and Northern Spy has yet been found hardy enough to grow at Ottawa. Some good winter sorts, however, live and bear fruit for several years, but most of them are eventually killed by the severe winter. Some of the Russian apples appear to be hardier than any apples of American origin, and their introduction has been the means of extending the culture of this fruit to Southern Manitoba. They are, however, mostly summer and fall varieties, but a few of them keep well into winter. The continuous work carried on in apple testing has enabled the Department to publish a valuable bulletin, which has been widely distributed, recommending a list of the best varieties suitable for the different districts. In addition to experiments with named sorts, interesting work has also been done in producing new varieties, it being hoped that seedlings raised in Canada will give desirable sorts. Persons who have produced seedlings are invited to help with this work by sending specimens of the fruit for examination, and if the variety is thought promising scions are asked for. By this means a collection of eighty-three very promising seedlings has been made. In 1890 another attempt was made to get hardy sorts by raising 3000 seedlings from apple seed brought from north of Riga in Russia. These have been cultivated at Ottawa and gradually reduced to seventy-five trees. Out of this number there are a few that may prove superior to any hitherto available variety of the same season. Twenty-five of these seedlings being very hardy have been sent to Manitoba and the North-West for trial. Here it may also be mentioned that Dr Saunders himself, for many years, devoted much attention to cross-breeding of apples with a view of getting suitable varieties for these districts.

Equally useful to the fruit growers have been the cultural experiments carried out by the horticultural division. They have dealt with practical subjects, suth as fall versus spring planting, root killing of apple trees and the growing of cover crops. The last-named subject is of outstanding importance as it is the recognised method of keeping up the fertility of the soil in Canadian orchards. This cover crop consists of a catch crop between the rows of fruit trees. Trial crops have included crimson clover, mammoth red clover, common red clover, alfalfa, soy beans, cow peas, English horse beans, hairy vetch, summer vetch, buck-wheat, and rape. The conclusions reached are that these cover crops are valuable, and that mammoth red clover, and common red clover,

sown about the middle of July at the rate of 12 lbs. of seed per acre, are the best and cheapest of the leguminous plants for this purpose ; summer vetch also gave good results, while rape is the best of the non-leguminous plants, and a mixture of it and English horse beans was found very satisfactory.

The work described applies more particularly to apples, but experiments have also been conducted in the culture of plums, pears, peaches, cherries, grapes, raspberries, blackberries, currants gooseberries, and strawberries, all of which grow to remarkable perfection in some districts of Canada.

Vegetable culture has also received much attention. It has been demonstrated that Canada can grow a very great variety of vegetables to a high degree of perfection if proper cultural methods are adopted. Hundreds of varieties have been tested at the experimental farms ; and concise lists of the best vegetables for farmers, with information as to the best methods of cultivating them, have been widely disseminated.

Forestry forms a most important branch of the horticultural work. The forest belts at the Central Farm extend to 21 acres. The forestry has been to a great extent directed with the object of discovering and demonstrating how to grow the hardiest and best varieties of trees and shrubs for adorning the homes of farmers, and for providing shelter belts on the treeless wind-swept plains of the great West. The time has come when men are beginning to think of attractive homes on the prairie.

The experimental work in forestry has clearly shown that this is possible and not even difficult if properly set about. There are trees that will thrive anywhere in these regions, and grow with great rapidity, even from seed if the ground is tilled previous to sowing or planting and kept free of weeds until the trees are established. The Department of the Interior of the Dominion Government has done much to demonstrate the best methods of cultivating trees and the great effect of shelter belts on the wind-swept plains, and it offers abundance of young trees and seed free to all farmers who undertake to comply with the regulations for the establishment of shelter-belts. For this excellent purpose a great forestry department and nursery has been established not far from the branch experimental farm at Indian Head. Farmers on the prairie meanwhile, however, are mostly so much engrossed in striving to increase their slender capital that they have little time to spare on making beautiful homes. But that is coming. Even in the most unlikely places a few were found who pointed proudly to young clumps and strips of trees which they had planted soon after their arrival. They were sufficient to demonstrate that it is possible to alter the whole aspect of the treeless prairie ; for the growth of such trees as Manitoba maple, and certain species of poplar, is so rapid as to yield 5 or 6 feet of growth in three years, even when grown from seed. This work is certain in the future to have a far-reaching effect on the prairie, and the comfort of living there. The settler will be fortunate who early recognises the possibilities of trees as a means

of improving his property and adding to his material and æsthetic comfort. The prosperous wheat farmer of to-day will do well to provide for the coming time when mixed farming will have to be his mainstay.

Cereal Division

Though only recently organised into a separate division the work of testing and breeding cereals, has been carried on ever since the Dominion experimental farms were established. For sixteen years this work was under the immediate care of the Director, Dr William Saunders, but in 1903 a new officer in the person of his son, Dr C. E. Saunders, was appointed to take charge of this branch of experimental enquiry, and to devote his whole time to it.

The work carried on has included the importation and trial of varieties of wheat secured from many sources. In this way many different sorts of seed were brought together from all over the world for comparative tests, the object being to determine their relative value in yield, earliness, strength of straw, quality of grain, etc., when grown closely together under conditions as nearly uniform as possible. Many varieties, and a few interesting ones that may prove valuable, have been obtained from abroad from time to time. But the conclusion arrived at is, that as a rule greater success will be obtained by breeding new varieties at home, rather than by importing varieties bred in other countries under climatic conditions usually quite different from those of Canada.

The system of uniform test plots which has been practised since the start of the experimental farms, has been found very suitable in reaching conclusions as to the relative merits of varieties of grain. The size of plot has been changed frequently, but of late years the standard has been one-fortieth of an acre. Smaller plots than this are not regarded as satisfactory for cereals, and larger plots are not practicable at the Central Experimental Farm owing to the large number of plots required.

A very large number of varieties have been tested. Some have proved distinctly inferior to others and have been rejected after a few years' trial so that the work might be kept within reasonable bounds. These systematic tests have not only given valuable information in regard to the varieties in general cultivation, but have also enabled the experimental farms to distribute among farmers a selection of the very best among the newly produced sorts. Moreover, for the information of farmers, some of the most important conclusions drawn from the tests are published annually along with short lists of the varieties recommended for general cultivation as well as for special purposes.

Other problems that have engaged the Cereal Division Staff are the quantity of seed to sow per acre, and also the best time to sow. In Canada seeding is very much lighter than in the Old Country. Experiments are being conducted to determine the best quantity of seed to sow in the case of wheat, oats, and barley on both heavy and light soils. The results vary somewhat from season to season,

and the tests are being continued through a series of years. With regard to the best time to sow, it has been shown that a difference of a week or two in the time of sowing makes an enormous difference in the yield.

A very valuable addition in equipment that has been made to this division in recent years is a small flour mill and baking apparatus. It is now possible to make satisfactory milling and baking tests from very small quantities of wheat; hence an important feature has been added to the work of the cereal division, and the possibilities of doing good service to the country have been considerably increased. All the new varieties produced at the experimental farms are subject to milling and baking tests before being distributed to farmers for trials.

This system has made it possible to eliminate some undesirable new sorts which though very promising in most respects were found to be deficient in flour strength for bread making.

Testing in this way has also clearly demonstrated the inferiority of club wheat and Western farmers have been strongly advised to discontinue sowing it. In the same way it has been shown that flour from very soft Red Fife wheat has markedly less strength for baking purposes than that obtained from very hard Red Fife. The two samples compared were both grown in the same district of Manitoba but on different kinds of soil. This investigation into the quality of wheats is to be extended to all the leading sorts of both spring and winter wheats now grown in Canada. It is believed that many farmers pay too little attention to the quality of the varieties they grow, and in many instances it will be found practicable to substitute superior sorts for those now being cultivated. At present, however, the information obtainable by farmers in regard to the quality of the leading sorts of wheat is very meagre, and with the Canadian system of marketing grain in large bulk of mixed lots, it is desirable in the interests of all that only wheat of a high standard of quality should be grown.

The Chemical Division

Part of the equipment of the Central Experimental Farm consists of a splendid chemical laboratory where since 1887 it may be said the building of the agricultural chemistry of Canada has been going on. Owing to destruction of the original laboratory by fire in 1896, the present building was erected. It is of a most up-to-date description, consisting of basement, main and upper floors. The main floor is occupied by two laboratories and offices for the chief chemist and two assistant chemists. The upper floor provides rooms for storage of samples and for photographic purposes, while the store rooms for chemicals, apparatus, and grinding and milling rooms are in the basement. This institution and its resources are devoted to the aid of Canadian farming by research work, analysis, and correspondence. In this it has been the studied policy from the outset, as in all the departments of the experimental farm system,

to keep in touch with the farmer so that the staff might have an opportunity not only of rendering immediate and direct assistance, but also of learning at first hand, those problems that are confronting the agriculturist in different parts of the Dominion, and which require what might be termed scientific aid for their solution.

The work may therefore be said to fall under two sub-divisions : education and investigation, though between these there is no sharp line of demarcation.

The former is carried on by correspondence, letters being received daily in which questions are asked relating to soils and their treatment, manures and fertilizers, their composition and use ; cattle foods ; insecticides, dairy products, etc. This branch of the work has frequently to be prosecuted at the expense of investigation and research, but it is pursued in the belief that the education of the individual is often the preparatory step towards the education of the community. Another educational method made use of is the delivery of lectures and addresses. By this means information is disseminated and contact established between the staff and many of the best farmers, dairymen, and fruit-growers in the Dominion. A concise account of each year's work is pubished in the annual report which is widely distributed ; and special investigations are written up in bulletin form as researches are completed or brought to a stage that the results obtained are of value to the agriculturist.

The division is made as practically useful as possible by examining and reporting upon all samples of an agricultural nature forwarded by farmers. These are received from all parts of Canada, and include soils, naturally occurring fertilizers, forage plants and cattle foods, well waters, dairy products, and insecticides. As far as time permits and occasion demands, these are examined chemically and microscopically. The greater number of these can only receive a partial analysis, but in every case an endeavour is made to make such determinations as will furnish useful information to the sender. Between five hundred and seven hundred of such samples are received yearly, and an account of those which afford information of general interest is given in the annual report.

In the investigation and research work that has been undertaken the aim has been to carry out by the aid of chemistry such investigations as may serve to solve the problems in Canadian agriculture which more or less affect the country in general. Only a few illustrations can be given here. They have included analysis of Canadian soils coupled with experiments in the improvement of unproductive soil, analysis and experiments by crop growing, to test the value of legumes for the improvement of soil. For the details of this valuable research, the reader may be referred to a bulletin issued in 1902 entitled " Clover as a fertilizer." The evidence shows that from 75 to 150 lbs. of nitrogen per acre can be added to a soil by means of green manuring. The field tests have confirmed in the most emphatic manner the results obtained in the Laboratory and have proved beyond dispute the great benefit to be derived from legumes as enrichers of Canadian soil. Inoculation for the growth of leguminous crops has also been a

subject of investigation, and some remarkably striking results of the good effect of this treatment on clover and lucerne were seen at Lacombe, one of the branch experimental farms. Concurrently with these investigations into the enrichment of the soil an enquiry has been conducted into the effect of various methods of cultivation on the conservation of soil moisture. The experiments in the North-West have demonstrated the value of summer fallowing in conserving moisture for the succeeding crop, while those conducted in Ontario and the eastern provinces have given data of particular value in the management of orchard soils.

Other work that might be mentioned is investigation from the feeding standpoint into the relative value of grasses and forage crops grown in Canada ; the composition of cereals in conjunction with the baking tests of the cereal division ; problems relating to dairy products ; causes of soft pork ; fruit-growing, and also the composition of well waters from farm homesteads, creameries, and cheese factories. The analysis of water may be of little scientific value, but the work is of the very greatest practical importance and benefit to Canadian settlers at the present time. The samples are analysed free of charge and the necessity of a good supply of wholesome water is annually urged upon the farming community, with the result that much greater care and attention is being given to the rural water supply. The use of water from backdoor and barnyard wells, which is often attended with disastrous results, is being abandoned for more distant and purer sources.

Division of Entomology and Botany

The work of this division consists of making collections of plants and insects particularly of an injurious character, investigating their life histories, and helping farmers to combat them. A great deal of useful and original investigation which cannot be noticed here has been carried on. One novel feature more or less connected with this department is worthy of notice. It had its origin in the unsatisfactory condition of the crop of 1905 when it came under inspection in Winnipeg on its way to the lake front for shipment. It was known that smut was causing considerable loss among the grain crops of the prairie provinces. In 1903 the percentage of dockage and rejection was only 3 per cent. ; in 1904 this had run up to $5\frac{1}{2}$ per cent. ; but in the crop of 1905 a far worse state of affairs was manifested. It seemed probable that upwards of 20 per cent. of the enormous crop for the year, of nearly 90 million bushels of wheat, would be graded as " rejected " by the official inspectors. It was thought that something should be done at once to improve this state of affairs. The railway companies and the Dominion Department of Agriculture consulted together with the result that a special train manned by experts set out on a campaign, the aim of which was to remind farmers before the spring work began that more care was necesssary than had evidently been shown in preparing their seed grain and caring for the resulting crop. The campaign which was organized largely by the seed branch of the Department of

Agriculture lasted for two months, in which 206 meetings were held with an attendance in all of about 29,000 people. This experiment has been attended with such encouraging results that it has been continued, it is believed, greatly to the benefit of the farmers of the West.

This Division has recently suffered irreparable loss by the death of the Botanist and Entomologist, Dr James Fletcher, who received the members of our Commission at the Central Experimental Farm, and whose services to Canadian Scientific Agriculture have long been held in the highest esteem.

The Poultry Division

Poultry keeping and the development of the industry is very fully dealt with in the section on poultry. It is sufficient here to say that poultry has received great attention at the Central Experimental Farm where splendid equipment has been established for conducting on a large scale breeding and experimental work. Since the inception of this work twenty years ago, it is claimed that there has been a gratifying change in the attitude of the farmers to the industry. Fowls are looked upon much more favourably now than they were then, and this change must to a considerable extent be credited to the influence of the work in the poultry division and the information disseminated from it. The reports that are circulated annually describe and discuss methods of breeding, feeding and management which many years of experience have proved to be effective in obtaining eggs and poultry, at the best paying season of the year.

Branch Experimental Farms

These farms vary in size from about 160 acres up to 680 acres, but recently the tendency in making new ones has been to restrict them to the smaller size. Each is well equipped with an up-to-date steading, manager's house and office, workmen's cottages, and other appliances. The location of the farms has already been given in describing the Central Experimental Farm system. It has also been indicated that each is carried on by a superintendent who acts under direction from the Central Farm. The work conducted on them is frequently the same as that which has been described as being carried on at the Central Farm, or such part of the latter as is likely to be applicable to local conditions. It must not be supposed, however, that this similarity is really duplication, because these centres lie so far apart and in many respects the conditions are so different that an entirely different result may be looked for even from the same experiment. But in addition to experimenting in conjunction with the Central Farm, each branch has its own local problems to solve and this gives a distinctive local phase to its work. For instance, at Nappan, the centre for the older settled Maritime Provinces, problems connected with live stock, keeping up the fertility of the soil, and fruit-growing claim attention. In the Prairie Provinces the cultivation of the

soil for grain-growing and the problems connected therewith are of special importance; while, in the semi-arid belt the branch farm at Lethbridge, in Southern Alberta, has been set up to deal particularly with irrigation and the merits of this system contrasted with the results of the best "dry" farming methods. Further north in Alberta, at Lacombe, a different set of conditions prevail and different methods are required. Here mixed farming and the cultivation of forage crops will stamp the character of the work of this branch farm once it is properly established. In British

DUNG DISTRIBUTOR AT WORK

Columbia, at Agassiz, the fruit-growing and crops suitable as food for live stock give characteristic features to the work.

In this section only the experimental farms of the Dominion Government and their work have been dealt with. But these are not the only experimental and demonstration farms in Canada. Nearly every province has its Agricultural College, of which an experimental farm is an essential part. While these fall to be dealt with elsewhere it may be recorded here that the splendid work carried on at some of these institutions entitles them to a share in the credit due to education and experimental work for valuable assistance in the advancement of agriculture.

LIVE STOCK

Cattle

The following figures show the recent development and the present position of the cattle trade of Canada :—

Number of Cattle Kept

PROVINCE.	Milch Cows.		Other Cattle.		Total Number of Cattle including Milch Cows.	
	1901	1908	1901	1908	1901	1908
Canada	2,408,677	2,942,281	3,168,774	4,730,303	5,577,451	7,672,584
Prince Edward Island	56,437	52,650	56,342	60,495	112,779	113,145
Nova Scotia	138,817	147,663	177,357	190,907	316,174	338,570
New Brunswick	111,084	127,419	116,112	123,081	227,196	250,500
Quebec	767,825	884,896	598,044	668,693	1,365,869	1,553,589
Ontario	1,065,763	1,301,840	1,422,043	1,916,098	2,487,806	3,217,938
Manitoba	141,481	173,546	208,405	357,988	349,886	531,534
Saskatchewan	56,440	119,375	160,613	378,248	217,053	497,623
Alberta	46,295	110,357	329,391	934,326	375,686	1,044,683
British Columbia	24,535	24,535[1]	100,467	100,467[1]	125,002	125,002[1]

N.B.—The figures of 1901 are those of the Census of that year. The figures of 1908 are taken from the July No. of the "Census and Statistics Monthly" of the Department of Agriculture.

[1] The figures for British Columbia are those of the Census of 1901, no later figures for that province being available.

Number of Live Cattle and Quantities of Beef Exported

1. *To Britain*

	Cattle one year old or less. No.	Cattle over one year old. No.	Beef. lbs.
1903	—	161,170	1,586,882
1904	—	148,301	1,828,101
1905	1	159,077	468,220
1906	90	163,904	763,169
1907[2]	—	149,340	889,437
1908	—	124,015	1,334,892

2. *To United States*

	Cattle one year old or less. No.	Cattle over one year old. No	Beef. lbs.
1903	4,733	5,699	75,044
1904	1,526	1,991	128,032
1905	1,566	2,130	204,483
1906	1,943	2,783	27,978
1907[2]	824	7,360	73,937
1908	4,674	18,938	81,592

[2] For nine months only.

3. *To Other Countries*

	Cattle one year old or less. No.	Cattle over one year old. No.	Beef. lbs.
1903	238	4,940	716,249
1904	240	5,359	1,006,627
1905	334	3,994	658,829
1906	341	6,969	2,096,815
1907[1]	97	4,520	491,837
1908	132	3,234	836,591

Taking province by province in the order in which they were visited, *Prince Edward Island* first claims attention. A very large proportion of the cattle seen by the Commission, were kept for purposes of dairying. As a rule, the animals favoured by the dairy farmer are not those most useful for the production of the best beef, so that branch of the cattle industry is not energetically followed in a dairy district. There are in Prince Edward Island a great variety of breeds and crosses. Jerseys and other Channel Island breeds, Grade-Durhams or Shorthorns, Holsteins and Ayrshires, with some nondescript crosses, of all colours, shapes, and ages were seen grazing together. Many of these were no doubt suitable for the purposes for which they were kept, but generally it may be said that the production of any large quantity of beef of a high quality could not be expected from such animals as were seen on the short visit paid to the Island. We were informed, however, that there were many of the farmers in other parts of the province who had pure bred herds of the various breeds from which bulls of good pedigree could be secured, and that many really good native-bred cattle could be seen at the various summer exhibitions or cattle shows held in the towns of the Island. With an average rainfall of about 35 inches, grass and fodder, straw and roots, should be, and really were on the occasion of our visit, plentiful, and on many farms luxuriant. We were informed that about fifteen years ago it was the general practice for every small farmer to fatten from three to four good three-year old steers in winter, and two or three in summer. This is now done by comparatively few. Though some good fat cattle are still brought out about Easter, the general quality has deteriorated; fattened, cast-off dairy cows having taken the place of some of the steers of the earlier period. At present there is an export trade done with the inferior quality of cattle, and quite a considerable number of beef cattle of better quality are imported into Charlottetown from Ontario for local consumption.

There are signs of a slight revival of the beef production, and quite recently some good bulls have been imported, with the view of, in some degree, resuscitating that branch of agriculture.

In *Nova Scotia*, as in the greater part of Eastern Canada, conditions are especially suitable for dairy cattle, and these conditions are largely taken advantage of. The mining, manufacturing, fishing, and lumbering industries have developed more rapidly

[1] For nine months only.

than agriculture, hence there is good local demand for dairy produce. There are, however, not a few farms which have large areas of pasture land, and along with that have a considerable extent of "Dyke" land, formed of alluvial mud, brought in by the high tides of the Bay of Fundy. The Dykelands are wonderfully fertile, and grow good crops of meadow hay. Many farmers in such favourable situations go in for the production of beef, and keep a fairly good class of cattle for that purpose. Again in the orchard districts the fruit-growers often find it more advantageous to keep a class of stock which demand less labour than dairy cattle and some make good returns from beef raising. In 1864, the Provincial Government began giving grants under an Act passed for the encouragement of agriculture, and in 1907, the grants under this scheme — given to 160 agricultural societies in the counties of the Province—amounted to $10,000. These societies had a membership then of 7849, and $13,015 were locally subscribed. This sum, along with the grant, was administered by the societies and seems to have been largely expended on the purchase of bulls for use in their respective districts. Judging from the annual reports of these societies, published by the Provincial Secretary for Agriculture, the breed of the animals selected depended on the fancy of the majority of the members, the Shorthorn being the favourite, while Ayrshires, Jerseys, Guernseys, Holsteins, and Herefords had each a certain amount of support. By the provision of these pure-bred bulls it was hoped that eventually what is called the "Scrub Sire" nuisance would be overcome. While the large majority of Nova Scotian farmers, who keep cattle in addition to those required to supply the wants of their own households, go in for the sale of dairy produce there are a few who have herds of pure-bred Herefords, Shorthorns, or other breeds, though not on a very large scale, and some very good animals are brought out at the autumn and winter exhibitions. With a suitable climate and a rainfall of over 35 inches spread well over the spring and summer, Nova Scotia in many parts seemed specially adapted for rearing and feeding cattle. Roots of all kinds seem to grow well, and hay of good quality is abundant, which means that the provision of winter keep for stock is not a matter presenting much difficulty.

In *New Brunswick* much the same state of matters is found as in Nova Scotia except that perhaps some of the other industries mentioned as giving such a good local market for farm produce in Nova Scotia, do not exist here to the same extent, also land settlement has taken place on a comparatively smaller area of land. The proportion of milk-producing stock to beef animals is less here than in Nova Scotia. The local government assists farmers to keep up the standard of their stock but generally on the settled parts, farming and stock keeping are conducted in much the same way as already described.

Only a comparatively small portion of the Province of *Quebec* was visited by the Commission. This home of the French Canadian produced the impression that the farmers were happy and contented, in many parts living on the produce of their farms, without

to any great extent energetically catering for outside markets. The agriculture of this Province is described as of a more *domestic* character than that of some other parts of Canada.

The cities of Montreal, Quebec, and Ottawa, undoubtedly account for a good deal of the surplus dairy produce raised, and the beef supply required in these cities, also, partly comes from a more or less local source. As mentioned in the case of the provinces already touched on, the cattle seen were mixed both in breed and crossing, and occasionally a black-horned breed, the French Canadian, of a more purely native and local origin, was met with. This breed was a favourite in some parts.

Ontario is called the province of mixed-farming. The beef breeds are in various parts receiving a great deal of attention by many energetic and particularly enthusiastic breeders. Of the Breeds, pure Shorthorns of a good class, replenished from time to time by the best the Old Country can produce, are most frequently met with, and the breeders of these, along with those who favour Herefords or Polled Aberdeen Angus, are in many ways nothing behind breeders of the same classes at home. Galloways are also represented by at least one, not by any means insignificant, herd. In many dairies Grade Shorthorns were found in considerable numbers. From these the calves, often got by a pedigree bull, are kept and go to make up the numbers of young cattle grazed on the mixed farms of the Province.

Members of the Commission were privileged to see quite a large number of well bred cattle in the various pedigree herds visited, and also on many of the farms good fleshy two-year old and three-year old steers of the Grade type, with which those are more or less acquainted who have seen the arrival of a cattle steamer at Glasgow or Liverpool. During the last seven years cattle have been increasing slightly. In 1901, the proportion of milch cows to other cattle was five to seven, in 1907 about five to eight. It should be kept in mind that many of these cattle other than milch cows will in all probability be heifers, eventually to be drafted into the dairies. This means that probably about three-quarters of the whole number of cattle are kept for the production of milk. The other quarter is composed in part of pedigree cattle herds, the young bulls from which often find their way outside the limits of the Province, and in part, of young stockers for home grazing and fattening, with the view of exporting the best, and using the others to meet the home demand. It may be presumption to suggest that much of the beef consumed in Canada might be improved. But the fact remains that even in the best hotels both the beef and the mutton are not of first-class quality.

With *Manitoba*, the first of the Prairie Provinces visited, begins the great central plain of the North-West, where to many, who in the last forty years have gone in search of a good home and reasonable affluence, there has not only been found the "land of promise" but the land of reality. Wheat-growing is the branch of agriculture predominant in the Province, for which the rich

alluvial loam found in many parts, accompanied with a full share of summer sun, is specially adapted. Manitoba, however, now exports cattle to the ranches in the West, and across the line to the United States, and sends large quantities of beef to the Eastern markets. An enumeration of the total cattle owned in 1908 showed an increase of about 52 per cent. in the preceding seven years, probably due to the large influx of new settlers, whose first wants would include milk, butter, and cheese, and to a desire on the part of many older settlers to enlarge the scope of their operations so as to include a certain amount of stock-keeping. The dry, sunny summer, which is so good for the grain-grower, is not altogether in favour of the stock-raiser on the barer regions; but where a certain amount of shelter from the sun is obtained naturally or otherwise, and where water can be procured, cattle raising should be, and we were informed was, quite a profitable adjunct to the prevailing grain-growing. It would appear, however, that it would, for a long time, probably always, be in a secondary position. There are many parts of the world, with a greater or at least a more evenly divided rainfall, and milder winters, where cattle can be raised under more favourable conditions than on the plains of Manitoba. All the same, till the unsettled lands are all under cultivation, there is room and keep at a low price for a still further large increase in the number of cattle. There are reported to be many good herds of pure-bred cattle scattered over the Province. Some members of the Commission were privileged to see two of the more famous herds of high-class Shorthorns, one near East Selkirk, and one near Carberry—both well known to Shorthorn fanciers all over the world.

The two other prairie provinces, *Saskatchewan* and *Alberta*, may be taken together as regards general configuration of surface and quality of soil. In these respects there is no abrupt dividing line between the conditions prevailing here and in Western Manitoba. There is evidence in these provinces of a " newness " which already in some parts of Manitoba has worn off. In comparison with the vast area of land which has been taken up by settlers and capitalists, and is as yet unbroken, the numbers of cattle to be seen are not large. Settlers near a town or village devote a portion of their energy and resources to supplying dairy produce for the local market, and judging from the current prices in such places this would seem to be quite a remunerative line of business. On the homesteads of the much larger area, where no such local demand exists, only one or two cows are kept. These and their followers are all the live stock, other than horses, on the average farm. Besides the difficulties to stock-raising on a large scale, such as want of shelter, want of running water, and the summer drought, there are other practical difficulties present to the new settler in this grain-growing country: for example, the high wages of the labourer who assists, the want of experience of cattle and their needs on the part of the farmer, the want of fences, and probably also the want of capital with which to purchase the stock or erect the necessary buildings. The provision of a succulent diet through the long severe winter for any but a limited quantity of cattle must

be difficult, and even the making of ordinary grass, clover, or green oat-hay may mean in many parts an amount of labour, which the farmer may consider would be better employed in growing a crop of wheat or barley, for which he can get a readier market and a quicker payment. There is a very large area naturally of unimproved land. Much of this is in the hands of what may be called the non-resident holder, the speculating investor, individual, or company. This unimproved land is of two kinds—bush or scrub land and bare prairie. The former is found in the parts where rainfall is more abundant. The scrub, which is composed of bushes five to fifteen feet high, of varieties of willows, poplars, and alders, is probably both a cause and a consequence of the greater precipitation of moisture; and if judged from appearances alone, the scrub country forms a much more ideal cattle grazing than the bare prairie. It may not be so well suited for cattle ranching on a large scale, owing to the difficulty of finding the stock, but it is more suitable for smaller "bunches" of cattle that have more personal attention bestowed on them, so in the scrub areas considerable numbers of cattle were seen, cows, calves, young steers and heifers all grazing together, an old cow or other recognised leader being furnished with a bell to indicate the whereabouts of the herd. These are not necessarily grazing on the holding or holdings of their owner. In many cases they are allowed to roam over neighbouring unoccupied and unfenced sections that have been bought up, and are being held till some one comes round willing to give the price which offers sufficient inducement to the seller. The speculating boom of the past ten years has interposed a great many sections of unimproved land among the settled sections, and while it has produced a state of isolation and loneliness for the homes of many settlers, it has provided a cheap grazing close at hand of which many have been able to take advantage. Thus we find a very considerable increase in recent years in the cattle population of these provinces. In addition to the Range Cattle Traders' Association, called the Western Stock Growers' Association, the breeders of pedigree cattle have an organization called the Alberta Cattle Breeders' Society. This Society holds an annual spring Fat Stock Show, and a bull sale under its auspices has become one of the biggest institutions of its kind on the continent. The breeders have shown great enterprise in importing some good bulls and choice females to put at the head of their herds. The breeds best represented are the Shorthorn and Hereford. There are also a few herds of Polled Aberdeen Angus and Galloways, and Jerseys, Holsteins, and Ayrshires are being introduced in some districts where more attention is being devoted to dairying. It seems almost a pity, from a beef-producing point of view, that this should be so, as the introduction of these "antibeef" breeds means a general lowering of price of young stock as stores for fattening, from uncertainty as to their breeding. Attention to the production of good milking strains of Shorthorns would seem to the outsider to be a better policy to adopt in a country where dairying may require time and many changes for its full development.

These provinces do not strike one as being specially suited for dairying, whereas the beef-producing breeds are there at present in considerable numbers, and might be largely increased. In the course of our drives through various parts of these provinces many good cattle were seen. In Alberta, especially about MacLeod, Cardston, Red Deer, Lacombe, Calgary, and Edmonton, some very good herds of Shorthorns and Herefords were visited, and some of the individual animals seen were not only useful but very superior, indicating skill and energy on the part of their owners in having produced in so young a country such good results.

Of the cattle trade of *British Columbia* very little can be said, though cattle raising was alleged to have been at one time a chief industry in the province. It was not a very prominent feature in the parts of the province visited. Some good cattle were seen on the Fraser River Valley and Delta. But at present a large part of the beef supply required for the province is imported from Alberta. With a moist climate, suitable for the growth of grass, fodder, and roots, and a mild winter, there is no reason, as the province developes, why the cattle industry should not attain very much larger proportions.

Cattle Feeding

The feeding and foods of the cattle are naturally regulated by the climate, and as it differs very much from the insular type we are accustomed to, so also do the foods required and the modes of feeding differ from ours. The moisture and heat of spring and early summer induce a greater growth in a shorter time than we are accustomed to, and give abundance of grass for pasture and abundance of growth for forage plants. The succeeding dry period allows of the making of these forage plants into excellent hay. When the drought is severe there must be occasionally a temporary scarcity of pasture, and it must then become necessary to have recourse to some of the deeper rooting plants such as lucerne, vetches, red clover, green maize or green oats, and cabbages. Thousand headed kale do not seem to be extensively grown but might be useful at this season. On the comparatively rainless prairie, the grasses during this dry period seem withered and dead, but even in that state appear not only to be able to support life but to put both cattle and horses into prime condition; a considerable area, however, is required, some of 20 or 30 acres for each animal, but "room" is not a scarce commodity in some parts of Canada. Where the rainfall is greater or more evenly distributed, turnips and mangolds can be very successfully grown, and when this is the case there is little difficulty in seeing the stock safely through the winter with the help of the hay previously made and some grain or other artificial food. Over a large area and especially in Western Ontario the place of roots is taken by silage, made of chopped green maize, of which a great crop can be grown per acre. In some parts every farmer has his silo and his chief green crop is his "corn." When neither turnips, mangolds nor green maize can be success-

fully grown, a dry food of hay has to be used; red clover, lucerne, timothy grass, and brome grass are the favourites on cultivated ground, and on unbroken ground the hay is made of such grasses or sedges as may be found, but except where there are sloughs or rivers the natural hay is not very abundant. In the ranch country of Alberta, however, the ranch cattle, which go out all winter and have to pick up what food they can, are often provided with hay during snow. Straw, as a rule, cannot be much relied on for fodder except when cut green and stacked early. The hot sun makes most of it very dry and brittle.

Cattle Embargo

A report on the Canadian cattle industry would be incomplete which did not touch on the question of the removal of the restrictions against the importation of Canadian cattle into this country. As it is a subject, however, of much controversy, we shall content ourselves with an impartial statement of facts rather than an expression of our own opinion.

1. As far as the ordinary infectious diseases, pleuro-pneumonia, foot and mouth disease, rinderpest, Texas fever, mange, etc., are concerned, no trace of them could be detected in any of the cattle seen in any part of the Dominion. It is, of course, admitted that there are bad thrivers and tuberculous cattle in Canada as well as at home, though probably not so many of them.

2. The onus of reporting infectious disease, as at home, lies on the owner of the stock. But it must be borne in mind that many owners are new settlers, a proportion of them being but badly informed as to the wants of cattle and their diseases, also that in the west, distances are very great and the population sparse. All these points tend to make it difficult to obtain a really reliable knowledge of the state of health of the live stock generally, however ably and actively the duties of the Officials of The Health of Animals' Branch of the Department of Agriculture may be attended to.

3. The precautions adopted for the detection of diseases in stock imported from the United States, Newfoundland, or Mexico, consist in a chain of sixty-seven inspection stations, at or near the frontier, where all live stock must enter, and where arrangements exist for the inspection to which all imported live stock are subject. The veterinary inspecting officers at these sixty-two stations act on their own initiative, or at the instigation of the Customs officers, who collect the heavy duty of 20 per cent. levied on cattle from the United States. A very heavy fine is chargeable, with liability to confiscation of the stock, for any attempt to evade the Customs officers, or to cross the frontier without payment of the duty. Over such a length of frontier, in many places unfenced, very close policing cannot be looked for, and reliance is placed on the heavy nature of the punishment, to which the lawbreaker would be liable, as a sufficient deterrent against any infringement of the regulations. The numbers of cattle at or near the frontier on either side

GUERNSEY COWS, HON. SYDNEY FISHER'S FARM

AYRSHIRE RECORD, 18 LBS. BUTTER PER WEEK

are not large, so that any accidental infection would probably be eliminated by the absence of the means for its propagation.

4. The opinions expressed by Canadian farmers, ranchers, and others interested, vary greatly. Many hold the view that with another market opened up by the removal of the restrictions on the importation of store cattle to this country, a great inducement would be offered towards a much more rapid increase in stock farming. The view has also been expressed more than once that if the cattle now sent as fat animals to this country were allowed, when fat prices were unremunerative or unsteady, to go into our store markets with the object of undergoing a further six weeks' or two months' feeding, a mutual advantage would accrue to the Canadian exporter and the home feeder. Others again are more in favour of making use of the cheap food stuffs, produced in Canada, to finish the fattening of their own cattle there, and rather rely on the formation and fostering of a dead meat trade by means of the establishment of packing and chilling houses at suitable places, than being dependent on a live stock export trade, either of beef cattle, or stores. Yet another section look on the question with indifference.

Horses

The introduction of the present race of Canadian horses is credited by history to the Spaniards, who, when they invaded Mexico in the beginning of the sixteenth century, brought over large numbers. Many of them were subsequently abandoned, and they became the wild animals of the prairies, and increased and multiplied exceedingly. The soil and climate of North America nurtured and nourished these horses until she had waiting for her settlers a race of animals well fitted for pioneering work—animals fleet of foot, strong of sinew, and long in wind. It is interesting to study the breeds of horses evolved from this foundation and the breeds subsequently introduced.

For the present purpose it will be sufficient to consider these under two classes—

1. *Riding and Driving Horses*

The standard-bred trotter is nearer the heart of the true Canadians than any other horse, and no other horse is more talked about by them. He represents their best in turf sport. Not only in every city, but in almost every township a well laid-off half-mile trotting track is to be found, fully equipped with grand stand and judges' bench. Races, as a rule, are not an annual event, but occur bi-annually or quarterly. Canadians cannot claim the standard-bred trotter as originating with themselves. The men of the United States have that privilege, and in this way: away back towards the end of the eighteenth century some wealthy citizens of the Western Republic conceived the idea that the native breed was well suited for crossing with fast thoroughbred blood. With that purpose in view they imported from England a famous double

line bred stallion, named Messenger. This horse, traced back through both sire and dam to great Arabian blood, must have been exactly the kind of horse wanted, for he is said to have become the "father" of the trotter. He sired many famous animals, but the line that has become of most note is through his son Mambrino, the sire of Abdallah, who in turn became the sire of what is known as the great Hambletonian, which was foaled in 1849. Hambletonian is the ancestor which represents the blue blood of Trotters. Other important English blood was also imported—notably, Diomed, a Derby winner; and Bellfounder, a Norfolk trotter. From this foundation, and by dint of careful mating, the best trotters in the world have been evolved. From a record of a mile in 2.59 minutes in 1806, the time was reduced in 1906 to 1.57. Trotters divide themselves into two sections—trotting and pacing. Records show a saving of 1½ seconds in the mile in favour of pacing. The mechanical difference between these two gaits is, that in pacing, the horse uses the two off legs alternately with the two near legs, or the gait is parallel, while in the trotter the gait is diagonal. It follows that, when so much attention is given to this breed, values are high. As much as £8000 has been paid for one of the best "record-breakers," whilst from £200 to £300 is quite a common figure for a probable local winner. Although breeders have attained the much coveted desire in producing the fastest trotting horses of the world, no evidence was found that they had become possessed of a class of animals of much utilitarian value. It is doubtful also if their possession tends to raise the morale of life, but they certainly appeal strongly to a large section of go-ahead Canadians. A grand object-lesson, however, is given as to what can be done in horse-breeding, and this should be carefully studied by devotees of other breeds. Saddle and driving horses are of very high merit. In appearance, the majority of them seem to have a dash of thoroughbred blood. Many of them trace to the hackney, and all appear well-bred. At every point visited by the Commission, these animals were greatly admired. They are notable for their speed, endurance, intelligence, and docility. Everywhere they seemed safe in the hands of ladies, and their surefootedness was remarkable. Thoroughbreds, hackneys, hunters, and ponies are carefully bred and kept well up to requirements. Light-legged horses represent about 75 per cent. of the total in Canada.

2. *Draught Horses*

The early conditions of Canada did not demand a large proportion of heavy draught horses. Conditions are rapidly changing, and as the towns and cities increase in size, as the country gets more settled, as the railways farther intersect the land, and as the business of the lumberman increases, the demand for draught horses will grow greater and greater. At the present time the price of geldings is high, and quite equal to that obtained for similar animals in Britain. The demand is gaining on the supply, and further attention ought to be given to the breeding of the heavier class of horses.

Draught breeds are subdivided as follows:—Clydesdale, Shire, Percheron, Suffolk-Punch, Belgian, and General Purpose Horse. As denoting the proportion in which these various lines hold favour, a quotation may be given of the number found in the Province of Ontario in 1906:—

Clydesdales . . .	79,810
Percherons . .	14,567
Shires . . .	9,717
Belgians . . .	1,536
Suffolk-Punch . .	644

This is quite a fair example of what the Commission found over Canada. Here and there Percherons were found in a greater proportion, but this was attributable to the nationality of the people more than to local conditions. Around Cardston, Lethbridge, and about High River, where men from the United States hold land, Percherons were more popular. Shires seemed to be losing favour altogether. Belgians were scarcely ever met with and little heard about. One very excellent stud of Suffolk-Punch horses was seen at Mossom, Boyd & Company's farm, near Prince Albert. The manager there reported that it was proposed to cross the mares with a Shire stallion, so that the hardy, docile, Suffolk-Punch cannot be finding favour with breeders. For the production of the heavy horse, it is clearly a choice between the Clydesdale and the Percheron stallion. For the Percheron it is claimed that the bone is more suitable for the country, that the legs are less liable to go wrong with "mud fever" in the spring season, and that he is a cheerier and more ready puller in shafts. An average Percheron stallion weighs from 1650 to 1800 lbs. The weight of a Clydesdale runs from 1750 to 2000 lbs. The Clydesdale, therefore, has the vote in the matter of weight. It is claimed for the Clydesdale that he is the much more powerful animal; that his broad, flat bone is superior to that of the Percheron; that he excels in his long, springy pastern; that his feet are superior; that he is the readiest cart-horse extant; and that he is fitted to breed a more valuable grade animal than any other horse. There is a very important difference between these breeds in the matter of the formation of the hind leg and in the hind action. In the Clydesdale the hind leg is much the superior lever. Its broader, cleaner hock, set at a more correct angle, and over a longer pastern, with a closer inward alliance to its neighbour, gives its wearer a great deal of additional purchase and greater immunity from spavins and curbs. The average Canadian does not appear to lay the same stress on close hind action that the Scotsman does. A closer study of the position of a heavily laden horse ascending a hill might bring about a change of type in the land of the Maple Leaf. The Canadian is much more critical—and rightly so—of the conformation of the body and carriage. A horse with a deep, broad chest, a nicely-set shoulder, "cresty" neck, good head, with prominent eye, especially good back, and well ribbed, is what he wants. The action must be smart, whether it be exactly level or not. In other words, a handsome,

HORSE AT TRURO COLLEGE

GROUP OF CANADIAN-BRED CLYDESDALES AT REGINA

hardy, strong, clever horse is the ideal in the Canadian eye. A fusion and a diffusion of ideas on both sides of the Atlantic will do much to raise still further the merit and usefulness of the Clydesdale. It was much too apparent, however, that a great deal of harm is being done to the fame of the breed by the importation of " Scrub " and unsound animals. A system of inspection for soundness and apparent freedom from hereditary disease is much needed. Leading breeders deplore the mischief that is being done to, what may be termed, the initial stage of draught horse-breeding by the introduction of blemishes which will take many generations to eliminate. Steps are already being taken to get the Government to adopt a measure which would protect horses against this, and on the same lines as are already in force protecting cattle against imported tuberculosis. Horse-Breeding Societies, of which there are a great many in Canada, have also another grievance. That is, the using of unsound and unsuitable stallions of all breeds throughout the provinces. Space does not permit reference to what is being done in every province, but Ontario may be taken as an example. In Ontario, the Society of Horse Breeders appointed an Investigation Committee in 1906 to procure detailed and accurate information of the whole industry in that province, and to report. The province was divided into eight sections, and eight sets of highly qualified inspectors were appointed. These men went into the matter very carefully and thoroughly. Their report shows that, out of a total of 2687 stallions bred to 161,663 mares, 332 stallions bred to 18,352 mares were serviceably unsound. They unanimously reported that the breeders were in favour of a Government inspection for soundness, and the granting of a licence for qualified sires. A novel and useful proposal was made, if it could only be put in practice. It was recommended that only horses, free from hereditary unsoundness, be allowed to breed ; that a first-class licence be granted to registered horses of good conformation and good action ; that a second-class licence be granted to registered horses of fair conformation and fair action ; that a third-class licence be granted to grade stallions. (One-fourth of the stallions reported were grade or non-pedigree stallions.) The Committee further reported that much harm was being done by the " Syndicating " system. Under this plan, unscrupulous dealers foisted second-rate stallions on a syndicate of men arranged for the purpose of buying animals beyond their value.

From the way these difficulties are being handled it is clear that horse-breeding in Canada is in a very healthy condition, and many breeders have laid the foundation of a stud on good lines though chiefly with imported animals. One notable exception was met with at Mr Russell H. Taber's farm of Hillcrest, Regina. Everyone of his mares is Canadian bred, and few in Scotland can show a better stud of Clydesdale females than he has got. Six of them were got by the " Baron's Pride " horse —" Baron's Gem " (10974). These mares are well-known prize-winners all over the west of Canada, and are another great object lesson of what can be done by careful selection and breeding.

The greater section of the public, however, have not yet realised the profitable nature of breeding a good draught-horse on distinct lines. The country is pre-eminently suited for it, both as regards soil and climate. The time has now gone when the farmer could buy a team of horses at less than he could rear one. There is a large and growing market for street or lumber "drafters" of 1500 to 1800 lbs., and these horses cost no more to raise than the nondescripts of half the value. This fact is being impressed on farmers by speakers at meetings, and by lecturers of colleges, and will bear fruit in the near future. One of the largest ranch owners in the Calgary district gave it as his opinion that he could grow a horse to four years old for £10. In the east, the estimate was £20. Prices ruling in the cities and in British Columbia for the best class of five year old horses ran from £60 to £80 each. In Winnipeg one team working daily on the street cost £100 each.

The number of horses, according to the census in Canada for the last twenty-seven years, was—

For 1881	1,059,358
,, 1891	1,470,572
,, 1901	1,577,493
,, 1907	1,923,090
,, 1908	2,118,165

The rate of increase is remarkable. During the period noted the numbers have been exactly doubled.

The export trade since 1900 is both interesting and instructive—

Year	Exported to Great Britain	United States
1901	2,143	2,088
1902	4,508	1,879
1903	1,638	1,907
1904	237	1,528
1905	276	1,867
1906	249	2,148
1907 (for 9 months only) .	140	1,569
1908	181	1,789

These figures show that whilst trade with the United States has kept uniform, it has almost closed with Britain. The higher prices prevailing in Canada and the United States have brought this about, so that notwithstanding the fact that horses have greatly increased in numbers during the last seven years, the supply is still short of the demand.

Sheep

Viewed in the ordinary way, there does not seem to be any reason to conclude that Canada is an unsuitable country for sheep. The physical features, the soil, and in many parts, the climate, are all favourable for the production of mutton and wool of good quality. Yet we were informed on all hands that the sheep industry has been falling back in almost every province. In 1881, the total

sheep population was 3,048,678, while it was only 2,510,239 in 1901. It is supposed that the improved markets for mutton and wool in 1906-1907 have induced a tendency to stock farms more largely with sheep, and to improve existing flocks; and it is possible that some increase may be shown when the next census is taken.

The Canadian farmer is credited with being very ready to change his methods, and when sheep and wool prices were low, sheep-keeping was abandoned by many, especially by those who had not sufficient knowledge for their proper management, or who treated them in a haphazard way. The thorough-going sheep-man, who gave attention to his flock, has seldom had to abandon sheep-keeping, and, with the late improved prices, has been reaping his financial reward and has improved his farm. In the older days when home-grown wool was homespun, practically every farmer kept his little flock, but that has been changed, and only those possessed of what has been called "the shepherding instinct" have retained their sheep.

All parts of Canada do not seem to be equally favourable for sheep-keeping, but there are many parts where sheep seemed the ideal stocking. On many occasions, when questioned, farmers in the western provinces gave the opinion that sheep took too much trouble owing to the cayotes and wolves, but where a farmer was found with a flock of sheep in which he took a real interest, that trouble was made light of, and was spoken of as causing very little loss. In other parts what seemed a more real difficulty was the number of dogs—especially around the towns and villages. This is said to have done more than anything else to discourage the sheep-farmer. To a Scottish sheep farmer, this seems a very extraordinary state of matters, and statements regarding the dog nuisance were received at first with incredulity. That the "pestiferous dog," as it is called, exists, and is largely to blame for the poor state of the sheep industry in most closely settled districts, is a fact, astounding though it may seem.

It is said that the sheep industry in Canada is showing its greatest advancement in the maritime provinces. This is said to be true, not only in numbers but in quality. Prince Edward Island, though the numbers have gone down from 125,546 in 1901 to 110,986 in 1907, still heads the other provinces by having an average of $9\frac{1}{3}$ sheep per 100 acres of occupied land, while the Annual Exhibition at Charlottetown holds the third place in Canadian fairs for numbers and quality of sheep, only Toronto and London in Ontario being considered superior.

A considerable number of lambs from the maritime provinces are exported to Boston or New York, where they are held in high favour, and bring prices sufficient to leave profit after paying duty. On an average about 5 to $5\frac{1}{2}$ cents per lb. is got, live weight, home. for Wedder lambs. It is reported that a serious loss is experienced by breeders carelessly neglecting to "wether" their lambs, a neglect which all over Canada causes the sacrifice of much of the profit which might be made. Agricultural Societies, in many

SHEEP RANCHING

places, aided by Provincial Government Grants, are doing good by the introduction of pure-bred rams of recognised breeds. This, it is hoped, may eventually lessen the practice, at present quite common, of keeping for use any good-looking ram lamb, irrespective of parentage.

Many of the older flocks were of the Cotswold or Kent breeds. These in many cases have been crossed with Southdowns, Shropshires, or Leicesters. There is a preference over most of the Dominion in favour of Shropshires, especially in parts where heavy falls of snow may be expected. As a defence against severe weather, short-wooled breeds are most in favour, those more open in their fleeces being apt to get over-weighted during long-continued and heavy snowstorms.

In Ontario and Quebec there are many good flocks of sheep, and it may be safely affirmed that the earnest and intelligent sheep-breeder is apparently doing well. At Toronto Exhibition the champion Shropshire ram at the Royal Agricultural Society's Newcastle Show was exhibited by his new Ontario owners—besides many other animals of quite exceptional merit. All parts of North America look to Great Britain first and then to Ontario for the supply of pure-bred rams. To the United States especially the export trade of pure-bred sheep has become quite an important industry, far exceeding the home trade. In many parts of the Province of Quebec, and even in Ontario, leaving out of account the flocks of the pure-breed specialists, there is ample room for improvement in the common flocks, both in numbers and quality. The development of dairying, the poor fencing, and want of skill on the part of the farmers, have been causes inducing the decline which has taken place in the numbers of sheep. In Quebec there were nearly double the numbers of sheep thirty-seven years ago that there are now, while in Ontario in the same time there has been a reduction of nearly a fourth.

In the prairie provinces sheep-keeping is not popular except with a few. The late large influx of population has probably put some new life into the industry, but outside the sheep ranches of Alberta, of which not much information was available, there are probably not more than forty or fifty farmers who give themselves out as sheep-men, and many of these even are in quite a small way—some forty to sixty ewes being considered quite a large flock. There seemed to be a great extent of country where sheep should do well with attention as to folding, with suitable fencing, and the provision of adequate succulent food in winter. Inquiries at any sheep-men that were met elicited always the same answer—"Sheep do very well and do not give much trouble," while some were enthusiastic about them and blamed their neighbours and fellow-farmers generally for their lack of interest in such an easy and lucrative addition to their farming methods. All through the west there is said to be an increasing demand for pure-bred sires, and good prices and keen competition marked the ram sales of 1907.

Quite recently a market for lambs has been opened by the

starting of feeding-stations at various elevator centres where the light grain and refuse is used successfully as a feeding stuff.

Pigs

The number of pigs according to the last census taken in 1901 was 2,353,828. This is an increase over the previous decade of 600,000, and is double the number recorded in 1881. In 1908 the number of pigs in Canada, exclusive of British Columbia, was officially estimated at 3,369,858.

The three leading breeds are—Large Yorkshire, Berkshire, and Tamworth. The Yorkshire is the most numerous and popular. In some districts, however, the Tamworth finds many supporters. Other five breeds held to a less extent are the Poland-China, the Essex, the Hampshire—a modern United States breed—the Durocs, and the Chester. The two latter breeds and the Poland-China are peculiar to the North American Continent. The Duroc is a red hog of the heavy class. It is a hardy variety of great growth with a neat carcase and medium-sized bones. The ears lop down over the eyes. Its disposition is remarkably gentle and docile. The Chester is a pure white with a thin skin. Its snout is comparatively long and its ears are drooping. Its flesh is of superior grain. The Poland-China originated in the State of Ohio. It is black in colour, and comes from a cross between the Berkshire, the Big China, and some others. These three native breeds are more adapted for meat-making hogs, and do not find favour with those engaged in the bacon trade. Very many crosses of these breeds are existent. The most common one, however, is that of the Yorkshire, with either the Berkshire or the Tamworth. For this grade it is claimed that size and quality is secured together with a fitness for "roughing" that the pure-breeds do not possess.

About sixteen years ago it was found on looking into the question of hog-feeding in Canada that the United States possessed an advantage in the production of the thick fat hog on account of the great supply it had available of blue grass, clover, and of Indian corn "shed" at shearing time in the fields. This caused inquiry to be made as to what market was open to the class of hog Canada could best produce. It was found Britain had an opening for prime lean bacon of the fine grade known as "Wiltshire side." On this brand packers and feeders at once focussed their attention. Britain now receives from Canada a supply of nearly ninety-two million lbs. per annum.

Where it was necessary to support private enterprise the Provincial Governments gave material assistance by the purchase of pure-bred stock. These, when imported, were sold to breeders by unreserved auction. The Government also assisted the movement, and still continue to assist it by carrying out feeding trials at the various experimental farms, by the publication of literature, by practical demonstrations, and by the instituting of "Block Tests" at several fairs or exhibitions. The housing of the hog also has

PIG HOUSE AT GUELPH

PIG AT GUELPH

been improved by study of conditions at the experimental stations. At the Ottawa farm a cheap wooden house has been found very efficient. Its floor is raised from the ground so as to afford the pig shelter from the heat by day.

Green feeding is coming more and more into favour. Cabbages, Indian corn, clover, alfalfa, and other legumes are increasingly grown for this purpose. The meals in favour are seconds of wheat, barley, and corn. Low grade flour and bran is also largely used, whilst at milk factories whey is, of course, of great value.

The ideal hog for bacon is one weighing about 200 lbs. It must have been fed under conditions of freedom with sufficient exercise until six months old, when it is confined and put on richer food for another month.

Buying and selling of fat hogs is done entirely by live weight. The price averages about 6 cents per lb. for first quality grade. The large packing houses in the Dominion afford a ready and easy market, and do much to stimulate the industry.

The quality of pigs throughout Canada is of a high class, and both breeders and feeders testify that "hog culture" is a branch of farming that makes profit.

Poultry

Canada possesses unique opportunities for raising poultry-keeping to an important industry. With the exception of the bare prairie lands there is abundant natural shelter everywhere in the woods, forest, and bushy scrub which clothe the earth, providing not only protection from the weather, but affording a supply of insect and animal food so necessary to the health of this kind of stock. In the apple orchards of the Eastern Provinces, in British Columbia, and in the magnificent fruit valley of the Niagara Peninsula, no better conditions could exist for the profitable keeping of fowls: the two industries of fruit-growing and poultry-keeping so naturally fit into and supplement each other. Whilst the fruit trees supply the shade from the sun and the shelter from the storm, so helpful and beneficial to the fowls, these active, foraging animals are continually devouring all insect and grub pests which are their natural food, but which are the deadly enemies of the fruit trees. Then the labour connected with the two industries is so divided that the busy season of the fruit picking is distinctly separated from the hatching and rearing of the chickens. Particularly is the labour reduced when the birds are put out in colony houses all over the orchards. The minimum of attention is required by this system, while the ground derives the benefit from the manure being equally distributed over it. There is ample evidence of the successful combination of these two industries to the mutual benefit of both to prove that this practice might be most judiciously and profitably extended.

The prices obtained for table poultry and eggs all over Canada assure a profit to the producer under good management. Taking the whole country the lowest summer price for eggs will not

be under 8d. per dozen, and the minimum winter price not under 1s. 5d. per dozen. Table chickens bring 8d. per lb. dressed weight, rising to 1s. per lb. for crate fattened birds. Ducklings make about the same rates, and there is always a good market for turkeys and geese. In British Columbia prices are much higher, but this is counteracted to some extent by the dearer price of poultry food. In the Eastern Provinces grain is also somewhat high in price, but with better distributing facilities from the great grain-growing areas, prices will gradually be equalised. Cheap frosted wheat is often available, and this can be used freely along with other kinds of food. Although the past six or seven years have seen an enormous increase in the poultry produce of the Dominion, prices, in sympathy with the other markets of the world, are tending upwards.

From the last census returns of 1901 the total poultry population of Canada is stated at 17,922,658. Competent authorities estimate that the Province of Ontario alone now possesses 13,000,000 hens, so that in 1908 the poultry population was probably twice what it was in 1901. Yet, in spite of this doubled working plant, as it might be called, the consuming capacity of the Dominion has been increasing at a higher ratio. While at one time it was considered impossible to consume all the produce raised, it has now become the problem to supply the home market. In 1902, 11,635,108 dozens of eggs were exported valued at $1,733,242. This had fallen in 1906 to 2,921,725 dozens valued at $495,176, and in 1908 to 1,365,890 dozens valued at $301,818. From 1902 to 1906 the value of imported eggs had fallen from $169,457 to $88,937. In 1908 the value of the imports of eggs was $214,994. The fall in exports, especially to Britain, is due to the increased demands of the home market. This strong local demand is an undoubted incentive to greater effort on the part of the Canadian poultry grower. The exports and imports of live birds have both notably increased, due presumably to the freer interchange of breeding stock between Canada and other countries. Very few large utility or commercial poultry farms are to be found in Canada. The tendency is rather to extend the industry on surer and better lines through the farmers taking a more intelligent interest in the fowls, and making them a regular paying part of the farm stock.

The exhibition side of poultry-keeping is well advanced in Canada. Fanciers are numerous, and as keenly active in introducing and improving new breeds as they are in the old country. They play their part in fostering and educating public opinion. They also distribute eggs and cockerels of pure breeds which go to build up and improve the strains of other breeders. Conversation with many of these fanciers brought out that the demand for pure eggs and cockerels of the useful varieties was increasing enormously, indirectly proving the greater interest being manifested in poultry-keeping. At most of the Agricultural Shows exhibitions of poultry stock are encouraged by liberal classification and good prizes. Table poultry and egg classes are almost invariably provided.

Looking at the Dominion a little more in sections, we find that in the maritime provinces of Prince Edward Island, Nova Scotia, and New Brunswick, the opportunities for successful poultry-keeping are to some slight extent modified by the price of grain, which has to be carried for food to all kinds of stock from the Far West. The heavy carriage, with the dealers and speculators profit added, makes dear grain, thus raising the cost of production. At the same time a flock of fowls from twenty-five to a hundred or so on each farm, when looked after with reasonable care, leaves a good margin of profit. The waste grain, vegetables, etc., augmented by a small quantity of maize meal, carries the birds through the winter at a very small cost. Farmers generally are doing well with their fowls, and the custom of adding these to the regular stock of the farm is rapidly increasing. The Agricultural College at Truro, Nova Scotia, has a poultry department in connection with it at which white and brown Leghorns, white Wyandottes, Barred Rocks and Pekin Ducks are kept. Mr J. P. Landry, a great enthusiast, is in charge, and is earnestly engaged in building up pedigree laying strains of the leading varieties by means of carefully kept trap-nest records. A large number of eggs from these good laying strains are sold to the farmers every year, as well as the pure-bred cockerels at very moderate prices.

Quebec and Ontario, being the oldest settled provinces, with several large cities as convenient markets, naturally take the lead in the production of poultry produce. From these provinces a considerable surplus is sent west every year to the growing towns, the mining districts, and British Columbia. Poultry-keeping is much more recognised as a regular part of the régime of the farm in these provinces than it is anywhere else in the Dominion. With the MacDonald College near Montreal, the Central Experimental Farm at Ottawa, the Ontario College at Guelph, the scientific and educative sides of poultry-keeping are well provided for. The wonder is that an organised system of marketing the produce has not yet been introduced.

At the MacDonald College, the poultry department is provided with housing of the most up-to-date, one might almost say of the most elaborate, description. The incubator room, lecture rooms, egg rooms, offices, etc., are in keeping with the rest of the college buildings, while the poultry accommodation is planned mostly on the colony system. A regular stock of about 680 hens is kept, and an annual batch of 3000 chickens reared. The varieties kept are the Barred Plymouth Rock, White Wyandotte, Single Combed Rhode Island Red, Buff Orpington, Black Minorca and White Leghorn. Mr F. C. Elford, the manager of this department, and one of the recognised experts in the country, conducted a most instructive experiment in regard to the housing of hens for winter egg production. A selected flock of 250 pullets, the fourth generation of good winter layers, were put out in colony houses to an open unsheltered field. The houses were made of one-inch boarding, except round the perches at the back, where it was double thickness with tar paper in between. Abundance of fresh air and light were

POULTRY HOUSE AT MACDONALD COLLEGE

POULTRY FEEDING APPLIANCE AT GUELPH

provided for in the front of the houses. No cooked food, hot mash or condiment of any kind was used. One feed a day, on a mixture of dry grain consisting of wheat, oats, barley, buckwheat, and Indian corn, was thrown on the floor, which was littered to a depth of 3 to 4 inches with cut straw and roughage. Besides the grain, the birds had a self-feeding hopper of bran or crushed wheat available, as well as access to grit, oyster shell and meat scraps. When the water froze inside the houses no more was given, but instead snow was shovelled in. Between 19th November and 31st March, 10,122 eggs were laid with the percentage of fertility running from 76 to 93, whilst the health of the birds remained excellent throughout. This by no means constitutes a record in winter laying, but it undoubtedly dispels the idea that warm housing is necessary to secure winter egg production. It is further suggestive of what may be expected from a judiciously graded up flock of layers housed on the colony system in a temperature often running down to 15 or 20 degrees below zero. Artificial hatching and rearing were extensively carried on at this College; for the latter, apex houses, with part of the floor space used as a hot brooder, were considered to give excellent results.

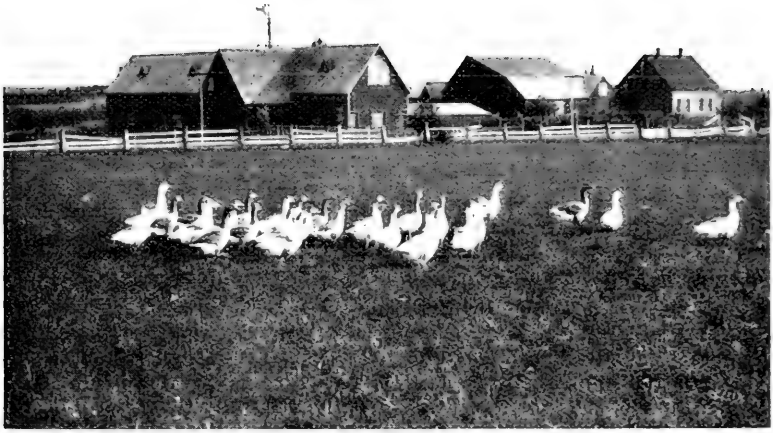
At the Central Experimental Farm, Ottawa, the poultry department is under the charge of Mr A. G. Gilbert, a veteran in knowledge and a pioneer in poultry development. Here the evolution of modern poultry housing was seen in its various progressive stages, beginning with the long range of artificially heated houses, and ending in the latest type of open-fronted colony houses, with sliding glass windows in the middle, on each side of which were open wire screens, over which cotton canvas curtains could be drawn in very cold weather. An additional cotton screen, which could be unfolded in extreme cold, was provided in front of the perches. Mr Gilbert believes implicitly in keeping up the stamina of the birds, claiming that from healthy vigorous stock, chickens hatch well and are easily reared. He advocates plenty of variety in the diet, an abundance of fresh air, with strict avoidance of damp, and undoubtedly the fowls under his charge bore ample evidence of excellent theories being successfully carried out in practice. The varieties here consisted of Barred and White Rocks, Buff and White Orpingtons, Minorcas, White Leghorns, Faverolles, and Light Brahmas.

At the Ontario Agricultural College and Experimental Farm, Guelph, the poultry department is equipped with capital buildings and yards, constructed according to the most approved plans. The stock of fowls consists of twenty-five varieties representing fifteen breeds, the principal of which are Barred and White Plymouth Rocks, Brown and White Leghorns, Buff and Spangled Orpingtons, Silver-laced, Columbian, and Silver-pencilled, Wyandottes, and Minorcas. A few of each variety are bred to exhibition standards, but utility is the main feature kept in view. Mr W. R. Graham, B.S.A., who is in charge of this department, has won a reputation for scientific research and practical experimental work which has made him known in every country where poultry are kept. One

experiment in housing gave conclusive evidence in favour of the open-fronted, freely-ventilated system when contrasted with the warm, fully-protected house. Three years ago four houses were erected representing different styles but equal in floor space. Each house was 24 feet long by 12 wide, subdivided by board and wire netting partitions, making two houses of 12 feet square under each roof. Into each of these four houses a pen of White Wyandottes and a pen of Buff Orpingtons was put, the birds being selected from exactly the same strains. Trap nests were of course used throughout. The warmest house was made of matched lumber and lined with paper, a dead air space being left between the inside and outside walls. The whole building, windows, doors, etc., were made as tightly fitting as possible to secure warmth. The coldest house was left extremely airy, the single boards dressed on one side only, with the seams battened up on the outside. About half of the front was left quite open to the weather, with large doors loosely fitted to shut in stormy weather. No special protection was given to the roosting place, the birds being allowed to sleep in the same temperature as they were in during the day. The other two houses had open fronts protected by glass windows and curtains, the perches being also specially protected. During the three years of the experiment the best results have been got from the coldest house, and the worst from the warmest.

The Provinces of Manitoba, Saskatchewan, and Alberta, particularly the latter two, are so much taken up with grain-growing, the farms are still so scattered, and labour so difficult to obtain, that no great output of poultry produce can as yet be reasonably looked for. As it is, considerable importations of poultry produce have to be made every year, though this will very soon be reversed when these Provinces get more thickly settled. The climate, though sometimes extremely cold in winter, need be no hindrance to the development of the industry. Many successful examples could be quoted to prove this point. Even round the outskirts of the towns many well bred flocks of fowls can be seen on the town lots. This might be called a characteristic feature of most Canadian towns, the birds being kept more with an eye to profit than merely as a hobby. Turkeys seem to thrive so well in these Provinces that it might be profitable to specialise in the production of this favourite table delicacy. At Indian Head Experimental Farm, Saskatchewan, four breeds of fowls are kept, namely—Minorcas, Plymouth Rocks, Light Brahmas, and Buff Orpingtons. At Lacombe, Alberta, a poultry branch has also recently been established. At both these stations the demand for eggs and cockerels is increasing. In Alberta in 1906, the Provincial Government started co-operative poultry fattening stations at five centres, Wetaskawin, Lacombe, Red Deer, Innisfail, and Olds. The principle of these stations was to take the ordinary unfattened fowls from the farmers, and to fatten, kill, dress, and market them. Formerly the farmers only got from 8 to 10 cents per lb. killed, plucked, and drawn ; the Government paid the farmer 8 cents per lb. live weight, then crate fattened, killed, dressed and put them on the market. After deducting all

POULTRY



GEESE

costs the farmers were returned 4¼ cents per lb. in addition to the 8 cents advanced at purchase. This system had been successfully established in other districts. Alberta has now engaged an expert to devote his whole time to the development of poultry-keeping in the Province. Throughout the whole of the North-west Provinces poultry stock keep remarkably healthy. The wet weather in the hatching season, particularly in June, is probably the worst handicap the farmers have to contend with, but this might probably be obviated by earlier hatching and by a little more attention to housing.

In British Columbia the opportunities for poultry-keeping are most inviting. In fact, almost ideal conditions exist for this industry in the fine climate, associated often with excellent soil and unlimited shelter. When to these natural advantages is added a splendid home market for the produce in the mining districts and in Vancouver, the wonder is that much more is not done in this direction. As in Nova Scotia the fruit orchards might most judiciously be more extensively used as chicken nurseries. Feed is certainly higher, but this only relates to grains, and after all, fowls in such conditions as usually predominate in British Columbia can be kept at a moderate cost. At Agassiz Experimental Farm there is a poultry branch which distributes a considerable number of eggs and cockerels. In Vancouver Island, where fruit-growing and market-gardening are extensively gone into, it is the custom to keep flocks of fowls in conjunction with these two industries. The Okanagan Valley and other districts of the same kind present most favourable opportunities for the development of this industry. Looking at all the circumstances there seems no reason why British Columbia should not supply her own markets with poultry produce as well as export a surplus, rather than have to import it as at present.

Housing

The united testimony gathered from all experimental farms, and other reliable sources, agrees in the essential principles of housing. It must be borne in mind that the winter over the greater part of Canada lasts at least four months, and that the temperature falls occasionally to 40 or 45 degrees below zero, while the thermometer often registers 100 degrees in summer. The variations of temperature are accordingly much greater than in Britain. The housing problem is, therefore, one of the utmost importance. One of the recognised essentials then is light ; at least one-third part of the south, or front end of the house, should be of glass or open to the sun. Abundance of fresh air is of equal importance ; this is secured by having the front of the house almost entirely open, but protected in extreme weather by cotton curtains or sliding glass windows. The open front with sides, back and roof tight, gives plenty of fresh air without draught or through ventilation. The minimum depth of a house of this kind should not be under 8 feet, with the perches low and close to the back. An additional

cotter screen suspended before the perches when the weather becomes extreme, protects the combs and feet of the birds from being frozen. In some houses with span roofs, the upper space is packed with straw, which admits of top ventilation and absorbs moisture as well; but, with the proper amount of open front, the straw is unnecessary. The main idea is perfect dryness of atmosphere inside the house. Dampness to any degree is fatal with low temperatures, therefore the floor ought to be tightly jointed and raised from the ground 6 or 8 inches, as well as littered 3 or 4 inches deep with cut straw or roughage of some kind. It is marvellous how birds thrive and lay in the coldest weather when housed as above described.

Feeding

The tendency at the present time is to feed dry grain and discontinue mash foods. It is admitted that mash foods may force growth in the young birds, and also stimulate egg production, but, for breeding stock, the eggs are considered to hatch better and give stronger chicks when dry food only is used. Sometimes sprouted grain, or grain steeped in boiling water, is given, also clover leaves or cut clover which has been well steeped in boiling water. Green food, such as mangels, turnips, cabbage, and sugar beets, is freely fed, also animal meal or green bone. The self-feeding hopper system is quite commonly adopted for grain, bran, etc., and also for oyster shell and grit. Where wet mash food is used the practice is tending towards giving it at night instead of in the morning. The custom of scattering grain in the litter is universal, and altogether the methods of feeding seem to be most intelligently understood.

Incubation

The use of incubators is decidedly on the increase, though opinion is divided between the natural and artificial methods of hatching. Where more than 150 or 200 chickens have to be reared, and where the varieties are non-broody, incubators may be considered a necessity. As already indicated some most interesting experiments are at present being conducted by Mr Graham at Guelph on incubation. It has already been ascertained that the hen differs from the incubator in having less evaporation of the egg content during incubation, and also in having a much higher amount of carbonic acid gas in the air immediately surrounding the eggs. Chemical analysis of new hatched chickens has shown that there is more lime in hen-hatched chicks than in chicks hatched in a dry incubator, and further, that the vitality of the chicks hatched in the various machines operated ascends according to the lime contents of the chicks. In other words, the more lime or ash in a chick the better it grows, and the less lime or ash the weaker the chick. With incubators the humidity of the atmosphere has been studied, and experiments conducted by the introduction of carbon dioxide. Disinfectants in the machines, such as mercuric chloride

zenoleum, have also been used experimentally. The above indicates the lines on which experiment is being conducted, but results are not yet definite enough to be recorded. It may incidentally be mentioned that Mr W. Brown, poultry instructor at Theale College, Reading, England, has for several years been working on similar lines with most satisfactory results.

Breeds

The tendency of the Canadian farmer is to go in for general purpose fowls, rather than for those with pronounced characteristics of one kind or another. Thus Plymouth Rocks, Wyandottes, Orpingtons, and Rhode Island Reds may be reckoned the favourites, with Plymouth Rocks easily leading. This variety is undoubtedly the standard fowl of the country, and it certainly seems to fulfil its dual purpose of egg production and table qualities admirably. Some strains, such as those at Guelph Experimental Farm, are remarkable for their prolific laying, early maturity, and fine table qualities. The White Wyandotte and Buff Orpington are also much kept for their all round good points, while the Rhode Island Reds are considered extremely hardy. Of the Mediterranean breeds, probably the Brown and White Leghorns are the most popular, with Minorcas and Andalusians next. There is general evidence of a desire for pure breeds, which shows that the theoretic teaching is taking practical form.

Poultry Institutes

These associations play an important part in developing the poultry industry in Canada. They are well established in Ontario, and are extending in all directions. Formed on the same principles as local poultry societies at home, they go much further in their scope. It is a regular practice to hold monthly meetings, except in the summer months, when lectures are given by prominent experts, followed by a discussion. Birds are brought to be judged and compared. One exhibition, at least, is held each year at which a lecture is given making an educative agency of the event. The Government gives one association in each county a grant of from 25 to 50 dollars annually to encourage utility poultry-keeping. The services of an expert lecturer can be had from some of the Agricultural Colleges free at any time. To the districts in which they are formed these associations are excellent media for distributing pure eggs and cockerels.

WHEAT-FARMING

THESE figures show the development of wheat-farming in Canada since 1871, and the export trade since 1903 :—

Wheat Production

Year.	Bushels.	Acres.
1871 . .	16,723,873	1,646,781
1881 . .	32,350,269	2,342,355
1891 . .	42,223,372	2,761,246
1901 . .	55,572,368	4,224,542
1907 . .	91,333,271	6,066,450
1908	112,434,000	6,610,300

Export Trade

Year.	To BRITAIN.		To UNITED STATES.		To ALL COUNTRIES.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Bush.	$	Bush.	$	Bush.	$
1903	30,726,947	22,999,745	892,904	536,264	32,985,745	24,566,703
1904	16,346,793	13,106,081	11,262	8,780	16,779,028	13,465,351
1905	11,280,407	9,474,870	3,018,232	2,577,531	14,700,315	12,386,743
1906	36,027,692	30,234,611	3,831,988	2,981,608	40,399,402	33,658,391
1907 [1]	24,432,786	19,566,017	804,937	630,349	25,480,127	20,379,629
1908	43,002,541	39,349,602	114,926	102,699	43,654,668	40,004,723

The Wheat Belt

The western prairie, though by no means containing the whole wheat area of Canada, is the great wheat belt of the country, to which in this section we wish to call special attention. It is composed of very variable land. There is the bald-headed prairie, level and treeless ; there is the rolling prairie, rising and falling like the waves of the sea ; and there is the prairie of slough scrub and light timber, more commonly known by the name of the park lands. There is wet land and dry land ; there is rich black loam and light sandy soil. The climate is not quite so varied as the soil. The temperature ranges from 100 degrees Fahrenheit in summer to 40 or 45 degrees below zero in winter. There is one region somewhat different from the others, the semi-arid region in Southern Alberta, over which the chinook winds blow, where the temperature is not so extreme as in other parts. The rainfall is deficient over a large part of the region, and the science of wheat-farming on the prairie is the cultivation of the soil in such a way as to retain the moisture and escape the frost.

[1] Nine months.

BINDERS AT WORK

While wheat is the principal crop grown on the prairie, there is a sort of mixed farming in the older and more settled districts, where wheat is succeeded by oats or barley seeded down with grass. In the newer lands of the far west, however, the most common system is two or three years in wheat, then a year in fallow, and back to wheat again. Either system is exhaustive enough to the soil. Nobody, however, knows this better than some of the intelligent wheat farmers of Canada. We interviewed one of them, who six or seven years ago had come from the States, though he was German born, and settled on the prairie, south-west of Saskatoon. Discussing with him the scientific cultivation of the soil and the exhaustion that must necessarily follow present methods in Canada, he said: "You do not need to tell me about these things. I know perfectly well that continuous wheat-farming exhausts the soil, but I know too that stock-raising, or at any rate dairy-farming, means continuous and hard work, and I know too that wheat-growing requires less capital and less labour and gives bigger returns; and though there is a disadvantage in having all one's eggs in one basket, I am to take the risk and go on growing wheat until the soil will grow it no longer, and then I shall sell out to the tenderfoot and move west." This may not be a far-sighted policy from the point of view of Canada's ultimate prosperity, though it is a policy deliberately followed by intelligent Canadian farmers. If little can be said for the policy something at least can be said for the men. They are doing precisely what most men in similar circumstances are doing—they are making hay while the sun shines. They are looking after themselves and their own generation, resting assured that the fertility of Canadian soil will last all their time, and will in due course be restored by some other body when the needs of the millions who must before long inhabit Canada will demand a system of mixed farming.

Fall Wheat

Both fall and spring wheat are grown on the prairie. Fall wheat is for the most part confined to the semi-arid region in southern Alberta, which was once, and that not long ago, given up to the rancher, because it was considered too dry for wheat-raising. It was found, however, that the moisture, if not abundant, was, when properly conserved, sufficient, and that the comparative mildness of the winter made it possible to grow fall wheat. Little progress, however, was made, till the introduction a few years ago of "Alberta Red." In 1902, 3444 acres were sown. In 1908, the area under fall wheat in Alberta alone was 101,000 acres. Sowing begins in July or August. The wheat grows to a height of 6 or 8 inches in the autumn. It remains in the ground for a whole year. Its longer life enables the roots to penetrate farther into the soil both in search of food and water, and it produces a heavier and an earlier crop than spring wheat.

BANNER OATS

Spring Wheat

But spring wheat is the great stand-by of the prairie farmer. The best known variety is "Red Fife." It suits the conditions well and seems to hold the field in most districts against all other varieties. Practical experience in Canada has satisfied most men that a few standard varieties of grain of proved utility are better than a lot of new ones, and that the best results are obtained through improving the reliable varieties by careful selection and cultivation. For some years great efforts have been made to propagate early ripening varieties. The difficulty is to maintain the yield and quality in attaining this end, but the varieties known as Preston, Huron, Stanley, and Percy are said to fairly combine the merits of yield, quality, and early ripening. The farther north you penetrate the season becomes the shorter, but in summer the days are longer, and quick maturing wheat would greatly extend the area of production. Along these lines lies the work of the Canadian Seed Growers' Association. A member of this Association fixes upon a foundation stock, such as "Red Fife," procures sufficient to sow a hand-selected plot of at least a quarter of an acre. Then, before reaping, sufficient of the most typical heads are selected by hand from strong, vigorous plants to yield seed for a quarter of an acre the following year. When the grower has complied with the regulations of the Association in respect of the selection of seed for a period of three years, and has bred his stock up to a high standard of excellence, he gets it registered by the Association. The Association receives a subsidy from the Department of Agriculture, and in this is found another striking illustration of the practical assistance to farmers rendered by the Government.

Seed-time and Harvest

The wheat farmer prefers to break prairie land between the beginning of May and the end of June. The object of this is evident. The success of a crop very often in Canada depends upon the moisture, and if the land is broken up into a fine tilth early in the year, it conserves all the available rain and thus has a moisture supply of two years to produce its first crop. The cost per acre of bringing the prairie into cultivation so far as we could make out, is :—

Breaking	$3.50
Discing	1.75
Harrowing	.70
Total .	$5.95

Field operations then cease till the following spring. During winter, the hard frost pulverises the soil and its deep penetration 5 or 6 feet opens up the subsoil, keeping it in good condition for capillary action. In the spring, a matter of supreme importance is to get in the seed as soon as the weather conditions permit. It is sown from 10th April to 1st June, at the rate of from 1¼ to 2 bushels per acre. During the growing season statements of condition and

estimates of yield are obtained by the Census and Statistics Office of the Department of Agriculture from local correspondents and the results are tabulated and published in the *Census and Statistics Monthly*, which contains, in addition, a vast amount of most useful information about other countries. When made by men of such extensive experience and sound judgment as Mr Angus Mackay of the Indian Head Experimental Farm, such estimates are absolutely reliable guides. After being in the ground from 112 to 120 days, the grain is ready for the reaper, and the final yield is obtained from the threshing mills, and is calculated on the actual acreage threshed. All threshers, whether private or travelling outfits, are licensed, and are bound to return the number of bushels

TEN-FURROW PLOUGH

threshed, and the acreage on which they were grown. This, again, is checked by the railway and elevator traffic in wheat, and the utmost accuracy is thereby attained.

Harvest time is a busy time in Canada. The cutting is of course all done by binders, generally from 7 to 8 feet in width, drawn by four horses. The threshing is largely done in the field off the "stook" and the threshing-mill owners have enough to do fulfilling their orders. The threshing-machine has a self-feeding web, which obviates the necessity of any person feeding in. Revolving knives cut the binder twine; two waggons discharge their load at a time, and the sheaves are rapidly drawn up by the feeding web into the mill, where the grain is threshed out, and the straw, cut by the knives, is blown by a strong blast out through a spout on to a bing along with the chaff; the wheat taken by elevators, is run

THRESHING OUTFIT

OIL ENGINE THRESHING

up another spout, automatically weighed into half bushels, and run out in bulk into a waggon placed in a position to receive it, which, when filled, is driven off to the railway station to be despatched to market, or to one or other of the elevators which characterise the landscape at many a lineside in the wheat districts, to be stored pending the arrival of cars, or a rise in price. All this work is done with the minimum of labour. There are only an engineer and a fireman on the mill, and two teemsters fork off their load at the same time. As a rule from 1200 to 1500 and sometimes 2000 bushels are put through in a day. The expense of threshing varies according to the district. In Manitoba, where the millowner provides the mill and its men and four forkers, 4 cents per bushel of wheat are charged. Where, however, he provides all labour save the carting of the wheat to the railway station or elevator, the charge is 7 cents per bushel. In the north-west it is as high as 9 cents per bushel.

The labour bill per acre for the first crop, in addition to the breaking, discing, and harrowing, above referred to, is as follows:—

Seeding	$0.50
Harrowing twice	.35
Seed—1½ bushels @ say 90 cents per bushel .	1.35
Cutting, say, 19 bushels— . . .	.40
Twine	.30
Stooking	.20
Board of men and hauling grain . .	.5
Threshing—19 bushels @ 7 cents per bushel .	1.33
Together .	$4.48

The above figures have not only been carefully verified, but they were obtained by the Commission from a farm manager once in the employment of one of them, who has been farming in Canada for the past few years, and they may be accepted as the maximum expenditure. It will be seen that the expense of the first crop amounts to $10.43. The expense of the subsequent crop will be $6.33, because instead of having to break up the prairie at a cost of $5.95 per acre, the farmer has only to break up his stubble at a cost of $1.85. The profit depends a good deal on the price of wheat. We shall take it at 80 cents. It has been much lower, and it has been much higher, but as the tendency for a considerable period of years is more likely to be up than down, we think no objection will be taken to the figure. The result is an apparent profit of $4.77 per acre the first year, and $8.87 per acre the second year. It is, however, only apparent, for we have not yet deducted interest on the capital invested in land and stock and fencing, nor the keep of men and horses during the period of the year when their labour is not necessary for the production of the wheat crop. Nor have we taken into account the land which must ultimately be fallowed. When, however, all these are taken into consideration, and even the drought and the frost are not forgotten, there is more than a chance for the man of small means, and there is a great opportunity for the man of brains and money.

Freight

Freight, of course, depends largely on distance from market. The freight from Fort William at the head of the Great Lakes, to Liverpool is 19 cents per hundred lbs. From Winnipeg, which of course is farther west, to Liverpool, the freight is 29 cents, and from Regina, the capital of Saskatchewan, still farther west, the freight is 37 cents. While it is quite true that the Canadian farmers must ultimately pay the freight, they sell for cash at Fort William, and when, as above mentioned, they get 80 cents per bushel, the only freight deducted is the freight from their local station to Fort William. Apart from these differences due to distance, which the

GRAIN ELEVATOR, PORT ARTHUR, ONTARIO

Canadian Government is doing what it can by railway facilities to blot out, Canadian grain is paid for according to grade, which is fixed by government inspection at Winnipeg. The farmer may be paid one of two prices. He may be paid after the grain is loaded on the car at the local station, settlement taking place on the basis of Winnipeg inspection and Fort William weights. This is termed "track price"; or he may be paid load by load as he delivers the grain to the elevator company, settlement being made on the elevator company's grading weights and dockage. This is called "street price," and is based on the possibility of getting the grain shipped to Fort William. Many complaints have been made by Canadian farmers against the elevator companies and their methods of purchase. The Grain Commission of 1906 were, however, of opinion that the whole difficulty was one of railway transit, and that with an ample supply of cars the only difference between the two prices

would be the cost of handling the grain by the elevator company plus the profit for their work.

Grades of Wheat

Under the Inspection and Sale Act of 1906, Canada is divided into two Inspection Divisions. The Eastern Division consists of all Ontario east of Port Arthur, and the provinces of Quebec, New Brunswick, Nova Scotia, and Prince Edward Island; and the Western or Manitoban Division consists of Ontario west of and including the Port Arthur district, the prairie Provinces, and British Columbia. According to the Act there are certain grades of spring wheat in the Manitoban Division, and there is power to increase the number. The existing grades are :—

No. 1 Manitoba Hard.
No. 1 Manitoba Northern.
No. 2 Manitoba Northern.
No. 3 Manitoba Northern.
Commercial Grade No. 4.
Commercial Grade No. 5.
Commercial Grade No. 6.
Commercial Grade Feed.

It is of interest to look at these grades as they pass from the mill and are transformed into flour :—

Milling Number.	Grade.	Weight per bushel as received.	Loss in Cleaning.	Weight after Cleaning.	Break Flour.	Straight Grade Flour.
		lbs.	Per cent.	lbs.	Per cent.	Per cent.
160	No. 1 Manitoba Hard	62½	·9	62¾	9½	65
162	No. 1 Manitoba Northern	61½	2·3	61¾	10	62½
163	No. 2 Manitoba Northern	61	2·5	61½	10	62
165	No. 3 Manitoba Northern	59½	3·7	60	9	59½
166	Commercial Grade No. 4	58	4·5	58¾	8	56
168	Commercial Grade No. 5	58	3·2	58½	7½	56
169	Commercial Grade No. 6	56	3·5	57½	6	50½
	Commercial Grade Feed	54	..	..	..	..

There can be no question whatever as to the excellent quality of the finer grades of Canadian wheat. During recent years, No. 1 Hard Manitoban wheat has been selling at 35s. per quarter, while Kansas and Russian Hard winter wheats have been selling at about 33s. per quarter, and the best wheat grown in England at only 28s. to 29s. per quarter. The English wheat is deficient in strength, that is, with equal weights of flour it yields a small loaf compared with Canadian wheat. Perhaps as strong a testimony in favour of Canadian wheat as we can produce is the following quotation from a letter written to one of the Commission by the Co-operative Wholesale Society of Scotland, a company which supplies with provisions about one-fifth of the whole population of the United Kingdom : " We use," the Society writes, " large quantities of Manitoban wheat and are thoroughly satisfied with the quality. We have arranged to erect six elevators in Manitoba for a start."

Transportation

Transportation—the term used for the movement of goods in every form—is a vital matter to the Canadian farmer. Distance from the railway, the condition of roads, the supply of cars, the connexion of the point of delivery with the main routes to the East—these are considerations summed up in the single word transportation. Nearness to the metals of a direct eastward going line is, of course, the height of good fortune, and this is enjoyed in such districts as Portage la Prairie, Brandon, Carberry, Regina, and other wheat lands on the main Canadian Pacific route. There the question of quickly marketing the grain gives no trouble. In regions of comparatively recent settlement, and as yet some way back from the railway, the road haulage affects the farmer's calculations. If he is working shorthanded and with insufficient teams of horses, distance and the heavy nature of the prairie trails may use up the time that should be given to the preparation of the land for the next crop. As the farmer cannot, as a rule, afford to hold his grain and makes no storage provision, there may be a periodic stress until the settlement of the land draws the railway after it. This co-operation of the railway and the farmer goes on unceasingly, the Dominion Government accepting the development and improvement of transportation as a leading concern of Canadian policy. Already about 1000 miles of the prairie portion of the new Grand Trunk Pacific line between Halifax and Prince Rupert are completed and the work of construction is being pushed ahead in seven provinces. The Canadian Northern Railway system, said to comprise about 5000 miles of track, is being carried forward from Edmonton towards the foothills of the Rockies, while there are sections from Dauphin to Prince Albert and from Winnipeg to Regina, along with tributary branches. From Winnipeg westward and northward numerous lines run into the prairie. Other extensions are projected or in progress, and it may safely be taken that land settlement and railway service will keep step. The one is essential to the other. It is contrary to Canadian interests to leave the farmer remote. In regard to the supply of cars, we have heard satisfaction expressed with the operation of the Manitoba Grain Act, the purpose of which was to place the single farmer on a level with the elevator company. The farmer desirous of shipping his grain on his own account is entitled to be supplied with a car on a specified date. Railway rates are a cause of chronic grumbling in all countries, and the Canadian North-West is no exception. Within the last few years, however, concessions have been made that seem to be regarded as reasonable. A report of the Winnipeg Board of Trade makes favourable comparison of the Canadian farmer's position with that of his neighbour directly to the south in the States of North Dakota and Minnesota, the advantage to the Canadian being from 5 to 10 cents. per 100 lbs. for transportation over the same distance.

What of the Future

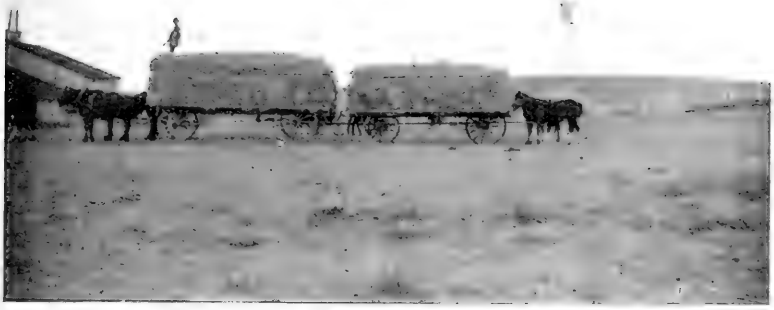
A far-reaching and important question, alike from the British and the Canadian standpoint, is our dependence upon the foreign market for our food supply. It is a fact too well known to need repetition, that to an increasing extent in recent years our arable land has been laid down in pasture. Nor is it less well known that the acreage under wheat is a continually decreasing quantity. It will be very difficult in the future to maintain even the position which we occupy to-day. In such circumstances, feeding ourselves is meantime out of the question. Besides, so long as it is cheaper to buy our supplies abroad than to grow them at home, we shall continue our present practice.

We require in the United Kingdom more than 100,000,000 cwts. of wheat every year. Where does it come from? The following table shows the percentages which come from the different countries of the world :—

Cereal Years.	United States.	Canada.	Russia.	India.	Argentina.	Other Countries.	Total.
1886-7	64·9	6·6	3·9	13·6	..	11·0	100
1887-8	49·8	4·6	20·0	8·2	..	17·4	100
1888-9	33·7	2·4	29·8	11·9	..	22·2	100
1889-90	45·1	3·4	23·3	11·6	..	16·6	100
1890-1	40·0	4·5	19·8	13·4	..	22·3	100
1891-2	59·2	5·2	6·4	15·8	2·7	10·7	100
1892-3	66·1	5·7	8·4	5·8	6·2	7·8	100
1893-4	49·8	4·6	17·2	6·6	12·2	9·6	100
1894-5	42·3	4·3	21·5	7·1	13·2	11·6	100
1895-6	50·2	6·4	18·9	5·0	6·3	13·2	100
1896-7	55·9	6·3	16·6	·5	1·4	19·3	100
1897-8	63·9	7·4	10·4	8·5	4·2	5·6	100
1898-9	64·5	9·9	3·3	8·8	7·4	6·1	100
1899-00	58·7	9·1	3·0	1·6	19·1	8·5	100
1900-1	64·4	7·9	3·6	1·3	11·1	11·7	100
1901-2	61·7	10·7	3·0	7·3	4·9	12·4	100
1902-3	48·6	12·6	12·3	10·7	10·6	5·2	100
1903-4	25·7	10·4	16·1	19·3	14·6	13·9	100
1904-5	8·3	4·4	24·0	24·2	20·7	18·4	100
1905-6	27·1	12·0	16·0	10·3	20·4	14·2	100
1906-7	29·3	11·9	11·4	12·9	19·7	14·8	100
1907-8	35·7	14·3	4·0	9·5	25·7	10·8	100

There is nothing more remarkable in that table than the fluctuations of the Russian and Indian crops, which makes it abundantly clear that whatever else we do, we cannot depend for regular supplies from Russia and India. It must not, however, be forgotten that with more modern agricultural implements and higher education the Asiatic races will be able to produce and export greatly increased quantities of wheat. Another noteworthy fact which the above table emphasises is the regularity with which the United States supplied us with a great portion of our wheat for a long period of years. In 1904-5, however, we only received 8·3 per cent. from the United States. The percentage since then has been much higher, but the day is not far distant when the United States shall have ceased exporting wheat. The reason of course is obvious. The population of the United States at the present time is 86,000,000, The yearly production of wheat is over 735,000,000 bushels. The

population consumes, including seed, approximately, 7 bushels per head. At the present time they are producing more than they are consuming. In 1915, when it is estimated the population will have reached 106,000,000, they will have no surplus wheat. Meanwhile, as the above table also shows, two countries have been forging ahead as wheat exporters, namely, Argentina and Canada. Both countries work under disadvantages. The Argentine is subject to pests of locusts and seasons of drought, and Canada has to contend with frost. On the whole, however, her exports are the more regular, and to her we must largely look for our immediate and more regular supplies. With an increased rise in prices large regions undrained and semi-arid in different parts of the world, would immediately come under the plough. Without, however, pushing the margin of cultivation farther back, Canada, on virgin soil, will by and by be able to make up for more than the deficiency of the United States and produce wheat at prices which, while tending upwards, will not be exorbitant.



BRINGING IN HAY. HORSE RANCH, MEDICINE HAT

DAIRYING

The return from milk and milk products in Canada is estimated at $94,000,000, made up as follows :—

Creamery Butter and Cheese . .	$36,000,000
Dairy Butter	22,000,000
Condensed Milk . . .	1,000,000
Milk for direct consumption . .	35,000,000
Total Value .	$94,000,000

Dairying owes its outstanding position in the Dominion largely to the fact that it is ubiquitous. There is no district in the whole land where the cow will not thrive and give a good return for the care bestowed on her ; and there is no province where you will not find cheese factories and creameries. It is well for Canada that this is so. Wheat-growing, as practised, is far too exhausting and one-sided to last for ever even on the deepest and richest of virgin loams. In the dairyman there is already being recognised the fitting and necessary successor to the wheat-grower. As yet in the wheat belts this tendency is just beginning to be noticeable ; in the end it will prevail, and Canada will be the first dairying country in the world. In anticipation of such a destiny, any survey of the industry to-day should be specially interesting.

Breeds

Naturally, one begins with the cows. There are nearly three millions of them in Canada, Ontario claiming over one million, and Quebec over three-quarters of a million. Only a small proportion is pure-bred and probably only a few of these are registered. The cow most frequently met with is cross-bred and may have had no pure-bred ancestor for generations back. In the east the number of Jerseys and Jersey crosses is striking, in the west, where beef is an important consideration, the Shorthorn prevails. A statement of the numbers registered as calculated from the Report of the Record Committee for 1907 will afford some idea of the relative importance and distribution of the breeds. The figures, though reliable, are only approximate.

Shorthorns .	73,822	about $\frac{2}{3}$ being in Ontario.
Ayrshires .	15,430	,, $\frac{1}{3}$,, in Ontario and $\frac{1}{2}$ in Quebec.
Herefords .	4,910	,, $\frac{1}{2}$ being in Ontario.
Jerseys .	2,038	,, $\frac{4}{5}$ do. do.
Aberdeen-Angus	1,634	,, $\frac{1}{2}$ do. do.
French-Canadian	1,390	nearly all being in Quebec.
Guernseys .	290	
Red Polled .	130	
Holstein-Frisians	15,020	

The last-mentioned breed though registered has not yet joined the National Records. It should also be noted that a very large number of Canadian-bred Jerseys are registered in the American Herd Books and not in the Canadian Records. The reason for this is that the trade in pure-bred Jerseys is largely in the United States, and they have to be registered in the American Herd Books in order to get free entry into that country. Pure-bred Jerseys must, therefore, be much more numerous in Canada than the above figures indicate.

In the dairy herds, Shorthorns, Ayrshire, Holstein and Jersey crosses are common, and pure-bred specimens of all these breeds are by no means rare. The best milking cow in Canada, when quantity alone is considered, is the Holstein. One of this breed was reported to us as having a milk record up to 2000 gallons, and as having given 10 gallons in one day. Her milk is poor in quality, the average butter fat as shown in the records of the Government Record of Performance being 3·2. Recognising this defect many breeders of Holsteins are now seeking to improve the quality rather than to increase the quantity of their milk. It is inferior for butter-making and unsuitable for the retail milk trade, but at the cheese factories it is made welcome. As cheese is the chief dairy export of Canada, and is likely to increase in importance, the Holstein cow must continue to be in demand. A contrast to the Holstein is found in the French-Canadian, a breed that was new to the whole of our party. Those we saw were handsome black animals with a slight brownish tinge. They were bigger and stronger looking than the Jersey, and they were reported to give a larger yield of milk than either the Jersey or Guernsey, without any reduction in its quality. In fact, they were reported to be nearly as good milkers as the Ayrshires and not less hardy. A competent authority informed us that they were the most profitable butter cows in the country. No cow is eligible for registration in their Herd Books which does not give 10 lbs. butter per week, and no bull is entered whose dam gives less than 10 lbs. of butter per week over a certain period. Ayrshires and their crosses are numerously represented in the dairy herds, but the standard of quality is often lower than at home. On the other hand some excellent Ayrshire cattle—many of them imported—were seen at Toronto Exhibition, a show admitted to be the best on the American Continent. The judging of the stock on that occasion is worth more than a passing remark. The Ayrshires were judged on sensible dairy commercial lines, a noticeable feature being the number of points given to the "touching qualities," and to the milky signs of the animals. This resulted in some of the imported stock that had been in the front at some of the leading Scottish shows having to take a back seat. In all the sections it was noticed that great attention was paid by the judges to the development of the milk veins, the size of the milk wells, the elasticity of the milk bag and teats, the width of the ribs, and the softness and looseness of the skin. Strange to say in Scottish show-yards little or no importance so far has been attached to these milky points.

Jerseys and to a less extent Guernseys are common in Eastern Canada, where indeed their blood often dominates the herd. Delicate as we consider them at home, these cows seem to stand even the Canadian winters without inconvenience. At Toronto we found perhaps the best exhibition of Jerseys to be seen anywhere. The fact that in the Aged Bull Class the winner at the recent Newcastle Royal Show was a competitor and failed to find a place, points its own moral. In the States this breed is the peculiar favourite of millionaires, and has been boomed by them to a considerable extent of late years.

A word must be given to the general purpose grade cow that makes up the bulk of the dairy herds. She is a big-boned, large-framed, rather coarse looking animal, capable if properly mated of producing good beef cattle, but she seldom has the points of a really good dairy cow. She costs the farmer from £7 to £12, the price often varying according to locality, and when fat she sells for some two pounds less money.

Milk Yields

Taken as a whole the dairy herds are capable of great improvement. The average yield of the Canadian cow is stated at a little over 300 gallons per annum, ranging, according to the returns of 1900, from 4038 lbs. in Ontario to as low as 2184 lbs. in Prince Edward Island. These figures contrast most unfavourably not only with Scottish and Danish records but also with the records of well fed and well selected herds in Canada. Repeatedly in the course of our journey we had satisfactory evidence of averages that were much higher. In Ontario one herd of sixty-five cows had a record of over 10,000 lbs., and even in Prince Edward Island several herds have averaged over 7500 lbs. At Truro College Farm we found a Holstein cow with a record of over 18,000 lbs., and the average there of all breeds up to the time of our visit worked out at over 1000 lbs. per cow per month, which promised a yield of about 1000 gallons a year.

One receives these contrasting figures with a sense of bewilderment. With an average of a little over 200 gallons—and of course many herds must be well under that average—how can a Prince Edward Island dairyman go on at all? More bewildering still, why should he? Naturally this state of matters is satisfactory neither to the Government nor to the farmer, and a remedy is being sought and will be found.

Milk Records

Profiting by Danish experience milk records are being kept, and an inquiry—as yet difficult to meet—has arisen for bulls of a good milking strain. Testing associations have been formed, and twenty of them are recorded to have been in operation in Ontario and Quebec during 1906. This figure, if we contrast it with the 402 similar bodies existing in a small country like Denmark in 1904, shows that the promoters of the movement have as yet but little more than broken ground. It is needless perhaps to add that in this as in

every other agricultural reform the Government is the main help and guide. It is not improbable that this rising demand for cattle of a good milking strain will make itself felt in Scotland and will stimulate the milk record movement among the Ayrshire men. The first call, however, will be on Canadian breeders, and they are busy preparing for it. A glance at an extract from the rules of the "Canadian Ayrshire Record of Performance," shows what is being aimed at. All cows must equal or excel the records specified below :—

	Lbs. of Milk.	Lbs. of Butter Fat
Two-year-old class . .	5,500	198
Three-year-old class . .	6,500	234
Four-year-old class . .	7,500	270
Mature Class . .	8,500	306

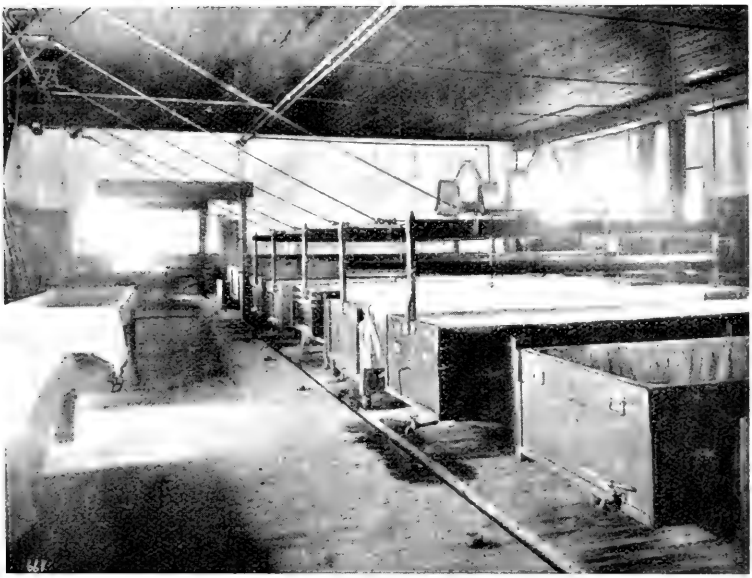
There is more needed, however, than a good milking strain. It is the "meat in the mou' mak's a good milk coo," as we say ; and there is as much in the feeding as in the breeding. So far as our necessarily limited observations bore, the Canadian cow is not over fed on the summer pastures, and the winter fare, as it was told to us, is not likely to interfere with her milking capabilities, through making her too fat. Indeed, to speak the truth, a conjecture might be hazarded that if the Canadian dairymen had to pay our rents and work under our restrictions, they would either have to make their cows give 200 gallons more or else quit the business. A 500 gallon record is not beyond any one's reach even in Canada.

Cheese Factories and Creameries

A very large proportion of the milk produced in the Dominion goes either to the factories to be made into cheese or to the creameries to be made into butter. These institutions are numerous as the following table shows :—

Province.	Cheese Factories.	Combined Cheese and Butter Factories.	Creameries.	Skimming Stations.	Total.
Ontario . .	1,096	86	102	..	1,284
Quebec . .	1,392	736	627	51	2,806
Prince Edward Island .	23	16	8	..	47
Nova Scotia .	7	..	10	..	17
New Brunswick .	33	..	35	..	68
Manitoba . .	36	..	21	..	57
Saskatchewan .	1	..	6	..	7
Alberta . .	8	..	45	..	53
British Columbia	..	..	16	..	16
Total . .	2,596	838	870	51	4,355

They may be divided into three classes, according as they are worked and owned by private persons, by Co-operative Societies, or by such



INTERIOR OF BLACK CREEK CHEESE FACTORY, STRATFORD, ONTARIO

INTERIOR OF BLACK CREEK CHEESE FACTORY, STRATFORD, ONTARIO

societies under Government supervision. About one-half of them are worked by private persons and half by societies. A few in the north-west have been begun by Government, and have afterwards, as they grew stronger, come to be worked on purely co-operative principles, without any outside help or guidance whatever. A working principle common to all is that the farmer is charged a fixed sum for the expenses incurred in making each pound of cheese or butter, and with this deduction gets the proceeds of the sales. The profit to the owner, or to the Society, as the case may be, comes from the skill shown in doing all the work for less outlay than has been charged to the farmer.

In connection with the spread of these factories, it is impossible to praise too highly the work of the Government. It has been most conspicuous in the past in Prince Edward Island, and is best seen to-day in operation in Alberta. Space may be taken to give a condensed account of what is being done in that province. Forty-three creameries and seven cheese factories are at work, twenty-one of the former being under government supervision. These creameries are set agoing in the following way. When a desire arises among the farmers of a district to have a creamery, those interested approach Mr Marker the Dairy Commissioner for Alberta. He informs them that he can help them if they fulfil the conditions of the "Dairyman's Act." They must therefore guarantee the milk from at least 400 cows: they must consent to be registered—free of expense—as a trading association: they must subscribe funds for the erection of a suitable building, and for other purposes, and their Committee must become responsible for the performance of certain duties, including the haulage of cream from the farms. The Government on its side is prepared to lend money up to $1500 for equipment, at the low interest of 3 per cent.: to have that equipment bought and erected by a skilled man; and to appoint a butterman to take charge. When butter is made it is taken to the Government Cold Storage at Calgary and in due time is sold, still by government officials, to supply the needs of Vancouver, the Yukon, or the Orient. The ordinary charge made for the manufacture of butter, whether in government or other creameries, is 4 cents a pound. The use of the Cold Store is granted without charge, but the material used and the outlay incurred in refrigerating has to be paid for. Thus the Government, at a very small outlay, encourages the development of an industry that is suitable for the country; it ensures the establishment of creameries on sound and safe business lines; and it provides for the production of the best butter that the country can make.

Cheese factories are conducted everywhere on the same principles as creameries. When cheese is made the farmer gets a better price for his milk, but he gets back with him to feed his pigs only whey and not skimmed milk as in the other case. When butter is made the milk is almost always separated at the farm and the cream is called for twice a week. This saves haulage and is the only method possible in districts where the distances are great. The cream is examined and tested for butter-fat when it reaches the creamery

and if the farmer has been careless and has sent what is unsuitable for making good butter, the butter-maker refuses to take it. It will be understood that after an experience or two of this kind the farmer learns how to keep his cream in good condition

The best of the creameries and cheese factories were clean, tidy and well managed on scientific principles. In others both as regards the structure, which was often wooden throughout, and the management there was room for improvement. It may be of interest to note, in view of coming dairy legislation at home, that only in one place did we find it the practice to pasteurize cream before making it into butter. In Denmark, as is well known, this is enforced by law. An ingenious arrangement, new to us, for stirring the curds

BLACK CREEK CHEESE FACTORY, STRATFORD, ONTARIO

by machinery was admired; but on the other hand the use of mechanical cheese turners which prevails in Scotland seemed to be unknown. Undoubtedly the weak spot of the system is found in the farmer and his premises. He is not and cannot be expected to be a skilled dairyman, and his premises, often put together in haste, and at the least possible outlay, cannot possible meet the requirements of modern dairy sanitation. In the circumstances the excellent reputation of Canadian butter and cheese reflects the greatest credit on the makers, and on the good work done by the government dairy schools that spread a better knowledge of the principles that should be observed in the handling of milk and its produce.

Cold Storage

Government officials have recently originated a cool storage system for the better ripening of Canadian cheese, and have demon-

strated the great advantage of the process. They also, by the very simple plan of packing a thermograph in the train or ship along with dairy produce, effectually supervise the refrigerating arrangements made for its safe transportation by rail or sea. The record made by the instrument affords precise evidence of the temperature maintained during transit.

Even at the landing port in Britain the Canadian official stands on watch lest the dairy produce of his country should be handled in a way likely to lessen its value.

In fact there is a complete chain of supervision from the time that butter or cheese is shipped from the factories in Canada until it is delivered to the importer in Great Britain. Every little defect in packing, or in methods of shipping, is brought to the notice of the responsible party, and the mere fact that inspectors clothed with Government authority are on watch continually, has a most excellent effect in toning up the services in every particular. This kind of supervision is possible, because the Government pays subsidies to the steamship companies for providing cold storage. Without those payments, the Government would not have had the consent of the steamship companies to place men on their ships and on the docks to watch the work they were doing. The steamship companies and other carriers recognise the usefulness of this supervision and are desirous of having it continued even for their own benefit, as they find that the work of these inspectors is most effective in securing a proper discharge of duty on the part of their own servants. The inspectors in Great Britain not only watch the discharge of produce from the ships and report thereon, but they supply information of any movement or circumstance which may affect Canadian interests in the produce trade. The dairymen of Canada have received many useful hints in this way. Some years ago, the Government took up the question of the delay in the removal of butter from the quays after discharge from the cold storage chambers in the ships at London, Liverpool, and other places. It was found that butter coming out of the cold storage chambers was being left on the quays for several days, sometimes for periods of four, five, six and seven days. The quality was undoubtedly injured very materially by being exposed to the high temperature. After remonstrance, the practice of leaving butter on the quay was abandoned. Not only that: cold storage is now provided in the dock sheds at London, Liverpool, and Bristol for the reception of Canadian produce.

Price of Milk

Whether the factories are co-operative institutions or private concerns, the price the farmer gets for his milk is practically the same. It varies somewhat according to locality, but the net sum realised after deducting all expenses including haulage is generally between 4d. and 4½d. per gallon.

Condensed Milk Factories

There are ten condensed milk factories in Canada. At Ingersoll in Ontario we saw a very large one in operation. On the day of our visit it had received 7000 gallons of milk and had had on one occasion as many as 12,800. It was a highly prosperous undertaking. A farmer told us that the average price paid him for milk was 5½d. a gallon delivered at the factory. The milk, however, had to be produced under certain conditions. The byres had to be white-washed every year; the cows must not be fed on ensilage; the milk must be delivered at a temperature not exceeding 68 degrees F.; and must contain not less than 3·5 per cent. of butter-fat. These are not onerous conditions, and an extension of these factories would be very welcome to the Canadian farmer.

As in Scotland—but to a greater extent—farmers often make butter on their own premises; and as in Scotland, the reputation of that butter is often not very high. It, however, supplies a certain local demand, which otherwise could not perhaps be easily met; it is often bartered to shop-keepers for goods, no money passing over the transaction.

The Cows' Feed

The most prosperous dairy farmer in Canada, as at home, is the man who retails his milk in towns. He has few restrictions; he has cheap cows; cheap food, and a good price for his merchandise. Unlike his neighbour who supplies the factories he must keep up the flow of milk all the year round and must therefore lay in a good store of winter food. To this end hay is everywhere the dairyman's sheet anchor. Feeding may differ in other details according to locality, but in all parts of the Dominion hay is regarded as essential for the feeding of cows in winter. Some farmers give them little else, but the enterprising man, especially if he is in the retail milk trade, believes in good feeding at all seasons. A successful farmer in Nova Scotia who made butter, and made it good, gave us the following account of how he fed his cows. In winter they got 2 lbs. of cotton-seed meal; 3 lbs. of middlings; 3 lbs. of bran; 30 lbs. of swedes or mangolds; and as much hay as they could eat. In the grazing season, lasting from the 10th June to the 1st September, he cut down the meals by half. His cotton-seed meal cost roughly £7, 10s. a ton, the middlings from £5 to £6; and the bran about £5, 15s. The hay was estimated to be worth 33s. a ton. The Ontario bill of fare is very similar except that ensilage made of Indian corn takes the place of roots. A dairyman near Calgary in Alberta stated his feeding thus:—Two sheaves of oat hay; prairie hay ad lib.; six gallons of brewers' draff; and, if milk was scarce, some bran and bruised oats. He added that last season his oats were all frozen and were fed to his stock. In summer his cows had each an allowance of two acres of prairie grass for pasture, and six gallons of brewers' draff. He paid 5s. to 6s. a ton for his draff, but had to cart it some five miles; he got his prairie hay for 10s. 6d. a ton if he drove it direct from the place where it was cut, and

for 21s. if he took it after it was stacked. This hay, it may be added, is short wiry-looking stuff but good feeding and much relished by stock. In the newer districts it can be had for the cutting in almost any quantity. The milk from this farm was sold in Calgary at 1s. 2d. a gallon ; 78 cows were kept and nearly the whole work was done by members of the family. The owner, a Dane, with the national industry and ability, had evidently found a short cut to prosperity.

An excellent winter food is found in maize which grows to perfection in Ontario and the warmer parts of Canada. There it is

OTTAWA CORNFIELD

the cow-feeders' mainstay. It is grown as a fodder plant, attaining the height of 13 feet and having thick stalks with luxuriant foliage. It is cut green, run through the chopper from which it is blown through a tube into the silo. This building is a prominent feature of Ontario farms. It is a round tower-like erection, made of wood or concrete, and rising high above the other buildings. A good crop of maize for fodder should weigh about eighteen or twenty tons per acre, and as maize silage contains from 20 to 25 per cent. of dry matter against 10 per cent. in swedes, and as it costs about £4 per acre to grow and store as compared with £8 per acre of swedes, the popu-

larity of the crop is not surprising. Another plant, as yet little grown but undoubtedly about to become of great importance to stock feeders, especially in the dry belt, is Alfalfa. This is said to grow well in arid districts and to yield three cuttings in one season. It is therefore suited for soiling. This, in a country where dry pasture and summer flies are the curse of the dairyman, where cows are sometimes sprayed every day to keep off flies, and where the milk yield is often heavier in winter than in summer, should prove a most valuable acquisition.

Pastures

As regards Canadian pastures it must be said that we found them nearly everywhere disappointing. We saw them at the end of an exceptionally dry summer, but after all allowance has been made, this is the impression that still remains. To what extent the poorness of the pastures is inevitable and to what extent it is the outcome of farming practice, it was of course impossible for us to determine. The hard frost, far more severe and prolonged than anything we ever experience, must have an injur ous effect. The comparatively short and hot summer cannot be helpful. Yet such influences do not seem to account for everything. What about the methods of farming? Are the fields, for instance, laid down to pasture in that high manurial condition which we consider as the first essential? On the contrary it seems rather the rule to sow a field only when the land needs a rest from the exhausting strain of grain-growing. Are the grass seed mixtures carefully arranged so as to be well adapted to the land on which they are to be sown? Almost the only mixture sown is made up entirely of timothy and red clover, and as we were assured on the highest authority, 97 per cent. of the whole grass-seed sown in Canada consists of timothy. The whole subject of top and bottom grasses, of deep roots and shallow roots, has yet to be discussed in Canada. Are the pastures that exist skilfully handled with a view to their improvement? Are they, for example, top dressed or manured? Are feeding stuffs consumed on them? On the contrary crops of hay are cut from them repeatedly and pasture seems to be reckoned a matter of altogether third-rate importance. Possibly it is really so in the Dominion, but to us who have learnt the value of good pasture and the difficulty of making it, and who have had some experience of how greatly good pastures improve the physical texture as well as the manurial condition of land, this is a new doctrine and hard to understand.

Farm Buildings

The Canadian barn practically constitutes the farm steading. It is a big building with four high walls and is nearly always entirely made of wood. Instead of slates or tiles, wooden shingles or corrugated iron cover the roof. It stands three storeys high. The

lowest storey is slightly sunken and has various uses. It may be a pigsty, a place for stock, a store-room or a combination of all these. The floor above is only a little higher than ground level so that loaded carts can be driven right in through an opening in the middle of one of the sides. On the right and left of this doorway extending the whole length of the building are the byre and the stable. Above them are great lofts where hay, oat sheaves, etc., are stored for winter food. The byres are in some districts wooden throughout, concrete floors being very rare though concrete gutters are fairly

FARMER'S HOUSE, NEAR BRANDON

common. In the most important dairy districts, on the other hand, we are informed a good proportion of the byres have concrete floors, and practically all new byres in these districts are now being floored with concrete. Ventilation does not receive so much attention in Canada as in Scotland, but there is less necessity. Drainage arrangements too are sometimes primitive, but that is inevitable in a newly settled country. Where the pigs or other stock live below the byres the litter is deposited among them through a trap door in the floor. In other cases the dung heap is contiguous to the byre, while not many yards away, as like as not, may be found the farm well. It must be carefully noted, however, that we saw some byres where the accommodation and arrangements were excellent—but these were exceptional. The sanitation of new houses in a new country whether they be for man or beast must of necessity be open to criticism. In the case of Canada such criticism may be easily overdone. When we remember the extreme cold in winter, the abundance of ice in summer, and the fact that cows are often milked in the fields

during the hot season, we must admit that the sanitary condition of the byres is of less moment than with us. If we ventured to criticise we also found points to admire, such as the common custom of bottling milk; the feeding passage in front of the cows; the practice of having a constant flow of drinking water to the cow stalls; and the lavish use of ice. Ice is luckily both plentiful and cheap costing only from 5s. to 6s. a ton. People in towns often contract to have a lump supplied at their house every day throughout the summer for a payment of 37s. or so.

Sanitation

In a new country where the farmer has to carry out all improvements at his own charges, it is much easier to make sanitary regulations than to enforce them. The broad principle acted upon seems to be that cast-iron requirements as to buildings, etc., are much better dispensed with, and that a great deal should be left to the discretion of the City Medical Officer or Inspector. He has the power if he sees fit, to debar any dairyman from selling his milk within the city bounds. It does not appear however that his prohibition will prevent the same milk from being used elsewhere or sent to a factory. Such regulations as do exist are not the same throughout the Dominion. As illustrating in a general way Canadian methods, one or two points may be instanced from the Byelaws of Calgary City.

I. Milk Vendors in Calgary must be licensed, paying $2 a year, or if non-resident $8.
II. No license is granted till the Medical or other Health Officer has seen and approved the dairy premises.
III. The Officer can cancel this license at any time if he thinks proper.
IV. Milk containing less than three per cent. of butter-fat, or less than a total of 11½ per cent. of total solids must not be sold.
V. Cream containing less than 18 per cent. of butter-fat must not be sold.
VI. A breach of IV. or V. on a first conviction may entail a loss of license and on a second conviction must do so.
VII. A license once lost cannot be renewed until at least six months have passed.

RANCHING

MANY years ago when the North-West and Hudson Bay Companies held sway over western Canada the plains were jealously guarded by their factors and anything approaching settlement was rigidly discouraged. However, in the very comings and goings of the trade a check could not always be maintained on the discretion of those engaged in it, with the result that tales of a rich grazing country lying to the north were carried to the United States by Indian traders. Long before this the Americans had developed a great horse and cattle raising industry in the Western States. It was highly profitable, and when the traders brought news to Montana that north of the boundary there were great possibilities, the Americans were not long in taking advantage of it. Among the early leaders rank the names of Powers, Samples, and Conrad Brothers, who brought up big bunches of horses and cattle.

In 1870 the Government bought out the Hudson Bay Company, and after the treaty of 1875 they had to feed the Indians who were placed upon reservations and could no longer wander over the country to hunt, even if there had existed game sufficient to support them. As there were few cattle available locally, it was thought advisable to try and encourage the breeding of cattle on the plains. For this purpose leases for twenty-one years were granted at a nominal rent and under certain conditions, which stated briefly were as follows :—The amount of stock was limited to one head to twenty acres of land, Cattle were admitted from the United States under bond, and, if kept for two years, were allowed to be sold duty free ; and, at the expiry of the leases holders were at liberty to acquire ten per cent. of their holdings at a fixed price of one and one quarter dollars per acre.

Thus was founded the great cattle industry of Canada, which in less than two generations has grown to such great dimensions that the cattle of Saskatchewan and Alberta are now a highly important factor in the world's markets. Once founded, the industry grew by leaps and bounds. In the first place private individuals obtained areas of land from the government, then the capitalist appeared on the scene, companies were formed and the business was conducted on a large scale, though one fears by sometimes unbusinesslike methods. Bad seasons, mismanagement and lack of knowledge of the country all told their tale, and the industry passed through many vicissitudes. As years go, in the older countries, it is but yesterday since the inception of this vast trade, but even now ranching on a grand scale is becoming a thing of the past.

How is this to be accounted for ? There are various reasons which may be summed up shortly under climate and the increased

value of land. One hears of winters when the calves died in the corralls, from severe cold accompanied by deep snow covered by a crust which prevented the stock grazing. In one of these winters the losses amounted to 40 per cent. of the herds. Of course such seasons are exceptional, but they have to be reckoned with. Then land is now worth five or six times its original value. In such circumstances shareholders think the present an opportune time for realising their capital. And so those wide rolling plains are being cleared before the advance of the homesteader and all the old romance of the prairie is being blotted out by the hosts from the east and south who are coming to this new land to fight for independence.

One would naturally come to the conclusion that the cattle industry of the west would vanish before this inrush of settlers. Yet this is far from being the case. In a stock-raising country such as this the carrying capabilities of the land are limited to the amount of stock which it is capable of maintaining over winter. In the days of the big ranches, when there was unlimited free range apart from the ground actually owned or leased, it was the endeavour to run as big a stock as possible with the minimum of attention. The natural consequence was that it was utterly impossible to obtain winter fodder for more than a small proportion of the stock, and the older cattle were left to fend for themselves during the winter. Given a few open seasons this worked well enough, but the inevitable must happen, and periodically the tale of terrible losses came to be told.

Now, however, a new era is dawning. The settlers are daily going further out and locating homesteads in the ranges. They take up their quarter or half section and find that, with very little extra trouble to that expended on their holdings, they can, if they had sufficient capital to start with, run a bunch of forty to fifty cows and their produce. They can make sufficient slough hay in summer to ensure that they can carry their stock through the winter in safety; this system is being followed with considerable success and we who fully expected to find that the cattle statistics would show a steady decrease in the ranching provinces following on the breaking up of the land, were astonished to find that the very reverse is the case.

There seems little doubt that this method will be greatly developed in the near future and with good management it should be very profitable. With the steady influx of settlers and the consequent demand for horses, their breeding will pay exceedingly well for many years to come. People say that steam will take the place of the horse, but experience teaches that steam cultivation is but the precursor of the horse. Horse breeding takes considerably more capital to commence with than cattle raising, but it has also considerable advantages. Horses require little or no attention during the severest winter, as they can scrape away the snow and get to their food when cattle would starve, and as regards monetary return a four year old colt would, generally speaking, be worth $100 as against $40 for a steer of the same age.

There are vast areas in the ranching provinces, which, though

HORSE RANCH, MEDICINE HAT

owned by a railway or land company are lying unoccupied and unfenced, on which anyone is at liberty to run stock; and to the homesteader who has gone out ahead of the railway and is waiting for the day when he will be within marketable distance of it before breaking up much land, this liberty is a great asset. Beginning in a small way, by the end of four years he will find himself in possession of quite a respectable bunch of stock representing a goodly sum in hard cash.

The following comparative table of shipments of stock from the range provinces since 1903 indicates the terrible losses incurred in the memorable winter of 1906-7, but in spite of this it also shows that up to 30th September last the provinces exported 13,500 more head of stock than they did during all the year 1903, and doubtless the figures will again soon reach the high watermark of 1906.

Year.	Horses.	Cattle.	Export.	To U.S. Points.
1903	9,745	68,700	24,500	..
1904	13,413	91,488	33,878	..
1905	12,882	83,415	49,991	..
1906	19,549	114,651	74,333	300 driven
1907	11,382	80,043	42,960	8,722
To 30th Sept. 1908	9,230	58,846	38,000	910

We had an opportunity of visiting the Crane Lake Ranch belonging to the Canadian Land and Cattle Co., Ltd. At first sight we could not help comparing the green hedge-girt fields and shady pastures of the old country with the apparently boundless stretches of level or rolling prairie covered with short bent-like grass over which the ranch stock roam. But we soon forgot the difference and were lost in admiration of the feeding qualities of the prairie grass which is capable of rearing and finishing cattle and has done much to make the prairie regions a factor to be reckoned with in the meat markets of the world.

In ordinary circumstances one might visit a ranch and in the short time at one's disposal see little or nothing of the cattle, scattered as they usually are over many miles of country. At Crane Lake, however, we were given a unique opportunity of seeing a large herd of ranch cattle in the course of one day as the owners of the ranch had sold all the stock and it was gathered within the home pastures ready for shipment. Before, however, examining the stock we examined the buildings. The commodious residence of the manager, with its surrounding green hedge presented a note of refinement and comfort. Near by stood the office with bookkeeper's house attached, behind which lay the garden, where praiseworthy efforts were being made to grow everything from potatoes to tomatoes and citrons with doubtful results, for the hot Chinook winds play havoc with garden crops in the arid regions. After a passing visit to the living rooms of the foreman and cowboys, and to the dining-room, where generous meals are prepared for men hungry from six hours in the saddle, we got to the rear of the main buildings, which form a hollow square enclosing a large yard, in

which there were a number of corralls or pens, some of them roofed for young stock in winter, others open and suitable for sorting stock. Close at hand was the dipper or bath for cattle. The cattle are first run into a big corrall, then a bunch out into a smaller one immediately behind the dipping tank. Then, as they are required, they are caught in a squeezer which holds them ready to go into the cage. Once in the cage, it is lowered by means of ropes and pulleys into the bath, and the animal is immersed in the wash, which consists of a solution of sulphur and lime heated to between 105° F. and 110° F. To keep the bath at a proper temperature there is a large furnace and boiler lying alongside and having pipes communicating with the bath. This seems a very drastic treatment, but the cattle do not seem physically any the worse for it, and it thoroughly eradicates mange. This disease is a very serious one, as when the cattle lose their hair they cannot withstand the severity of the winter and die off. Water for household and stock purposes was pumped by a large windmill into a big tank situated below the roof of the barn, from which it flowed by gravitation to where wanted.

While we were being shown over the buildings, the foreman had brought in a bunch of horses to the yard; a couple of these were caught and harnessed up to a rig and we set off to see the stock. First we went to see a small bunch of pure Hereford cattle. These were generally of a very good short-legged type and there were some outstanding cows among them. The calves were particularly good, well-grown, fleshy and richly haired, everything that a calf should be. Leaving them we drove across country to a big bunch of cattle composed of all classes and ages, with the exception of yearlings, which had been disposed of beforehand. The breeds represented were Herefords, Shorthorns and Galloways. Before turning the horses' heads homewards we had an opportunity of examining by the shore of Crane Lake the horses and cattle on an adjoining ranch. Thus we were able in a comparatively short time to see on their own pastures many typical ranch cattle and something if not very much of the romantic life of the cowboy which is passing away.

FRUIT-GROWING

The fruit and vegetable trade of Canada is yet in its infancy. In 1901, there were only in round numbers, 476,000 acres under these crops. The following are the exact figures :—

Orchards	354,545 acres
Vegetables and small fruit . . .	116,517 ,,
Vineyards	5,600 ,,

While fruit can be grown to a greater or less extent in all the provinces of Canada, it is confined for the most part to Nova Scotia, New Brunswick, Ontario, Quebec, and British Columbia. We had little opportunity of examining the gardens and the orchard-land of either New Brunswick or Quebec, and in this section we are to confine ourselves to a description of fruit-growing as we saw it in the Annapolis Valley, Nova Scotia ; in the Niagara Peninsula, Ontario ; and in different parts of British Columbia.

Annapolis Valley

This valley, called by different names as it passes through different districts, and varying in breadth from six to ten miles, extends along the Bay of Fundy from Windsor to Digby, separated however, from the Bay by the North Mountain and protected from the east wind by the South Mountain. It is thus sheltered on both sides by parallel mountain ranges, and it is more suitable for the production of fruit than any of the other large stretches of country in Nova Scotia. The soil is as suitable as the situation. The quantity and quality vary at different parts, but it is all more or less suitable for the production of the crops grown. The farms which, as a rule, are long narrow strips owned by the occupiers, extend from 20 to 120 acres, and are composed of hay land in the bottom of the valley, orchard land round and behind the steadings, and grazing and woodland farther up the hill. They lend themselves to a system of mixed agriculture, particularly dairying and fruit-growing, but there seems to be a disinclination on the part of many farmers to carry on the joint occupation of dairying and fruit-growing, possibly because it is difficult adequately to attend to both, and possibly because the fruit trade is easier and has been a more profitable trade than the dairy trade. In any case the tendency has been to specialise in fruit, and there are 50,000 acres of orchards in the valley. Different varieties of fruit are grown—raspberries, blackberries, currants, gooseberries, strawberries, pears, plums, cherries, apples, but the apple predominates. The people believe that the valley is specially suited for the production of apples.

alleging that the situation and the climate are such that fruit of the very highest quality can be grown, and that the fruit trees will last much longer than in more trying climates. They believe too that any advantages more favoured parts of Canada may have over them are counterbalanced by the fact that they are nearest to Great Britain, which is the market for much Canadian fruit. The most profitable varieties grown are—the Gravenstein, Ribston, Blenheim, King, Yellow Bellefleur, Fallawater, Baldwin, Northern Spy, Golden Russet, Rhode Island Greening, Nonpareil and Stark.

It is customary to plant forty apple trees to the acre. As these trees do not begin to bear until they are from five to ten years old,

ANNAPOLIS VALLEY

and are not in full bearing till they are from ten to fifteen years old, the fruit-grower utilises the space between the trees for the production of other crops, such as potatoes, corn, roots, and small fruit. When the trees cover the greater part of the ground regular crops are dispensed with, and cover crops take their place. Cover crops are sown in July. Just at that time the fruit trees cease to grow. The vacant ground is then sown down with buckwheat, or clover, or oats, or some similar crop which serves a three-fold purpose. It absorbs the plant-food in the ground, and thus, while feeding itself, it stops the growth of the trees and hastens the ripening process before the frost comes. It lies on the ground all winter, and, holding the snow, it protects the plant-roots from the frost, and being ploughed in during the following spring, it adds humus, and in the case of the leguminous crops, also nitrogen to the soil. With the addition of phosphates and potash, put on in the shape of

artificials, the land which in many cases is not otherwise manured, is kept in a fair state of fertility.

There is no lack of insect pests and fungus diseases in the valley, and vigorous attempts are being made to keep them down. The up to date fruit-growers spray their orchards three times every season, once before the trees blossom, once immediately after the blossom falls, and once again a fortnight later. The mixture is usually made of 4 lbs. of copper sulphate, 4 lbs. quick lime, and 40 gallons of water, to which is added from $\frac{1}{3}$ to $\frac{1}{2}$ lb. of Paris green. Spraying is one of the heavy items of outlay necessarily incurred on a fruit farm, but it is one which must be incurred if failure is to be avoided.

The grower, almost invariably, picks his own apples. He may also grade and pack them before disposing of them locally or sending them to a commission agent for sale. In such circumstances, he must provide himself with a fruit store and have a fairly good knowledge of the packing business. More frequently, he sells his fruit to apple buyers, who stipulate that it must be delivered at their warehouses. There the fruit is graded and packed by experts. Where the co-operative movement has taken root the fruit is consigned to the co-operative store and is graded and packed and ultimately shipped to the market where it is to be disposed of.

The average yield of fruit is difficult to estimate. We have it on the authority of reliable growers in the valley that an acre of good orchard land in full bearing will yield 100 barrels of 150 lbs. each per year. The average price in 1908, at the point of shipment, was about two dollars per barrel, which would give a return of fully £40 per acre. We heard of returns much greater in amount and in value. Possibly the above figures are as high as the average could be put.

In the Annapolis valley, so desirable for situation and so capable of producing crops which more than pay the money expended on them, it must seem strange that scores of farms are in the market. As a matter of fact, we know of thirty fruit holdings in the valley and elsewhere in Nova Scotia for sale. The reason is not that the fruit-growers are doing badly, for this is not so. It is rather occasioned by the unrest, which more or less is affecting the rural population the world over. It is accentuated in Eastern Canada, because the young men have the blood of the pioneers in their veins, and the romantic story of farming and ranching in the wild west is ever being told to them; and, discontented and dissatisfied without much reason, they are ever seeking pastures new. As a result, there are openings in the Annapolis valley for fruit-growers particularly those of them who can combine fruit-growing and dairying, —but they must be men of shrewdness, of intelligence, and of perseverance. For such men, good farms, possibly to some extent run out, with good buildings upon them, and planted partially with fruit trees, may be bought at from £10 to £12 per acre.

CULTIVATION OF APPLE ORCHARD, GRIMSBY

COLDSTREAM RANCH, VERNON, B.C.

Niagara Peninsula, Ontario

There is more fruit culture in Ontario meantime than there is in any other province of the Dominion. These figures show the extent of the trade :—

Orchards	266,015 acres
Vegetable and small fruit . . .	65,303 ,,
Vineyards	5,440 ,,

The fruit district is confined for the most part to Southern and Western Ontario, and this district is divided into two parts. Hardy fruits, such as apples, sour cherries, and plums, are grown on the east shore of the Georgian Bay and Lake Huron, on the north and south shores of Lake Ontario, and on the north shore of Lake Erie. Tender fruits, on the other hand, such as grapes, sweet cherries, pears and peaches, are grown south and west of Toronto, on the south of Georgian Bay and the east of Lake Huron. The districts described constitute the garden of Ontario, and some of the best fruit on the American Continent is grown there. The market is, or at any rate will be, by and by an almost unlimited one. At the present time, the Ontario fruit-growers ship large consignments of fruit to Britain. The great market of the future, however, will be the western prairie. As the country fills up, the demand will increase, and Ontario is likely in the future to have a better market for her produce than she has had in the past. Outside the peach belt, land capable of producing the hardier kinds of fruit can be brought at from £10 to £20 per acre.

Our visit, however, was mostly confined to the Niagara Peninsula on the south shore of Lake Ontario. It extends from the Niagara river to Hamilton. It is a strip of land about forty miles long by from one to five miles broad, bounded on the south by a low range of mountains, and on the north by Lake Ontario. The district is thus sheltered by the hills, and the climate is tempered by the waters of the lake, and it enjoys the enviable reputation of having the best climate in all Ontario. The soil differs at different parts. At the foot of the hills it is a clay loam and sometimes a stiff clay. Towards the shore of the lake it is a sandy loam. Apples were once the predominant crop in this particular part of Ontario. The climate, however, is too warm for producing apples that will keep. After they are ripe, two or three weeks of warm weather is usually experienced, and they give way much more readily than apples grown in colder climates. This difficulty might have been overcome by the introduction of cold stores, where the apples after being picked, would have been kept until required for the market. It was, however, discovered that this particular stretch of country was capable of producing other fruits without the aid of cold storage, and so the clay land has been devoted to vine-growing. The vines are generally grown in rows about eight feet apart, to allow a waggon to go up between for the purpose of manuring the land and spraying the plants. They begin to bear when three years old and they yield when in full bearing about four tons to the acre. The variety

grown is both suitable for eating and for making wine. It has not, however, the flavour of the continental grape, to which we are accustomed in this country. The taste for it must be acquired. The sandy loam in the Niagara Peninsula is devoted almost exclusively to the production of peaches. Peach trees are planted from 15 to 20 feet apart. It takes from thirty to forty dollars per acre to plant an orchard. The annual outlay for cultivation till the end of the fifth or sixth year when the orchard is in full bearing is $30 per acre. Once, however, an orchard is established, it will last for fifteen years and will bear good crops varying according to the seasons. It is difficult to estimate what the return from such an orchard during the years of full bearing will be. We have been informed that the gross return per acre would not exceed 200 dollars in a favourable season, one half of which would be spent on cultivation.

It is not easy to get an entrance into this most favoured spot of the garden of Ontario. You must be, whatever else you are, a man of means. Unplanted land costs as high as from 200 to 300 dollars per acre. Land, on the other hand, planted with peach trees costs 500 dollars per acre. In choice spots it may reach the enormous sum of 1200 dollars per acre. A corner lot, extending to 10 acres, near Grimsby Park, a mile from Lake Ontario, with trees in full bearing, and a house on the ground worth from 3000 to 4000 dollars, was sold five years ago for 7000 dollars. Recently the same property was sold for 12,000 dollars. The parts of the belt, however, where such prices are obtained, are the best parts and are well served by an electric railway which runs from Beamsville to Hamilton. The houses are large and commodious, with beautiful lawns extending to the public road. There is no isolation and no loneliness. Social life is as characteristic of the people as it is of the people resident in any of the suburbs of our great cities.

British Columbia

It is only twenty-one years since the first car-load of fruit was shipped from British Columbia. Much progress, however, has been made since then. The development of the trade is shown by the following figures :—

Year.	Acreage under Fruit.
1891	6,437
1901	7,430
1905	22,000
1907	100,000

But the fruit-growers of British Columbia are as much concerned about the quality as the quantity of their fruit, and in this connection they possess certain undoubted advantages. They have an admirable climate. There are of course wet regions, where the clouds drifting from the Pacific break on the coast mountains and fall in rain. Such regions are unsuitable for fruit culture. There

are dry regions on the east side of the coast mountains—dry because the clouds have broken and the rain has fallen before it reached them. Such regions without irrigation—and sometimes irrigation is impossible—are equally unsuitable for fruit culture. Outside these districts, however, the climate is admittedly the best in the whole Dominion. They have also the experience of all the other fruit-growers of Canada at their back and they have not been slow to learn. According to Mr M'Neill, Chief of the Fruit Division—and he should know—the fruit-growers of British Columbia grade, pack, and market their fruit better than any of the other fruit-growers of Canada. It is this which in large part is giving the province a hold on the markets of the world.

The fruit districts are scattered pretty well over the province. We had an opportunity of examining the gardens in Vancouver Island. The soil is light but not unsuitable for certain classes of fruit and vegetables. Besides, the climate is as good as it can well be. The rainfall, while sufficient is not excessive, and the temperature, both in summer and winter, is moderate. Undoubtedly, it will become a great centre of fruit-growing and market-gardening, supplying many towns on the Pacific coast. We also had an opportunity of examining orchards at Agassiz, where one of the Dominion experimental farms is established. Agassiz, however, has a rainfall of 67 inches per year, too much for the perfect production of fruit. Fungus growths, due no doubt to the wet climate, were much in evidence throughout the district. Most of our time, however, was devoted to what may be described as the two great fruit districts of British Columbia, the Kootenay district and the Okanagan Valley. The Kootenays—east and west—are situated in the south-eastern portion of British Columbia, west of the Rocky Mountains. They are composed for the most part of mountain and forest land, with beautiful sheets of water in place of fertile valleys. Sailing up the Kootenay or the Arrow Lakes, it needs a good deal of imagination to believe that there is any cultivatable land in the district at all. The arable land, however, is more extensive than at first sight appears, and hundreds of acres covered with timber lie along the banks of the lakes, and hundreds of acres more pierce the mountains in different directions. But the timber must be cut and the ground cleared of stumps before fruit cultivation is possible, and that may cost from 100 to 150 dollars per acre, according to the size of the timber. In some cases the timber may pay for the clearing. In other cases it may not pay even the cost of marketing. It was entirely in accordance with commonsense that the capabilities of the district as a fruit-growing centre should be discovered more by accident than intention. Mr James Johnstone, Nelson, a Scotsman from Aberdeenshire, who had carried on mining operations in different parts of the United States and Canada, settled down in Nelson some years ago. He found in the forest behind his house a number of fruit trees. Investigation revealed the fact that a Frenchman had once settled there and had actually planted an orchard, and the trees, notwithstanding that the luxuriant vegetation had done what it could to crush them out

of existence, had grown and flourished and were producing abundantly. Things were not going well with mining at that time and mining was then, as indeed it still is, the chief industry of the Kootenays, and Mr Johnstone turned his attention to the development of fruit culture, and most of what has been done is due to his enterprise and energy. The holdings as a rule are small, due, no doubt, to the comparatively limited area, and the high price, of choice land, which sells at from £30 to £50 an acre, and also to the expense of clearing the ground of timber. The holdings run from a few acres up to sixty, but the sixty-acre holding is the exception. The soil varies greatly, and in some places is poor in quality. Nowhere is the cultivation noteworthy, but whatever the soil and however indifferent the cultivation, the climate never fails, save some-

YOUNG ORCHARD, KOOTENAY LAKE

times from want of moisture. The luxuriant growth and the amazing crops are due more to climate than to anything else. The climate in west Kootenay, which lies between Kootenay Lake and the Arrow Lakes is perhaps the most equable in Canada. For some years the summer temperature has never exceeded 94 degrees at Nelson, and the thermometer was only for a short time during the same period six degrees below zero. The only drawback is the deficient rainfall which in some places necessitates irrigation. In west Kootenay it is about 19 inches, but the snowfall is heavy and the annual precipitation is fully 27 inches. It is possible to grow any kind of fruit suited to a temperate climate, —apples, pears, plums, cherries, grapes, hops, and the bush fruits. The more perishable fruits, however, are not grown extensively, due no doubt to the fact that transportation from the Kootenay to the

markets of the world is not sufficiently developed. The growers are meantime, while not neglecting other fruits, devoting most attention to the production of apples, apples for the British and apples for the Australian markets. It would be difficult to find larger apples, if size were wanted, than those grown in the Kootenay. It would be difficult to find better coloured apples or better keeping apples, though it is generally considered that the apples of Eastern Canada have more juice and a higher flavour than the apples of British Columbia. In consigning their fruit to Britain they start with the disadvantage of much longer transit than the fruit-growers of Nova Scotia and Ontario. Disregarding this, however, they are catering with much energy and enterprise for the British market, asserting that the apples produced in the Kootenay are superior to anything produced anywhere else and that they will always demand a first place in a first-class market. A new trade has just been opened up with Australia and the Kootenay growers are assuredly well suited for supplying that market. The Australian demands a much smaller apple than is common on the British market, and with the view of meeting this demand, the Kootenay fruit-growers, when growing for the Australian market, do no thinning. They thus get larger crops of smaller apples. We have seen trees utilised for supplying the Australian market splitting by the weight of the crop. Undoubtedly, however, the great market of the future for the Kootenay district and for all British Columbia will be the western prairie. In the years that are to come, Ontario and British Columbia will divide that market between them.

The Okanagan Valley is a very different place from the Kootenay. The mountains are not so high. There is no timber on hill or valley, which is a decided advantage to the settler. The climate is delightful save that there is not sufficient moisture. The rainfall does not exceed eleven inches in the year, and that makes irrigation indispensable. We struck Vernon at the head of the valley on the day when the fruit-growers were holding their annual exhibition, and if we were not able to see all the district we were at least able to see all the products of the district, and we felt that it would have been difficult to improve upon the samples of fruit sent for exhibition. The chief varieties of apples grown, apparently, are the Spitzenberg, Jonathan, Wagner, Wealthy, Northern Spy, M'Intosh Red, and Cox's Orange Pippin. After inspecting the exhibits we visited Lord Aberdeen's ranch at Coldstream, about five miles from Vernon. It comprises about 13,000 acres of land. Since Lord Aberdeen bought it in 1891, it has been transformed from an indifferent cattle ranch to one of the finest fruit farms in British Columbia. Before, however, that was possible, an extensive irrigation scheme had to be developed which is fully described in the section on Irrigation. In 1906, the Coldstream ranch was turned into a limited liability company. The orchard land of the company extends to 350 acres, of which about 160 acres are in full bearing. It would be difficult in all Canada to find a better cultivated orchard. The fruit is mostly confined to apples, pears, plums, cherries, and hops, with small fruit or vegetables between the rows in the earlier years of cultivation,

and cover crops later on. The markets are the cities of British Columbia, the North-West Provinces, Britain, and Australia. But fruit-farming is only one of the departments of the Company. It has a colonisation branch. Small holdings have been sold to English, Scotch, and Canadian settlers, at varying prices, depending a good deal upon the demand for land. The price at the present time is 200 dollars per acre, which, of course, gives the purchaser a right to water, for which, however, he pays according to the quantity used, which usually works out at about three dollars per acre. The price of the land is payable, one-fifth in cash and the balance by four annual payments, with interest at the rate of six per cent. on the unpaid balances. Formerly, the holdings offered

SPRING CULTIVATION, NEAR KENTVILLE

for sale extended to twenty acres. More recently, they have been reduced to ten acres. Further developments have taken place. The Company has entered into cultivation agreements with purchasers to plant out and cultivate their orchards for one or three years as may be agreed on—a wise development when one considers that Mr Ricardo, the manager of the Company, has lived through the years of fruit development in the Okanagan Valley, and has made the Coldstream ranch what it is, and also when one considers that the fruit-growers who are settling in British Columbia are men with considerable means, but in many cases with little or no knowledge of fruit culture. The Company undertakes to supply and plant eighty-eight apple and prune trees (the cost of other trees is somewhat higher) and cultivate the ground for fifty dollars per acre the first year, and twenty-five dollars per acre for each of the second and third years. Nor do the operations of the Company end here.

For many years it bought most of the fruit grown by the small holders. Messrs Oscar Brown & Company, Limited, a wholesale and produce firm, whose headquarters are in Edmonton, Alberta, and whose business to the extent of one half is controlled by the Coldstream ranch, have now opened a branch on the estate and will purchase, pack, and ship all the available fruit.

Packing Fruit

In eastern Canada the greater portion of fruit for export is shipped in barrels, the minimum size of which is regulated by the Inspection and Sale Act, which also stipulates that the barrels must be so marked as to indicate the name and address of the packer, and the variety and the grade of fruit. There may also be added the words "Canadian Apples," and a number designating the workman who is responsible for the actual packing, and anything else not inconsistent with or more conspicuous than the marking required by the Act. The Nova Scotia barrel, as a rule, is smaller than the Ontario barrel. The fruit of course is graded and packed —sometimes in the orchard and sometimes in packing houses— in terms of the Inspection and Sale Act. It is, however, apparent that the finest classes of fruit cannot be barrelled. In marked contrast to this method of packing we have the method adopted in British Columbia. There the fruit is all packed in boxes. The packing is done in packing-houses, to which the apples are brought from the orchards. The packers are expert at their work. They have in front of them boxes for the different grades of apples. The packer lifts each apple separately, decides what grade it belongs to, and then places it carefully in the proper box. The smaller apples are kept towards the end of the box and the larger apples towards the centre, and they are so deftly arranged that to the eye of the ordinary observer there does not appear to be any difference in the size. Sometimes they are packed according to colour, that is, the highly coloured apples are put into one box and the less highly coloured apples into another. When the box is full it is placed in a frame, which is provided for the purpose with a lever by which the ends of the lid are pressed down close to the edge of the box. While in this position the nails are driven in, without in any way unduly pressing or injuring the fruit. These boxes are easily handled and fruit in them travels much better than in barrels.

Preserving Fruit

Fruit of inferior grade though not unwholesome, which is unsuitable for the market, is utilised for canning and preserving purposes. We had an opportunity of seeing canning carried on at the Ontario Agricultural College, Guelph, by the students. It is done to some extent in the homes of the farmers, but the bulk of the trade is in the hands of the canning and preserving factories. It is not yet, however, an extensive trade, but it will grow as the population increases. We scarcely think it has begun in British Columbia at all. The aim of the fruit-grower there is to develop a trade in fresh fruit,

IRRIGATED VEGETABLE GARDEN

and the market is so great, and the supply meantime so limited that the demand has not yet arisen for preserve works and canning establishments to utilise surplus fruit. No doubt, in course of time, the inferior grades of fruit, and the softer varieties, will be preserved and shipped mainly to the North-West Provinces.

Co-operation

The agricultural communities which have adopted co-operation, have done so less by desire than necessity. Denmark, for example, did not adopt the co-operative method in connection with her agriculture until her farmers were on the verge of ruin. Irish agriculture has been admittedly in a disastrous condition for generations. Many expedients have been tried to improve matters. It is only a few years however since Sir Horace Plunkett initated the co-operative movement which now seems to be the main hope of Irish agriculture. The same need does not exist for co-operation in countries of the new world as in countries of the old world, because there is not the same poverty which seems to be the compelling force. We hear little, therefore, about it in the first stages of a new country's development. When, however, it becomes apparent to the colonist that co-operation is a necessity to the development of his trade, prejudices do not trouble him, He brushes them aside, provided he is satisfied that co-operation means more money. And so, the Canadian fruit-grower being satisfied that co-operation was to his advantage, seems to have had little difficulty in getting into line with the movement. It had a very humble beginning. In Ontario a few of the small growers, finding it difficult to sell small lots of fruit, bound themselves together and appointed a salesman. They were thus able to get better terms from the railway companies, to eliminate to some extent the middleman, and to get into closer touch with the consumer. The movement had as yet, however, only touched the rim of the subject. There was the grading and the packing of the fruit. This department has now come within the sweep of the co-operative movement to the great advantage of the Canadian fruit-grower. Nor is this all. Some of the co-operative associations are manufacturing their barrels on their own premises and thus reducing the cost of shipping their fruit. In 1906 there were two co-operative Societies in Nova Scotia, twenty-five in Ontario, and nine in British Columbia. Doubtless there are many more to-day. Their ramifications and their influence will widen with the years. They cannot but have a beneficial effect on the development of fruit-growing in Canada.

APPLE PICKING, WATERVILLE

FARM HOUSE, BARN AND ORCHARD, NOVA SCOTIA

IRRIGATION

Irrigation projects have been undertaken in Canada as elsewhere to make it practicable to cultivate profitably parts of the country independent of the rainfall. Some districts have a deficient rainfall almost every year. Others, at periods of varying length, seem to be similarly unfortunately situated. Considerable parts of Southern Saskatchewan, Alberta, and British Columbia may be regarded as "arid"—having less than 10 inches annual rainfall—semi-arid—having less than 15 inches, or at least sub-humid—having less than 20 inches. With a rainfall of less than 15 inches only a very limited variety of crops can be produced, and it is to make it possible to grow fruit, fodder and grain crops any season, however dry, that irrigation has been attempted, and in not a few instances, successfully carried out.

While it is generally understood that those parts of a country which have a plentiful supply of moisture in the form of rain, are favoured, there may be some advantage on the side of the *dry* land. Every year the rainfall, especially if it is plentiful, carries off a great amount of the most valuable constituents of the soil and so it is gradually drained of plant food and becomes worn out. By this process, there is no doubt, the benefits of artificial, and even farmyard manure, where applied, are to a considerable extent lost, and almost certainly the same conditions will apply to the natural elements of the soil. On the other hand, in the "Dry" districts of a country there is practically no "leaching" or "running off" whatever, and consequently there are present in the rich soil of Southern Saskatchewan, Alberta and British Columbia, all the constituents which have accumulated for centuries. The application of a sufficient and seasonable supply of moisture is all that is needed for the growth and production of useful and profitable crops.

Finding farming in those districts which fall to be described as arid, or semi-arid, too uncertain and risky, many farmers in the later years of the past century began to make experiments in irrigation, but for the most part the attempts were on a very limited scale. From a report on the subject to the Department of the Interior we gather that the first effort was made on Fish Creek in Alberta about eight miles south of the spot where Calgary now stands. "Here Mr John Glen, who had settled in the district in 1875, constructed a small ditch in 1879, and utilised it to irrigate some 15 acres with satisfactory results." At the date of the report above quoted—1894—there were seventy-six ditches constructed, but with the exception of two they were small systems designed to supply private needs. Development has been rapid and the efforts of individuals have given place to company undertakings. Reservoirs in some

instances have been included in schemes to secure supplies, even at the times when rivers are at their lowest, and companies in turn are being amalgamated, and their efforts consolidated. The legislation applicable to Saskatchewan and Alberta makes this consolidation possible as all projects have to be approved by, and carried out under the supervision of, a Government Department, and a consistent policy is thus secured. "By this same provision much is done to prevent 'Wild cat' or 'Boom' irrigation enterprises."

At a comparatively early stage in the history of Irrigation it was recognised that there must be legislation to regulate the rights of parties, and secure that the available water should be used for the greatest good of the country as a whole. In all times the claims

HEADGATE OF IRRIGATION SYSTEM, NEAR CALGARY

to water and water courses have been a fruitful source of litigation and contention—the very word "Rival" having come into our language through the troubles arising between claimants for river rights and privileges. Consequently in 1898 the "North-West Irrigation Act," was passed. Very shortly the main principles of this Act may be summarised :—

(1) That all streams, lakes, and other water sources are the property of the Crown.

(2) That water may be obtained by individuals and companies for domestic, irrigation, and other purposes, and that on a clear and indisputable title.

(3) That the holders of water rights, thus secured, will have the protection and assistance of the Government in the exercise of such rights, and that all disputes and complaints arising from the diversion

of water, shall be settled without appeal by the officials of the Government Department charged with the administration of the Act.

Before the right to any stream, lake or other source of water supply is granted to an individual or company, it is necessary that complete plans and estimate of the proposed works be lodged, along with a statement of the amount of water wanted and the purposes for which it is required. If it is for irrigation purposes, it is necessary to indicate the land which it is proposed to irrigate. All applications are thoroughly examined and care is taken that any previous rights be respected. When there is no valid objection, the application is granted and a licence issued, the Government Department retaining and filing all particulars including the amount of the water which in the case has been disposed of. Future complications and difficulties are thus guarded against. Up to the present time, the foregoing arrangements—enacted by the Dominion Parliament—apply only to Saskatchewan and Alberta, but it is expected that shortly somewhat similar regulations will be introduced for British Columbia, where at present the provisions of a local Act are in force.

Three of the main Irrigation Schemes of Western Canada were visited, and some slight reference may here be made to each of them.

1. *The White Valley Irrigation and Power Company's Scheme*

At the Coldstream estate, owned by the Earl of Aberdeen and his associates, and situated in the Okanagan Valley in the dry belt of British Columbia, very successful experiments in irrigation have been made. Some years ago the estate consisted of a cattle ranch of a very ordinary character; now there are a highly specialised farm where fruit, hops, and vegetables are grown on a large and paying scale, a considerable nursery for young trees, an extensive area under grain and hay, flocks of poultry, and herds of cattle and horses of a high quality. This change, it is claimed, has been brought about by means of irrigation, the water of the stream flowing through the estate being diverted by ditches to the lower lands of the property, rendering these, with the favourable climate, productive in the extreme. From comparatively small beginnings the scheme developed, and not a few holdings of twenty well-watered acres each have been sold, any one of which affords a comfortable living, under careful management, to its occupying owner. About five years ago, steps were taken to form a company, which for technical reasons is called the "White Valley Irrigation and Power Company," with the object of bringing the water from Jones Creek on to parts of the Coldstream estate and intervening lands which had not as yet been dealt with. This undertaking, commenced in 1906, is still in process of construction, and aims at irrigating 10,000 acres. The engineering problems and difficulties have been considerable, including the construction of storage reservoirs—one of which, Lake Aberdeen, is 1000 acres in extent—and the laying of a pipe line by which the water is conveyed across the White Valley 6 miles above the Coldstream ranch. A wooden stave pipe of 24 inches diameter, and 6300 feet long is already laid, and it is the intention to build immediately another of 36 inches diameter.

The problems to be faced in the undertaking have not been few. The water has been difficult to retain in the ditches owing to seepage. Labour has been scarce and dear. Rocks have had to be cut and materials to be transported over many miles of rough mountain trail. Tree stumps of three and four feet diameter have had to be blown out, and 1400 feet of flumes constructed. But in spite of all these difficulties the work has been energetically prosecuted, and when completed the cost will probably not be less than £4 per acre of land irrigated. The total length of the main canal will be 30 miles, and the only revenue of the company will be derived from the sale of water.

It should perhaps be stated that there is in project another very considerable irrigation enterprise in British Columbia—that of the Columbia River Valley lying between Golden and Cranbrook on the Crow's Nest Line. This will probably be the biggest undertaking of the kind in the province, but as construction has just commenced it will be some time before results can be estimated. It is expected that apple culture, alfalfa growing and dairying will be the main features of the Columbia River Valley project.

2. *The Alberta Railway and Irrigation Company's Scheme*

This is one of the oldest in the Dominion. The district covered is that triangle of Alberta which has Cardston, Stirling and Lethbridge at its angles. The scheme has had many engineering difficulties to overcome, but it has been successful in diverting the water of the St Mary River by miles of artificial canals, and the natural channels of Spring Coulee and Pot Hole River, to many acres of fertile but arid soil. The intake is near Cardston, 30 miles from the United States boundary, and nearly 60 miles from Lethbridge. The system has 200 miles of main, and 500 miles of subsidiary canals, and 250,000 acres can be irrigated thereby. So far 1,500,000 dollars have been expended, but it is expected that extensions involving considerably increased outlay will have to be made. Many statements have been got to show that land in this district which is irrigable is much more valuable than land that is non-irrigable, and the fields of sugar beet which were shown, for example, at Raymond, indicated that under present conditions, valuable crops are being produced. The Company which works the scheme charges 25 to 30 dollars per acre for lands which are or can be irrigated, while lands which cannot be reached by the ditches are sold according to quality at from 8 to 15 dollars. Farmers who take advantage of irrigation are charged by the Company a dollar per acre per annum for the privilege.

3. *The Canadian Pacific Railway Company's Irrigation Scheme*

This scheme is by far the largest on the Continent. The Company owns or owned land extending at an average breadth of 40 miles eastward from Calgary for 150 miles. It has undertaken the irrigation of this land, and about one-third of the system is now finished. The water supply is taken from the Bow River near

Calgary, and is said to be inexhaustible. It is expected for all time coming to afford moisture for the 1,500,000 acres of land under the canal system, and that at the water rental of 50 cents per acre per annum. When the work, now going forward, is completed, there will be some 3000 miles of canals and water ways. The Company sells irrigated land at 25 dollars per acre, and unirrigated land at 15 dollars. The 10 dollars per acre of difference will not do more than cover the cost of construction, and the annual charge of 50 cents will certainly not pay the cost of upkeep, but the Company looks for its profit to the increased traffic which will be secured through the land being fully taken up and cultivated.

The irrigation of fields is not difficult when the engineering problems have been solved, and the water conducted to the highest point of the farm to be dealt with. It is brought from the main canal or branch, as the case may be, by means of a ditch to which it is admitted by a gate or sluice, and it is made to flow over whatever area is desired in small distributing channels. These channels are simply cut by the plow or spade, and the water is allowed to flow out of them and spread over the surface as far as it will go. The simplicity of the method is apparent, and a man can look after the distribution of water over a considerable area. When a field, or portion of it, is sufficiently watered, the channel is stopped by a shovelful of earth, and the water is carried to another part and the operation repeated till the whole crop or farm is irrigated, when, if desired, the distributing ditches may be filled in. For root crops, Indian corn and vegetables, the furrow method of irrigation is often employed. The water is allowed to flow down a furrow between the rows from which it rapidly reaches the roots needing moisture. In the case of orchards long boxes or flumes are sometimes used instead of furrows. In these there are holes opposite the different trees, from which the water escapes, and comes in touch with the plants to be moistened.

At present, among some farmers in Western Canada, there seems to be a disposition to question the necessity or desirability of irrigating the land, but the testimony of many best qualified to judge goes to show that farming would in some districts be very uncertain, and the results exceedingly doubtful were irrigation not applied. Probably it is not, and will not become necessary for the production of hard winter wheats, although water might in almost any season be applied to the land in autumn or early spring with advantage. Possibly also in most seasons soft wheats and forage crops adapted to dry land conditions may be successfully produced without irrigation. On the other hand it seems undoubted that alfalfa, clover, sugar beet, tender vegetables, garden and orchard fruits cannot be grown profitably in arid or semi-arid districts in almost any year without water artificially applied; and if mixed farming with the culture of fruit and vegetables and the rearing and feeding of cattle is ever to succeed in the parts of the country to which reference has been made, it would almost seem essential that irrigation be pretty extensively used. In any case although the ditch be not in operation every year—perhaps not even in most

years—yet the fact that water is available must add a sense of security to the farmer's work, and keep him from some of the anxieties and worries that seem inseparable from his calling.

It is difficult if not impossible to write with definiteness as to results in the way of enhancing the value of land in Canada by irrigation. The works reviewed are of too recent a date to permit of speaking of them with anything approaching certainty, but this at least may be said that under irrigation, in the Okanagan Valley in

IRRIGATION SCHEME, BIG CUT ON COLDSTREAM ESTATE, B.C.

British Columbia, crops and fruits are very successfully grown, and at Raymond and Stirling on the Lethbridge system, and at Gleichen on the C.P.R. system, beautiful fields of sugar beet were seen, which could not be conceived as grown without its aid. One farmer who has had considerable experience gave it as his opinion that irrigated land was well worth twice as much as non-irrigated land in his district, and from facts and figures which have been produced relating to lands and crops in certain districts in the United States, where irrigation has long been employed, it would appear that his estimate is well within the truth.

WHEAT FIELD

COST OF LIVING

THE prices of food in Canada are probably on the whole not very different from those in Great Britain; but all manufactured articles and articles into which the price of labour enters largely, cost more in Canada than they do in Great Britain.

Food and Clothing

The following are the retail prices of some of the principal articles of food as paid at Ottawa in June 1907: Bread of ordinary quality, 12 cents per 3-lb. loaf; flour, 3½ cents per lb.; beef—sirloin, 18 cents per lb.; roast, 10-15 cents; boiling, 8 cents; veal, 8-15

HOUSE MOVED BY TWO TRACTION ENGINES AND EIGHT WAGGONS TWENTY MILES ACROSS THE PRAIRIE FROM WARMAN TO SASKATOON

cents per lb.; mutton, 10-18 cents per lb.; pork, 14 cents per lb.; bacon, 14-18 cents per lb.; and hams, 16-18 cents per lb.; milk, 6-8 cents per quart; butter, fresh, 25-30 cents per lb.; eggs, fresh, 18-25 cents per dozen; cheese, 17-18 cents per lb. These prices are not materially different from those which rule in other centres of population in Eastern Canada. Living is dearer farther west. The prices of all descriptions of clothing, save boots and shoes, are higher than in Great Britain, and in winter heavier and warmer clothing is necessary. Comparing quality for quality, the cost of clothing may be estimated at from 35 to 50 per cent. more in Canada Great Britain.

Rents, Rates, Taxes, &c.

In towns, many houses are built largely of timber with veneer; but owing to the higher cost of labour, and the ad the prices of materials, the cost of building a brick veneer the present time would not be much less than the cost of a solid brick house of the same size in Scotland.

Rent is usually payable by the month, and tenancies r

year with six months' notice expiring at the end of April. The 1st May and the 1st October are the usual dates for changing house. For a nine or ten-roomed house, which in the neighbourhood of Edinburgh would rent at about £40 per annum, the rent in a city like Ottawa would be about £5 per month, including rates, taxes, and water. But as the owner pays all taxes, and as in this case they would amount to about £1 per month, the net rent would be £4 per month or £48 per year, thus showing a difference of about £8 in favour of the Scotch house. The wages of domestic servants are a serious item, being considerably higher than they are in Scotland. In cities and towns they range from £2 per month upwards.

Locomotion, Light, and Fuel

In Canada all services which depend upon electricity are excellent in kind, and in localities where water power is abundant,

CAR ATTENDANTS

ı price. In most Canadian towns, electric cars (or trams) phones are everywhere in use. The former provide practie only popular means of conveyance from point to point ırban and suburban areas, and usually there is a uniform f 5 cents for all distances with reductions for tickets supplied tities and for workmen travelling during specified hours, and evening. Telephones—a Canadian invention—are rgely used in domestic life than they are in Great Britain. rge at Ottawa for telephones installed in private houses, is annum. The electric light is also practically universal, and wa the charge is 8 cents per 1000 watt hours less a cash

discount of 10 per cent., plus rent of meter, one dollar per annum. Houses are heated by stoves or by cellar furnaces, the fuel used being hard or anthracite coal costing at Ottawa from 6.75 dollars to 7.75 dollars a ton. The amount of coal used during the winter varies with its severity; but an average quantity for a medium-sized house, rented at 25 dollars monthly, such as that previously referred to, would be from 8 to 12 tons for the season, including the fuel used for kitchen cooking stove. The advantage of a furnace is that the whole house is warmed and not, as in Great Britain, only those rooms in which fires are lighted. The systems of heating usually in force are by hot air and by hot-water pipes, the former being cheaper as regards initial outlay for installation. In the summer, gas stoves are largely used for cooking in towns. At

SHOOTING PARTY AT AGASSIZ

Ottawa the price of gas is $1.25 per 1000 cubic feet, less a cash discount of 12 per cent., and plus a rental of two dollars per year for meter.

Wages

Wages vary considerably in the different provinces of the dominion. It may be taken that the rates steadily increase as one goes west, and that they are highest in British Columbia, although it may, and probably does happen in the case of certain trades—those relating, say, to house-building in rapidly growing towns in the north-west—that wages reach a very high temporary level.

In dealing with the wages of farm labourers, it must be kept in mind that they have often only seven or eight months' work in the year. Keeping this in view, the following figures taken from

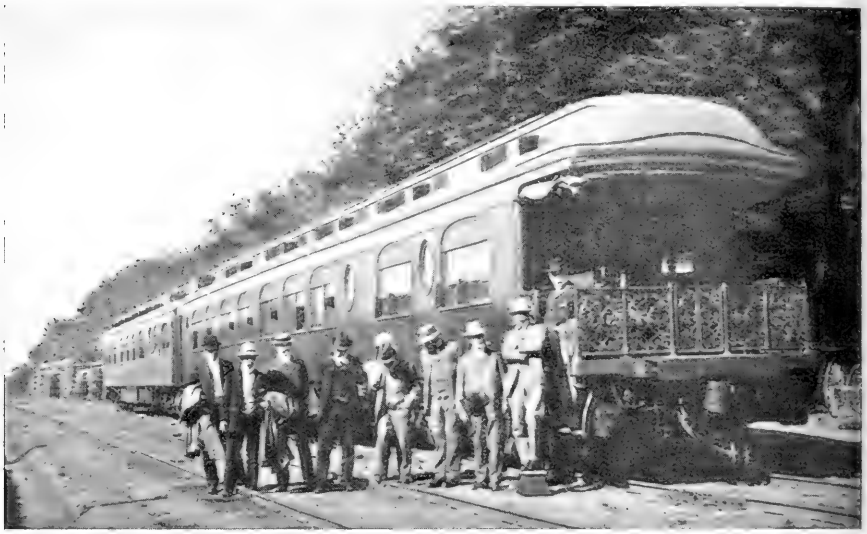
the *Labour Gazette* of September, 1906, showing the wages of farm labourers for that year, are interesting :—

Locality.	Rate.
Nova Scotia :—	
Sydney	$1.60 per day with board.
Prince Edward Island :—	
Charlottetown	$0.65-$1.00 per day, or $12-$18 per month with board.
New Brunswick :—	
Moncton	$24-$30 per month with board ; $1.25-$1.50 per day without board.
Chatham	$9-$12 per week with board.
Quebec :—	
Quebec	$1.50 per day with board.
Sherbrooke	$1.50-$1.75 per day with board.
St Hyacinths	$1.75-$2.00 per day with board during harvest.
Hull	$12-$15 per month with board.
Ontario :—	
Ottawa	$20-25 per month with board.
Kingston	$2.00 per day during harvest ; $20 per month during 8 months, beginning April 1st
Peterborough	$1.50-$1.75 per day ; $20 per month on 5 months' engagements ; $25 per month on yearly engagements.
Toronto	$1.00-$2.00 per day with board, or $10-$25 per month with board on long engagements.
Niagara Falls	$20-$30 per month with board ; $1.50 per day on short time engagements.
St Catherine's	$1.50-$1.75 per day, or $20-$25 per month with board.
Brantford	$1.25-$1.50 per day with board during harvest ; $22.50-$25 per month with board.
Guelph	$1.50 per day with board ; $25-$30 per month with board during harvest.
Berlin	$2.25 per year with board and washing.
Woodstock	$1.50-$2.00 per day, or $30-$35 per month.

Locality.	Rate.
Stratford	$36 per month with board.
London	$1-$1.50 per day with board; $2.00-$2.25 per day for 8 month agreements; $200-$300 for yearly agreements.
St Thomas	$1.50 per day with board during harvest.
Chatham	$9-$10.50 per week during harvest; $25 per month with board on yearly engagements.
Windsor	$22-$25 per month with board.
Sault St Maria	$1.50 per day with board; $2-$2.25 per day without board.
Manitoba :—	
Winnipeg	$2.25 per day during harvest for competent men.
Brandon	Engineers, $5.00 per day with board. Firemen, $3.00 per day with board. Separator men, $7.00 per day with board. Farm Labourers, $2-$2.50 per day with board, or $45-$50 per month with board.
Saskatchewan :—	
Moose Jaw	$40-$45 per month with board, or $30 per month on 8 month engagements. By the day, $2.00 with board were paid.
Alberta :—	
Calgary	$40-$45 per month with board.
British Columbia :—	
New Westminster	$40-$45 per month, with board for white labour.
Vancouver	White labour employed by the year receives $35-$40 per month with board. Chinese receive 75 cents to $1.00 per day and board themselves. Harvesters receive $2.50-$3.00 per day.

Locality.	Rate.
Victoria . . .	$2-$2.25 per day for short periods; $35 per month with board for long engagements. Chinese receive $1-$1.75 per day.
Nanaimo . . .	$20-$35 per month with board.

In order to give a fair idea of tradesmen's wages, we take wage schedules attached to building contracts in different parts of the Dominion. We do not, of course, take into account unemployment,



THE CARS AND SOME OF THE COMMISSIONERS

which is often very bad in the building trade of Canada, due in part to the seasonal nature of the work, but largely to a foolish rush on the part of tradesmen from our own and other countries to Canada :—

1. *Halifax, Nova Scotia*, 1906

Trade or Class of Labour.	Rate of wages per day of nine hours. Not less than : Dollars
Carpenters	0.25 per hour.
Painters	2.00 per day.
Bricklayers	0.35 per hour.
Masons	0.35 ,,
Stonecutters	0.36 ,,
Plasterers	0.33 ,,
Plumbers and Steamfitters . . .	2.00 per day.
Sheet Metal Workers	2.00 ,,
Builders' labourers	0.16 per hour.
Driver, one horse and cart . . .	2.25 per day.
,, two horses and wagon . . .	3.50 ,,

2. *Ottawa, Ontario,* 1906

Trade or Class of Labour.	Rate of Wages. Not less than the following: Dollars	
Masons	0.42 per hour	9-hour day.
Bricklayers	0.42 ,,	9 ,,
Stonecutters	0.43 ,,	8 ,,
Builders' labourers	0.20 ,,	9 ,,
Carpenters	0.22½ ,,	9 ,,
Plasterers	0.30 ,,	9 ,,
Painters and Glaziers	2.00 per day	9 ,,
Ordinary labourers	1.50 ,,	9 ,,
Plumbers and Steamfitters	0.25 per hour	9 ,,
Sheet Metal Workers	2.00 per day	9 ,,
Electricians	10.00 per week	8 ,,
Driver, with one horse and cart	2.00 per day	9 ,,
,, with two horses and wagon	3.00 ,,	9 ,,
Watchman	1.50 ,,	9 ,,

3. *Winnipeg, Manitoba,* 1905

Trade or Class of Labour.	Rate of Wages. Not less than the following: Dollars	
Masons	0.55 per hour	9-hour day.
Carpenters	0.35 ,,	9 ,,
Painters and Glaziers	0.30 ,,	9 ,,
Sheet Metal workers	0.30 ,,	9 ,,
Builders' labourers	0.25 ,,	9 ,,
Ordinary labourers	0.20 ,,	10 ,,
Driver, with one horse and cart	0.35 ,,	10 ,,
,, two horses and wagon	0.50 ,,	10 ,,
,, one horse	0.35 ,,	10 ,,
,, two horses	0.50 ,,	10 ,,
Timekeeper	0.30 ,,	10 ,,

4. *British Columbia,* 1906

Trade or Class of Labour.	Rate of Wages. Not less than the following: Dollars	
Stonecutters	0.50 per hour	8-hour day.
Bricklayers	0.50 ,,	8 ,,
Masons	0.50 ,,	8 ,,
Builders' labourers	2.50 per day	8 ,,
Stair-builders	0.33⅓ per hour	9 ,,
Joiners	0.33⅓ ,,	9 ,,
Carpenters	0.33⅓ ,,	9 ,,
Lathers	3.50 per day of 8 hours.	
Plasterers	0.50 per hour	8-hour day.
Plasterers labourers'	2.75 per day	8 ,,
Painters and Glaziers	3.50 ,,	9 ,,

Trade or Class of Labour.	Rate of Wages. Not less than the following: Dollars.		
Plumbers	0.50 per hour	8-hour day.	
Steamfitters	0.50 ,,	8 ,,	
Tinsmiths	3.50 per day	9 ,,	
Blacksmiths	3.50 ,,	10 ,,	
Ordinary labourers	2.50 ,,	9 ,,	
Driver, one horse and cart	4.00 ,,	10 ,,	
,, and one horse	4.00 ,,	10 ,,	
,, two horses and wagon	6.00 ,,	10 ,,	
,, and two horses	6.00 ,,	10 ,,	
Timekeeper	75.00 per month,	10 hours per day.	

MONTREAL MELON FIELD

COLONISATION

SCOTLAND is an old country. It is limited in extent, and it has an ever-increasing population. It is inevitable that there should be men without elbow-room to carve out for themselves a destiny. Their numbers may vary, according to the wisdom or want of wisdom with which we manage our national affairs. As it is, thousands are leaving our shores every year for distant lands. Our object in this Report is not to augment but to direct and guide this stream, so that that which the mother country must lose, the colonies may gain.

A Word of Warning

At the outset we should like to say, with all the emphasis possible, that there are certain classes which Canada does not want, and for which she makes no provision. There is, first of all and pre-eminently, the "remittance men," men who live on remittances from long-suffering relatives at home. A new life in a new land seems to do little for them. They are what they have ever been. They give no promise of being anything else, and they constitute a drag on the wheel of Canadian progress. There is another class, in every way respectable, composed of professional men and tradesmen, for whom there is no work in Canada meantime. The land is overflowing with them. If they are to emigrate at all, it ought to be to some other colony where the chances of success are greater.

Farmers Wanted

The men wanted in Canada are men with some knowledge of agriculture. There are many openings for such men, but they must be careful. Canada is a new country, and its people are full of hope. It is suffering from honest exaggeration. It is suffering too from a worse evil—from a superabundance of real estate agents and speculators in land. It is, however, so good a country that exaggeration can but harm it, and we, who have no land to sell, are doing it the best service we can when we tell the truth about it. It is a country of almost boundless possibilities, from an agricultural point of view, but it is also a country of many climates, not all equally good, and of great varieties of soil, not all equally suitable for farming, and while we are satisfied that there are in Canada splendid opportunities for the right kind of emigrants, we are equally satisfied that no man should farm in Canada until he knows the country and its climatic conditions, and has learned by experience as a hired hand, or otherwise, what Canadian farming means.

The Eastern Provinces

To men thus equipped, men of knowledge and experience, there are openings both in Eastern and Western Canada. Emigration to

INDIAN SCHOOL, BRANTFORD

ON THE BANKS OF LAKE BROME, QUEBEC

the Eastern provinces has been showing, even in late years, a steady increase. In 1901, 18,568 emigrants entered Eastern Canada. During the nine months ending 31st December, 1907, 119,829 emigrants entered Eastern Canada. But we hesitate to suggest the east, on the ground that, though it is more homelike to Scotchmen than the western prairie, the gold does not lie so near the surface. Money is not so quickly and so easily made. Besides, while the tendency of population in Eastern Canada is partly towards the town, which might be withstood, it is partly also towards the west, which seems irresistible. The men of the east have been smitten with the western fever, and the stream of life in Canada is ever setting stronger westward. Between 1901 and 1906, no fewer than 166,611 Eastern Canadians went west to the plains. We feel that while a Scotchman might with advantage settle in the Eastern Provinces, he would ultimately go with the stream. This movement will not last for ever. The west is to be filled up, and in that day the east will have her chance. This much, however, may be said for settlement in the east even now. The fruit-grower for whom wheat-growing has no fascination, might settle, for example, either in the Annapolis Valley or in the Niagara Peninsula. If he has a few hundred pounds he could get agricultural land and himself turn it into a fruit garden. If he has a few thousand pounds he could buy planted out land. But he should do neither without first making the most exhaustive inquiry possible on the spot. He must needs also be an expert, with a scientific knowledge of soil cultivation and fruit culture, for the fruit-growers of Nova Scotia and Ontario know their business well. It might also be an advantage, although many Canadians deny this, if he knew dairying as well as fruit-growing, and combined these branches of agriculture. Their conjunction would help him to keep up the fertility of the soil, which is difficult where no stock is kept and where no manure is available.

The Call of the West

It is to the west we would particularly direct the attention of the intending emigrant. There is room for him there, although emigrants are pouring in. Between 1901 and 1907, 530,895 emigrants went to the North-West Provinces. It is quite a mistake, however, to suppose that everyone will succeed in the west, though there are few kinds of farming more simple than wheat-farming. There are men who will not succeed anywhere—men who will always be hewers of wood and drawers of water. If a man has no ambition and no ability to be anything else than an agricultural labourer, Canada is not the place for him. He may have more wages while he is working than he would have here, but he will have less regular employment. He will have longer hours during the summer months, and, everything considered, he will not be better off in Canada than in Scotland. But if a man has ambition and ability, if he is determined—having as a ploughman placed his foot on the lowest rung of the ladder—to reach the top as an occupying owner, Canada is

emphatically the place for him. It offers the opportunity to succeed to all those who can, and it welcomes with outstretched arms the man, who, having counted the cost, has decided to avail himself of the opportunity.

Now, a man, after having gained experience of Canadian farming as a hired hand, may lease land. Tenancy has already begun in this new land of occupying owners. We even get a hint now and then of the absentee landlord. If the settler decides, in the first place, to lease, he will enter into an agreement with the owner of a farm, who, for some reason is not himself working it. The

C.P.R. HOTEL AT VICTORIA

owner usually supplies part of the capital ; the tenant supplies the rest, and manages the farm. The profit is divided between the two in the proportions agreed on. Whatever may be said of this system of tenancy as part of the rural economy of Canada, there is no doubt that it affords a working man a good opportunity, while gaining experience, of making money to enable him either to homestead or to purchase.

Homestead

But the settler may prefer at the outset to farm his own land. If his means are limited, he will be forced to homestead, that is, take up 160 acres of land, which the Government is willing to give, provided he pays a registration fee of ten dollars, and lives six months every year for three years on his homestead, and breaks up thirty acres, of which twenty acres must be cropped. Now, this seems an easy way to become an occupying owner, but it

is not so easy as it seems. A settler, who is unmarried, or who has left his wife at home—for a pioneer's life in the west is no life for a woman—may do this without much money, provided he is of the stuff pioneers are made of, and is willing to settle on a farm in a district, where there is no schoolmaster, and no doctor, and no railway, and has resolved to accept the rigours of a Canadian winter, and all the hardships and all the loneliness that go to make up a pioneer's life. He may live on his farm for six months every year, for three years, breaking up the necessary thirty acres by contract, or otherwise, finding what work he can in the winter to help him to live and face another summer on his farm, thus keeping the wolf from the door while fulfilling the conditions of his land grant. But such a course is beset with innumerable difficulties. It is not easy thus to work oneself into a farm. One-fourth of all those—many of whom, however, were not ploughmen—who have tried it in Canada, have given it up.

Purchase

For the ordinary man who does not care to be on the frontier of civilisation, fighting nature at every step for a foothold, it seems to us better that he should remain a hired hand or a tenant farmer till he has made £400 or £500. With this money he could purchase a farm not very far from a railway station in a partially settled district. Hundreds of such farms are in the market. Many of them can be got in good districts at from 10 to 15 dollars an acre—the price payable one-fifth on purchase and the other four-fifths by four equal yearly instalments, with interest at 6 per cent. on the unpaid balance. A man deciding to adopt this course will have hard enough work and will have to exercise the strictest economy in spending his money, but it will be trifling compared with the work of the lonely homesteader. It will be lightened by the comforts and the social intercourse of a partially settled district. There is rich reward for such a man, and for the homesteader too, if he perseveres unto the end. There is independence; there is comfort and plenty; there has sometimes been, and there may yet be, great wealth.

A Scotch Colony

It were worth while making the pathway of the Scotch farm labourer to a homestead of his own in Canada a little easier. It might be done with advantage to the mother country and the colony, and with profit to those who did it. Other countries are doing it for their people. We might do it for ours. It means the flotation of a company on business lines. No other proposition is worth considering. Thousands of acres are available in different parts of Canada for such a purpose. The policy of the company would be twofold. It would, in the first place, be a farming company. The farm would be worked on such an extensive scale that it could afford to engage ploughmen, not for eight months, but for twelve months every year. Its ploughmen would be drawn from Scotland, and good wages would be paid to good men. Scotch

ploughmen would feel in going to Canada they were going to serve men who had at home a reputation to sustain for fair dealing. Unless we are greatly mistaken, the company, if properly managed, would make handsome profits from its farming operations. But it would have another, and an equally, if not more, profitable branch of business. It would have its colonisation scheme. Its policy in this connection would be to settle Scotchmen on part of its land in colonies so far as that was possible. Its own farm servants would have the first claim. The Company would break up the ground for them by contract and work it for wages till they were ready financially to work it for themselves. Similar facilities would be given to other Scotch settlers. Unless all reports are false this should be a profitable part of its business, for land in Canada, notwithstanding the recent depression, is rising in price, and the company need neither work for less than the current rate of wages nor sell land at less than the market value. Settlers would pay for the land by instalments spread over a period of years, which is in fact the system at present in vogue in Canada. Interest would run on the unpaid balance at current rates. This system of payment which is advantageous to the settler, would be equally advantageous to a sound company, because it would borrow money at home for 4 per cent. on which it would be paid in Canada 6 per cent. The Company would assure the settlers that when bad years came it would stand by them, instead of forcing them to sell out at a loss. There is undoubtedly a great future for such a company, great, looked at from a financial point of view, and greater looked at from a national and imperial point of view. So much for the emigrant who particularly stands in need of help and guidance.

The Dairyman's and the Market Gardener's Chance

The west also opens up possibilities to those comparatively well-to-do dairy farmers and market gardeners who are having some difficulty in making much money at home. Their promised land is not on the bald-headed prairie, but as close as they can get to the habitation of men in the new and rising towns of the west, where cows are cheap and feed is cheap, and where milking machines will get over the labour difficulty till increase of population otherwise solves it. In these centres there is the hope of an ever-increasing demand for dairy and market garden produce, at exceedingly good prices. Nowhere is there a better chance for the dairyman and the market gardener. But they too must be wary. There are western towns which have shot up almost like a rocket, and may come down like a stick. It would not be safe for the dairyman and the market gardener to get in beside them. There are other towns, however, which have come to stay, and their development is only a matter of time, and in some cases, a very short time. To differentiate, the dairymen and market gardener must do one of two things. They must either go as hired hands or they must, if they have the necessary means, make a prolonged stay in Canada, and

find out for themselves the district best suited for their particular trade.

British Columbia

Beyond the western prairie there is British Columbia. It is a goodly land too, with a fine climate, which draws men from the western prairie in the evening time of their days when they have extracted from it a competence. But it is a much boomed land. The fame of British Columbia, particularly as a fruit-growing country, has reached sometimes, in the language of exaggeration, to the ends of the earth. Possibly, nowhere is there need for more

LUNCH ON ROAD AT "PATERSON'S FARM," LADNER, B.C.

care on the part of the emigrant than here, for land is selling at almost fabulous prices, and that too in districts where the possibilities of soil and climate have not yet been tested.

The settler in this far-western land has certain undoubted advantages. The climate and the soil are usually all that can be desired. The growth is amazing. We have seen timothy six feet high, and clover more than knee deep. We have seen apple trees, which grew five feet in a single year, laden with fruit, until they had to be bolted together with iron bolts to keep them from splitting. There is a good market for all this produce, and though the fruit-growers of British Columbia are catering for the distant British market, this does not seem to be necessary. They have over the mountains the prairie, and it will be an ever-increasing market. But the settler in British Columbia has difficulties to contend with. The country is a mountainous country and the suitable land is exceedingly limited. Much of the land is heavily timbered, and has to be cleared at very considerable expense before farming operations can be commenced. The wheat-grower may

grow wheat a long way from a railway station. Transport, on the other hand, is indispensable to the fruit trade, and transportation is one of the real difficulties in British Columbia. The fruit-grower is thus forced either to confine himself to land in the immediate vicinity of a railway or go into a fruit district already developed. In both cases, land sells at extravagant prices. There is even more need here, in some respects, for settlement on the colony system, than there is on the prairie, because co-operation and transport facilities are of the essence of fruit-growing, and they would be the immediate and natural outcome of a colonisation scheme. But there are more difficulties. The initial expenses would be much greater. More capital would be tied up for a longer period of time. The scheme would take a generation to work out unless the settlers were monied men. But it could be done. Some thousands of acres could be got outside the present fruit districts at a comparatively low figure. A colonising company could, with a steam stumper, clear four or five acres on each holding. It could erect a cottage for each settler. It could do both at very much less cost than the settler could do himself. The difference in the cost of clearing and building would represent a very good profit to the company, and would not increase the price of the holding to the settler. Such a work is worth doing among the mountains of British Columbia as well as on the plains of the North-West. It would constitute another link in the long chain that will in the years to come help to bind together the far-scattered portions of our world-wide empire.

LOGAN BERRIES, BRITISH COLUMBIA

POSTSCRIPT

Our Canadian friends may be interested to know that over one hundred illustrated lectures have already been given in Scotland by members of the Commission. The popular call for these expositions of Canadian life and prospects continues. In this way much of the experience of the Commissioners, which it was found impossible to record in the foregoing pages, is being presented to the public, and especially to the rural public, of the "old land."

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