E. R.

AGRICULTURE WITHIN THE EMPIRE:

BEING THE

REPORT

OF THE

BOER DELEGATES

(Messrs. JOOSTE, LANE AND ROOD)

ON THE

Agriculture and Stock Farming of Canada, Australia, and New Zealand.

ISSUED BY THE TRANSVAAL AGRICULTURAL DEPARTMENT.

EDITED BY WILLIAM MACDONALD.

WITH FOUR MAPS AND FIFTY PLATES.

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THE BOER AGRICULTURAL DELEGATES.

Mr. W. L. Jooste. Mr. J. Moody Lane. Capt. *H. J. Kirkpatrick, D.S.O.* (Imperial Representative)

Mrs. Jooste. Mrs. Moody Lane. Mrs. Kirkpatrick. Mr. H. T. Rood.

To

HIS EXCELLENCY VISCOUNT MILNER,

P.C., G.C.B., G.C.M.G., ETC.,

HIGH COMMISSIONER FOR SOUTH AFRICA,

GOVERNOR OF THE TRANSVAAL AND THE ORANGE RIVER COLONY,

AS A TOKEN OF GRATITUDE

FOR THE OPPORTUNITY AFFORDED US OF VISITING

VARIOUS BRITISH COLONIES AND OF STUDYING

NEW METHODS OF AGRICULTURE,

THIS WORK IS INSCRIBED,

IN THE HOPE THAT IT MAY, IN SOME MEASURE, TEND

TO THE ENLIGHTENMENT OF OUR PEOPLE AND

THE PROSPERITY OF THE COUNTRY.

PREFACE.

Shortly after the declaration of Peace, His Excellency Viscount Milner, High Commissioner for South Africa, decided to send a party of Boer Agricultural Delegates on a tour around the British Colonies to study and report upon the different methods of Agriculture and Stock Farming. It was resolved to select them from amongst the prisoners of War at St. Helena. Accordingly, Mr. W. L. Jooste, Mr. J. Moody Lane (both of Klerksdorp) and Mr. Swartz (of Bethlehem, O.R.C.) were chosen, and accepted the responsibility. At the last moment, Mr. Swartz was unable to go, and Mr. H. T. Rood (of Ermelo) was chosen in his place. Captain Kirkpatrick, D.S.O., of the South African Constabulary, was appointed to command the party as the representative of the Imperial Government. Two of the Delegates were accompanied by their wives.

In submitting this record of our tour, we have tried to set down our ideas as plainly as possible, the report being written from notes taken while the facts and incidents were still fresh in our memory. And we hope that it may prove of some value to our fellow countrymen, in showing what has been accomplished in the Sister Colonies of the Empire.

To the people of Great Britain, Canada, Australia, and New Zealand; to the Premiers and Executive Heads of the several Governments, and to the many Departmental Officials, we would tender our heartiest thanks for their uniform courtesy and unfailing consideration toward our party at all times.

In connection with the publication of this Report, we especially desire to thank the following gentlemen for kind assistance : The Commissioner of Lands, the Hon. A. Jameson, M.L.C. ; the Surveyor-General, Colonel Jackson, R.E., M.L.C.; the Director of Agriculture (Transvaal), Mr. F. B. Smith, M.L.C. ; the Director of Agriculture (O.R.C.), Mr. W. J. Palmer, M.L.C. ; the Commissioner of Dairying for New Zealand, Mr. J. A. Kinsella ; the Canadian Trade Representative, Mr. J. G. Jardine ; the Commercial Agent of the New South Wales Government, Mr. George Valder ; the Commercial Agent for the New Zealand Government, Mr. J. Graham Gow ; Mr. E. Heron, and Mr. Trevor H. Foster, of Pretoria.

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AGRICULTURE WITHIN THE EMPIRE.

PART I.

CHAPTER I.

FROM PRETORIA TO LONDON.

Via the Cape—Three weeks in England—Farms in Bedfordshire and Berkshire — Broom — Market Gardening — Biggleswade — Steam Ploughing — Farringdon — 500 Milch Cows — Hatfield — Intense Cultivation

AUGUST 16th.—We started from Pretoria for England, *via* the Cape, and arrived in Southampton on the 6th of September, proceeding immediately to London. Here, owing to the difficulty of obtaining berths to Canada, a stay of three weeks was made. While in England, through the courtesy of the Agricultural Department, the opportunity was taken of visiting several large farms in Bedfordshire and Berkshire. Our first visit was to Mr. King's farm—"Broom"—at Southhill, where there were about 400 acres* under intense cultivation for market gardening. Mr. King goes in largely for pickling small white onions in brine, and hundreds of barrels were standing ready for market; also a large quantity of mustard and turnip seed. He has some fine Shire horses and dairy cattle.

We next visited Mr. Daniels, of Biggleswade, and saw an interesting trial of steam traction ploughing; a double-furrow plough worked by a six-horse power oil engine, all very compact and easily manipulated. Mr. Daniels harvests heavy crops of onions and potatoes. The yield of onions is about 13 tons to the acre; the variety of potatoes chiefly grown is the "Up-to-Date"—a fine sample and prolific bearer, but rather thin in the skin.

September 16th.—We started at 7 a.m. and visited Mr. Adams' farm at Farringdon. This farm has taken the second prize for the best kept farm in England for two successive years. Mr. Adams has about 800 head of Shorthorns, and 500 cows are milked every day. He is a great believer in Shorthorns for milking, and will not have any other kind on his place.

September 17th.—This morning we visited two farms at Hatfield. What struck us most was the very careful cultivation and manuring of the land. All these farms grow root crops for feeding stock during the winter. We do not believe that farming of this intensive nature would pay in the Transvaal owing to the immense amount of manure required.

*2½ acres—1 morgen.

CHAPTER II.

IN THE NORTH OF IRELAND.

Farms—300 to 800 acres—Time of Harvest—Self-Binders at Work—Seed Potatoes—Clydesdales—Shorthorns and Galloways—Black-faced Sheep—A Scottish Visitor.

ALTHOUGH it was not down on our programme, Mr. Lane, who had about two weeks at his disposal, took the chance of visiting the North of Ireland, where he was the guest of several of the leading farmers. His headquarters were on the farm of "Rushhall," about two miles from the town of Limavady. This neighbourhood is said to possess the richest and best soil in Ireland. Here farming operations are conducted on modern lines and in a profitable manner. Farms range from 300 to 800 acres; the fields are all fenced with hedges, and vary in size from 10 to 20 acres. The farmyards, with stables and stalls for fattening oxen, sheds for machinery, and extensive storerooms, indicated an advanced state of agriculture.

As it was about the middle of harvest Mr. Lane was able to witness the self-binders at work in the corn fields. These machines are drawn by two Clydesdale horses, with one man in charge, and can cut an acre per hour. Oats yield, on an average, about 43 bushels to the acre, barley 38 bushels, and wheat 31 bushels. The place of the potato in Irish agriculture is not as dominant as it was three or four decades ago; but it still forms the staple food of a large proportion of the poorer population of the South-West and North-West. The average yield of potatoes is about 3·6 tons per acre. For seed, potatoes are cut so as to leave two eyes on each piece and a fair proportion of flesh to each eye. The varieties of most commercial value are the "Up-to-Date," "Sutton's Main Crop," "Duke of York," and "Early Rose." A little old and well rotted manure is used for preparing the ground for potato growing. The seed is set out, at distances of 12 inches, in furrows 27 inches apart. The fattening of cattle and lambs is a profitable branch of rural industry, and, in consequence, turnips are extensively grown. Hay is a most important item; slightly over two tons to the acre being an average crop.

Clydesdales are the chief breed of horses. Some splendid mares and stallions were seen. Shorthorn cattle are common in many parts. The Galloway, a hardy animal, is very common, and is bred entirely for beef. As a rule, the Galloway is crossed with a Shorthorn, and produces an animal that three years later will slaughter at 1,200 pounds. Blackfaced mountain sheep

are supposed to give the best class of lambs for fattening, and also to be the most remunerative. For pedigree stock the prices are as follows :—

Shorthorn bulls	..	.. £30 and upwards.
Shorthorn heifers	..	.. £20 ,,
Galloway heifers	..	.. £10, £12 and upwards.
Galloway bulls	..	.. £20, £25 ,,

Grade heifers of a good milking strain run from about £8 to £10.

Mr. Montgomery, a Scottish farmer, came over on purpose to see Mr. Lane. He is a large exporter of horses and cattle to the British Colonies and the United States of America. He is noted for his superior Clydesdales, and is the owner of the celebrated stallion "McGregor." Last year he sold 150 Clydesdales for export to Canada and the United States. Mr. Montgomery deals largely in Galloways and Ayrshires, and is supposed to be one of the best judges of cattle in Scotland. He buys for the Royal Farm and the Duke of Bedford. Mr. Lane received valuable advice from this gentleman, who kindly offered to give further information at any time.

CHAPTER III.

TO THE GREAT DOMINION.

Quebec—Montreal—Cold Storage—McGill University—Nappan—Forests of Spruce and Maple—Government Experimental Farm—Dyke Land—Industry of French Settlers—The Sea as a Fertilizer—Ensilage for Feeding.

SEPTEMBER 23rd.—This forenoon we embarked on board the steamship "Lake Champlain" for Canada. After a pleasant voyage, we entered the Gulf of Newfoundland, and steamed up the mighty St. Lawrence. Here the scenery was *delightful*; on either side of the river were red-roofed houses, quaint hamlets, and rich pastures.

October 3rd.—It was in the early morning just as the mists were lifting that we weighed anchor at Quebec—the most splendid of all the cities in the New World. We were much struck with the mediæval architecture of the town, the narrow streets, the antique churches, and the Old World convents. It was round this Ancient Citadel that the long and terrible struggle raged which finally terminated with the taking of Quebec, and the death of Wolfe and Montcalm on the Plains of Abraham. High on the cliff that commands the majestic river a single noble column has been erected by the English and the French to commemorate their valiant dead. It bears the following inscription:—

MORTEM. VIRTUS. COMMUNEM.
FAMAM. HISTORIA.
MONUMENTUM. POSTERITAS.
DEDIT.

Valour gave a common Death: History a common Fame: Posterity a common Monument.

At Quebec we were met by Mr. O'Halloran, Deputy Minister of Agriculture for Canada, and Mr. W. W. Moore, of the Dairy Division of the Dominion Department of Agriculture, who were most kind and accompanied us on the boat to Montreal.

October 4th.—Montreal is the first city in the Dominion, the centre of trade and political influence. It has large and varied industries, which give employment to many thousands of artisans. Built upon a series of terraces, making the former levels of the river, it is nearly four miles long by two broad. Mount Royal,

which rises 700 feet above the river level, forms a magnificent background to the busy city. The estimated value of real estate within Montreal is $180,000,000 (£36,000,000 approximately). It has increased in population since 1891, both by annexation of adjacent municipalities and by natural increase, and now contains about 250,000 people, of whom one half are French, and the rest English, Scotch, and Irish. Its hotels and public buildings are stately, and its quays imposing and extensive. Fifteen lines of steamships trade regularly with the Port. Montreal is the centre of the great railway systems of Canada. The Grand Trunk, Canadian Pacific, and Canadian Government Railways have their Headquarters in this city, and connect with the railways of the Eastern and Central United States. Besides these there are several minor roads centering in the city.

We visited the Gould Cold Storage Company, where large stores of fruit, butter, and cheese are kept. Small compartments can be rented by the public. Private owners are thus enabled to hold their provisions for any length of time before putting them on the market. In the afternoon we visited the McGill University—a magnificent seat of learning. It is richly endowed, and consists of splendid buildings and spacious grounds. The Medical School has achieved a world-wide reputation. We were specially interested in inspecting the Mining, Electrical and Botanical Departments.

October 5th.—Left for Nappan, in Nova Scotia, at noon, passing through small holdings most of the way, and occasional large tracts of spruce, cedars, and maple forests. The spruce here is a very useful soft wood, largely used in the manufacture of wood pulp, or, in other words, paper. Mr. W. W. Moore accompanied us on our trip.

October 6th.—Travelled all night. Arrived at Nappan at 12.15 p.m. Here we met Mr. Robertson, Superintendent of the Experimental Farm, and Mr. W. S. Blair, Horticulturist. This is an excellent farm laid out on ground once heavily timbered and a portion of dyke land reclaimed from the sea—a striking tribute to the industry of the early French settlers. The soil is wonderfully rich, and has been under continual cultivation for a hundred and fifty years without any fertilization beyond allowing the sea to flow over it once every few years. We saw some fine dairy cows and splendid samples of root crops; also a silo. Ensilage is largely used throughout Canada, and is an excellent food for stock. It is made from green maize (mealies), which is cut while the milk is still in the grain. Before being stored in the silo the stalks are cut into lengths of about three-quarters of an inch. Formerly, some farmers used to cut the stalks even shorter, but it was soon found out that the shorter the pieces the sharper the edges; and very short pieces were liable to lodge under the tongue and irritate the gums of the animals. In the silo it will keep good for a long time, provided the air is excluded. All stock eat it with great relish. The estimated cost is 4s. 6d. per ton.

CHAPTER IV.

The Province of Nova Scotia.

Experimental Farms—Efforts to help the Farmer—Nappan—Reclaimed Ground—Fattening and Feeding Tests—To Truro—Bible Hill—An Agricultural School—The MacDonald Manual Training School—Wolfville—United Empire Loyalists—Kentville—De la Rey—A New World Welcome—Halifax.

THE Dominion of Canada possesses five main Experimental Farms, namely:—(1) Nappan, in Nova Scotia; (2) Central Experimental Farm, at Ottawa; (3) Brandon, in Manitoba; (4) Indian Head, in the North-West Territories; and (5) Agassiz, in British Columbia. In addition the several Provinces maintain minor farms.

These farms are not worked solely for profit, but chiefly to help the farmers. Experiments are made to illustrate the best method of tilling the land and to ascertain the proper amount of manure to be used. Tests are also conducted to find out the best varieties of cereals, fruit trees, and vegetables, etc. Again, the breeds, the foods, and the diseases of horses, cattle, sheep, pigs, and poultry are all studied. Further, trials are carried on with farm implements and modern machines of all sorts to show what can be done in saving time and labour. Records are kept, and the results issued in popular and attractive bulletins, which are distributed free of charge to all farmers.

The Nappan Experimental Farm, which was originally meant to serve the purposes of the three Maritime Provinces—Nova Scotia, New Brunswick, and Prince Edward Island—is located at Nappan, in the County of Cumberland, N.S., on the Inter-Colonial Railway. It is situated about eight miles east of the boundary line, between New Brunswick and Nova Scotia, and is within easy reach of Prince Edward Island. It is 743 miles from the Central Farm at Ottawa. This farm comprises about 310 acres, of which nearly 100 acres are still virgin forest. The cleared land may be classified approximately as follows:—Marsh or dyke land valuable for the growth of hay, 50 acres; lower upland, 50 acres; and higher upland, 110 acres. The higher land faces the west, and overlooks the inlet from the Bay of Fundy, and commands a good view of the surrounding country. The soil of this farm is a fair type of that found along the border line of the two Provinces. It is chiefly a clay loam, more or less mixed with sand, becoming heavy or light as clay or sand pre-

dominates, with some parts gravelly, and having a sub-soil varying from clay to gravelly clay. The advantages of this location consist in a variety of soil, partial shelter from prevailing winds, a central location, and proximity to the main line of travel.

Work was begun in the spring of 1887; Mr. Wm. M. Blair acting as Superintendent. Under his able management the farm was greatly improved. A large area of land was drained, and the great value of underdraining in the Maritime Provinces clearly demonstrated. Much useful experimental work has been carried on with grain, roots, grasses, maize, and other fodder crops. Orchards have been planted; and belts and clumps of ornamental trees and shrubs placed so as to act as windbreaks, and also to ornament the grounds around the building. Suitable buildings have been provided, consisting of a commodious barn, stable, piggery, poultry house, and a machine and implement shed. Comfortable residences for the officials have likewise been erected.

We were driven around the farm by Mr. Robertson and Mr. Blair, and inspected plots where wheat, barley, oats, and potatoes have been sown. These had already been harvested. The only standing crops were maize and turnips. Several large plots of clover attracted our attention. Mr. Robertson said that the clover, which was then about six inches in height, had been planted before the winter set in, and that it paid better to plough it under as green manure than to mow it. Clover contains a large amount of nitrogen, and makes a first class green manure. Turnips are used for fattening cattle during the winter months, and some experiments were in progress with this crop. We next visited the orchard, which consists chiefly of apple trees, planted from 15 to 30 feet apart. Then Mr. Robertson called our attention to the reclaimed ground on the shores of the Bay of Fundy. Altogether about 30,000 acres have been reclaimed by making dykes. This ground is used exclusively for growing hay, and yields from 1½ to 2 tons to the acre.

Next to the farmyard. Here was a large barn built of wood with a pitch roof. This barn is constructed with a drive-way for carts and wagons to pass through, and the hay and straw are packed on both sides. At one end of this building there was a large ensilage cutter worked by machinery for cutting maize stalks. It is like a chaffcutter. The maize, which has been cut, is carried up on an endless chain elevator and conveyed into the silo. The silo is built in a portion of the basement of the barn. Usually it is constructed of wood, and may be round or square. The walls of the silo are made air-tight by using tongued and grooved boards, with tarred or insulating paper inserted between the boards. The majority of silos built inside are square in order to save space; but when placed outside the barn the round form is preferable, as it can be more easily strengthened and stayed. The big frame-work of the barn makes it an easy matter to brace the square silo by means of long heavy bolts passed through the main posts.

At this farm the dairy cattle and oxen are fed on ensilage. Holsteins, Jerseys, Guernseys, Ayrshires, and Shorthorns are to be seen here. The Holstein is considered one of the best milkers. There are about twenty-six milking cows on this farm. The calves are not allowed to suck the cows for more than thirty-six hours after birth; then they are removed and fed on pure milk for the first ten days, and then on skim milk and gruel. We were told of an interesting experiment that had been made to determine the actual profit of dairying. The test extended over one year, and during the whole period the cows were fed on the produce of the farm at current market prices. Twenty-two cows were fed in the stalls, and only in summer time were allowed to run in the fields. At the end of the year, the balancing of accounts showed that twenty returned an average profit of £8 per head, while two had been fed at a loss. The cows tested were Guernseys, Holsteins, and Ayrshires. Another fattening experiment. Eight oxen were put into the stalls on November the 16th, and sold as fat oxen on the 31st March. When tied up, they weighed only 9,890 lbs., when fat 12,540 lbs., showing a gain of 2,650 lbs.

Some Shorthorn steers, about eighteen months old, were pointed out. They were being prepared for placing in the stalls in November. They were worth £7 apiece, and looked quite as big as our three-year-olds. On the farm there were a few pure-bred Leicester and Shropshire sheep, and some Yorkshire, Berkshire, and Tamworth pigs. Yorkshire boars are crossed with Berkshire or Tamworth sows. Poultry was fairly well represented. Four varieties of fowls were kept, namely, Barred Plymouth Rocks, Black Minorcas, White Leghorns, and White Wyandottes. During the winter they are fed on a warm maize meal and shorts mash in the morning, and whole grain in the afternoon scattered on the floor of the pens. Water is placed before them all the time, and green ground bones and oyster shells are occasionally given.

Oats are sown at the rate of 2½ bushels to the acre, and usually yield some 60 bushels; barley, sown 2 bushels to the acre, returns about 46 bushels; wheat, at the rate of 1¾ bushels, generally produces about 30 bushels; potatoes give a return of between 200 and 300 bushels to the acre. In manuring it is common to spread about thirty cart loads to the acre. Maize is sown in rows, about three feet apart, but it does not ripen so well in Nova Scotia as in many parts of Ontario. Weeds are destroyed by cultivating between the rows. The maize or mealie plant grows to a height of about eight or nine feet, and is cut before the frost in order to prevent it spoiling. As a general rule when sown in this manner the yield of green food is about twenty to thirty tons per acre.

After leaving Nappan we proceeded by train to Truro, where we arrived at 8.30 p.m., and stayed at the Learmont Hotel. Here we saw a superb collection of mounted horns of Moose, Cariboo, and other species of Canadian deer. We were introduced

to Mr. Fuller, the Manager of the Provincial District Experimental Farm. This farm is maintained by a grant from the Provincial Government, and has no connection with the Central Experimental Farm at Ottawa.

October 8th.—This morning we drove out on a tour of inspection. In passing through the town we noticed some fine suburban residences, mostly built of wood. A great portion of the land adjoining the town has been reclaimed by making dykes. We halted at Mr. C. A. Archibald's farm—"Bellevue"—and inspected the premises. He is chiefly interested in dairying, breeding Ayrshire and Shorthorn cattle. We were shown a fine Shorthorn bull—"Robert Bruce."

We next visited the Experimental Farm at Bible Hill, which is pleasantly situated, with commodious buildings and many modern agricultural appliances. Hay is the main crop. It consists chiefly of Timothy grass, and is cut along with ensilage for fattening cattle. In the Butter Factory there was a cream separator, which could be worked by hand or by machinery; a butter worker for abstracting the moisture from the butter granules. The butter is put up in neat one-lb. packages, and is sold locally. An engine works the machinery required in the butter factory, as well as the threshing and other farm machines, etc. After examining the storage lofts and the silo we proceeded to the new stables recently erected for the accommodation of the thorough-bred horses belonging to the Government. We admired the Clydesdale—"Adjutant"—which won sweepstakes at St. John and Charlottetown, and the yearling hackney—"Sensation." We were interested in the poultry houses. The fowls are enclosed in pens separated by wire netting. There were ten pens, with about one hundred birds in each. As many as 300 eggs are placed in each incubator. The eggs are bought locally at 25 cents. (one shilling) per dozen.

In the chicken-fattening room we witnessed the operation of cramming. Young birds, four or five months old, are placed in coops, which are raised about three feet from the ground. Each coop holds four or five birds. For the first ten days they are fed twice a day with ground oats, having the hulls removed, and ground barley. To this ration a little tallow is added. After about ten days they are ready for the cramming process. The food is mixed with milk or water to form a sort of porridge. It is then placed in the hopper of the machine and forced through a rubber tube into the crop of the chicken. A good operator can feed thirty dozen fowls per hour. This process of cramming lasts about ten days, when the fowls are shipped to market. It is said to do no injury to the fowls, though it seems cruel. Many cows are kept on this farm—Guernseys, Jerseys, Shorthorns, and Ayrshires. The Ayrshire gives the largest yield of milk.

At the Provincial School of Agriculture special instruction is given, free of charge, in the making of butter and cheese. Here also a training in general farming can be acquired without cost, the only charges being living expenses, of about 10s. per week.

This school is largely attended by farmers' sons and daughters, some of whom travel 200 miles to the classes. Students who remain for a stated period are slightly remunerated for their services, and there are many who avail themselves of this offer. We saw some wooden houses here that had been built one hundred and thirty years ago. They are still perfectly sound.

In the afternoon Mr. Kidner and Mr. Matthews kindly showed us over the MacDonald Manual Training School, erected by Sir William MacDonald, of Montreal. The honour of initiating this scheme of manual training schools and technical colleges is due in large measure to Professor Robertson, Commissioner for Agriculture and Dairying, who has been the most strenuous advocate in Canada of a closer union between the School, the College, and the Farm. In this school the students are taught wood carving and painting, etc. The several varieties of wood produced in the Province are exhibited here. Tuition is free. Many scholars who attend other schools manage to devote a few hours every week to study in this Institution. Among the specimens of wood exhibited was a piece of timber 850 years old. It was taken from an old bridge in Bristol.

Our next visit was to the Truro Condensed Milk and Canning Factory, where we met Dr. D. H. Muir, who gave us much valuable information. Local farmers supply the milk handled by this Company. Thus ended a most pleasant and profitable afternoon.

October 9th.—We started this morning at 7 a.m. for Wolfville. Here on Savage Island a place was pointed out to us where the first United Empire Loyalists landed from America (United States) in 1775. It may be of interest to recall the fact that an Order in Council was passed on the 9th November, 1780, to put a mark of honour upon the families who had adhered to the Unity of the Empire and joined the Royal Standard in America before the Treaty of Separation in 1783. These men were the Champions of National Unity. More than 35,000 men, women, and children, refused to take up arms against the British and passed into the Dominion. They were known as the United Empire Loyalists—a name given to them in recognition of their fidelity to a United Empire. Many of these people spent their first winter in log-huts and in tents roofed with spruce and walled with snow. A number died through exposure and privation; and it is said that strong proud men wept like children and lay down in their snow-bound tents to die. Many of the refugees could trace their lineage from the early English Colonists. Others were of the blood of the persecuted Huguenots and the German Protestants from the Rhenish or lower Palatinate. Not a few, indeed, were the Highland Scotchmen, who in former days had followed the Standard of the Stuarts, and yet fought for Union and King George and the British during the American Revolution. Canada, of a truth, owes much to the loyalty of these men who in the great crisis of her chequered history rendered so signal a service.

We traversed a thickly wooded part of the country, where immense logs are floated down the river to the different saw-mills. The foliage of the trees, reflected upon the dark-blue water, lent a wonderful charm to the solemn grandeur of the forests. We passed a quarry of "Plaster Stone," which is largely used in the United States for agricultural purposes. It contains a large proportion of lime, and is ground to a fine state and spread over the land in the form of a manure. At Wolfville, we were met by the Mayor, Mr. J. W. Bigelow, who is also President of the Fruitgrowers' Association. A wagonette, with four spanking horses, was waiting to take us down to the hotel: after which we drove through the upper country. First of all we inspected Mr. Bigelow's orchard. In driving along the road we passed orchard after orchard laden with beautiful apples. Our next stop was at the farm "Willowbank," owned by Messrs. C. R. Starr & Sons. These farmers deal in stock as well as fruit. We were shown a fine trotting mare, also a splendid Shorthorn bull—"Lord Kitchener." At the house they were busy packing apples for the London markets. The apples grown in this district are the Baldwin, a red apple, good for a long journey; Gravenstein, an early apple, well liked in London: Ribston Pippin, King of Tompkins County, and three sorts of Russets. The farmers complained of a poor crop this year, and classed it as third rate, although to us it seemed a very heavy one. Trees are planted in rows, about 25 feet apart each way. They are kept well pruned, and the ground is thoroughly cultivated. Orchards are started by planting two-year-old trees.

We visited the Acadia College, the Horticultural School at Wolfville, and inspected the orchards at Stair's Point. Next we drove through the Gaspereaux Valley. This valley extends for several miles, and is thickly studded with apple orchards. One orchard contains six rows of trees, each row being a mile long. In the afternoon we were taken to Kentville, a distance of nine miles. Here we were met by the Mayor, Town Councillors, and several members of the Legislative Assembly. Thence we visited the Stock Farms in Cornwallis, and saw some celebrated Shorthorns.

October 10th.—Left Wolfville for Halifax by the 7 o'clock train. Passed through a densely wooded country with saw-mills here and there all along the banks of the river. Arrived at Halifax about 10 a.m., where we met Mr. B. W. Chipman, Secretary of the Provincial Department of Agriculture, who informed us that he would introduce us at Admiralty House at 11 o'clock. Here we were entertained by the Vice-Admiral, Sir A. L. Douglas, Lady Douglas, and her daughters. At 2 p.m. we visited H.M.S. "Ariadne," after which we were taken to Parliament House and introduced to the President of the Council, the Attorney-General, and several members of the Legislative Council and Assembly.

We then called on the Lieutenant-Governor, the Hon. Alfred G. Jones, P.C., who received us most cordially, and delivered the following impressive speech :—

"As Head of the Government, I have very much pleasure in welcoming you to our Province. I am glad to notice that you are accompanied by your lady friends, whose sex always exercises such a potent influence on public opinion. They will, no doubt, be able to assist you in arriving at conclusions in regard to the general position of affairs, agricultural and otherwise, in this Dominion. You have already, I understand, visited a section of our country, known as the Land of Evangeline, where you have been able to see beautiful, cultivated farms and orchards, the products of which have a very high reputation in the old country. The lands you saw were dyked by the Acadian French on the first settlement of this country, and from that day to the present they have been producing from two to three tons of hay per acre, and other fruitful crops, without having received any other fertilizing assistance.

"You are just on the threshold of your experience. You will travel from this place to Vancouver on the Pacific, a distance somewhat over one thousand miles longer than from here to Liverpool. This will show the extent and variety of the resources of our country. Through all this long railway route you will find active and growing settlements, towns, and cities; you will find rich farm lands, and prairie lands, inhabited by a prosperous, self-reliant, and happy people. We are, as you are aware, under the protection of the Crown, but the cord that binds us is a silken one, the hand so gentle that we fail to feel its restricting influence.

"We have an adaptation of the British form of Government. We have our own local, as well as our Dominion, Parliament. We make our own laws; we make our own tariffs; we dispose our own money in such a way as Parliament may direct. We have until lately placed the duty on our imports at the same rate as on the imports from any foreign country. Lately, however, to show our desire to bring our connection with the old land closer we have given a reduction in duty on goods coming from all British points of production. We are, as I say, a self-governed and a self-reliant people. England receives nothing from us; on the contrary, she gives us the protection of her armies in our land, of her garrisons, and of her fortifications, which are built at her expense; the protection of her flag, and of her navy, in all parts of the world; and the advantage of her service in her consular system in foreign parts. These are great advantages, for which up to the present time we have never been called upon to contribute one penny. Lately, however, the idea has been suggested, and discussed, that it would only be fair for us to make a contribution for the Imperial Defence. This suggestion has not yet taken any practical shape, and it is doubtful whether we shall contribute directly or not; but we shall always hold ourselves ready, and liable, to take part in any contest in which

the British Crown and interests are concerned. We have shown that in the assistance we rendered during the late unfortunate war. We could have sent five times the number of soldiers to that distant part of the world, had their services been required, but, fortunately, that war was brought to a conclusion. No people took a greater interest in its progress from day to day. We searched the columns of the papers for the details of the contest as it proceeded, and, I have no hesitation in saying, that at times we could not but admire the courage and energy of your people in the unequal contest. We admirred still more the honourable course taken by your Generals who directed the final settlements, and the loyal way in which they carried out in good faith the terms of the agreement was most satisfactory to us all; and I trust, now that this war is over, that your people will realize the advantage of belonging to one of the greatest nations of the world.

"We cordially welcome you as British subjects. We extend to you our greeting that we are in future to class you among the Colonies of the Crown. I have pointed out to you the independent and happy position in which our people stand toward the British Government. This position has been won after long years of Colonial service, and, as it were, showing that we had adapted ourselves to the highest standard of Colonial responsibility, and this Government, when bestowed upon us in years long past, was given in consequence of the loyalty of our people, and the readiness they had shown for self-government. Such, I most sincerely trust, may be the case in your own land. You have the matter very largely in your own hands. You can become a happy and a prosperous people if you will avail yourselves of the position in loyal submission to the Crown, in peaceful pursuits—agricultural, commercial, and mining, all that will tend to make you prosperous and self-reliant, and will bring the greatest blessing a free people can enjoy—the right and privilege of governing themselves. It is, therefore, important that a good start in this direction should be made. The potent influence of your ladies here, and elsewhere, cannot fail to be of the greatest possible effect and advantage, and I humbly pray you, good ladies, when you return to your native land, having seen the position in which we in Canada stand to-day, enjoying all the blessings of free government under the Crown, that you will use your highest endeavours to inculcate into the minds of your brethren and your sisters, not only the duty of loyally fulfilling the obligations entered upon, but also the desirability of ensuring the blessing of free government, such as was won for the people of Canada by those who, many years since, passed away. Free Government can only be exercised by a free people. You have shown during the late contest the higher qualities in many respects. Those higher qualities will doubtless lead you on to further developments, and prepare you for the blessings of self-government, which, no doubt, the British Government will be only too happy to extend to you the moment you prove yourselves ready and capable of carrying out its obli-

gation. We wish more and more to impress upon you that you carry away with you the conviction that the people of Canada only enjoy this great privilege of self-government because they are a self-reliant and a loyal people; loyal to the Crown in every respect, never dreaming for one moment of any change in their condition in any way, and only desirous of showing to the authorities of the Crown, and to His Majesty himself, that they are a very happy and contented people. Such, I pray, may be your case; such, I am sure, will be your case, at no very distant date, but it requires the exercise of caution and loyal submission to the Crown, who will in turn bestow upon you, I have no doubt, this great privilege which we, the people of Canada, now enjoy.

"I am glad to know you are to visit every part of the Dominion. I beg you will take particular notice of everything relating to our agricultural, our commercial, and our other industrial interests, and I feel sure that you will carry away from this country the idea which I desire to firmly implant in your minds, that all this comes to us as part of the possessions of the Crown, as a great Colony of the Empire, whose wealth and importance is advancing day by day."

Next morning we visited the House of Assembly of the Provincial Government. The Assembly is composed of thirty-eight members. It is a fine large building, the walls being decorated with paintings of celebrated men. Prominent also were handsome pictures of their Majesties King Edward VII. and Queen Alexandra. Just outside the building there is a monument to the memory of those Canadians who fell in the late war in South Africa.

The city of Halifax has a population of 40,000, and its harbour is said to be the grandest of all the harbours of the Empire. It is capacious enough to afford anchorage for all the navies of Europe. It runs inland over fifteen miles, and, after passing the city, suddenly expands into Bedford Basin, a beautiful sheet of water, covering an area of nine square miles, completely land locked. Halifax is the chief naval station of British North America, and the only city in Canada now occupied by Imperial troops. The city and harbour are protected by eleven different fortifications, armed with powerful batteries. Large stores of munitions of war of all kinds, including torpedoes, are kept there by the Imperial Government. Of late years it has made rapid strides in manufacturing. Halifax is situated 3,666 miles from Vancouver on the Pacific.

CHAPTER V.

TO PRINCE EDWARD ISLAND.

A Coal Mine—Pictou—In a Severe Gale—Charlottetown—Cold Storage Factory—Pigs and Sausages—An Apple Peeler—Fruit Canning Department—Poultry Farm—Cheese Factory—Impoverished Soil—Introduction of Mixed Farming—Marsh Field—Senator Ferguson's Farm—Provincial Agricultural Farm—Agricultural Show Grounds—A Greeting to South Africa.

OCTOBER 11th.—At 12.30 p.m. we started for Prince Edward Island, parting regretfully with many new, but none the less sincere, friends. Colonel Blair, who was the founder of the Nappan Experimental Farm, accompanied us as far as Truro. From here the railway extends along the river for many miles. The soil is poor and the country very hilly. For the first time in our travels we saw snow, the branches of the spruce and fir trees being covered with it. At Stellerton we passed a large coal mine. The coal found here is very soft. Coal at very high prices was then in great demand due to the coal strike in the United States.

Next we changed trains for Pictou, but owing to the darkness were unable to see much of the country. Boarded the steamer at 8 o'clock. After leaving the shelter of the land we were caught in a severe gale; and the ladies of our party suffered very much from the continual tossing of the steamer. Arrived at Charlottetown, the Capital, about 2 a.m.

Prince Edward Island is the smallest of the Provinces of the Dominion of Canada. It contains an area of 2,000 square miles, equal to 1,280,000 acres, and its population at the last census (1900) was 103,258. The island has a moist, cool climate in summer. The total precipitation in rain and snow is from 35 to 40 inches. The soil is loamy and fertile. The principal crops raised are wheat, oats, barley, potatoes, and turnips; of which oats and potatoes are exported in immense quantities. The island has gained a high reputation for horses, sheep, and swine. And within the last decade there has been a great development in the dairy industry.

In 1892 an Experimental Cheese Factory was started under the supervision of the Dominion Dairy Commissioner. Five years later twenty-eight cheese factories and two butter factories were in operation during the summer months.

October 12th.—To-day, accompanied by Mr. McKinnon, Professor E. J. Macmillan,* and Lieutenant Mellish, we drove first to the pork factory. Here we were met by the different officials and shown every detail of the working of that institution. To begin with the slaughtering process. At the top of the factory the pig is seized by the hind legs, and a moment later is dangling head downward from an iron shackle. Next he is swung along on an overhead rail till he reaches an operator, who makes a quick cut and gives a sudden jar, and the pig tumbles lifeless into a tank of boiling water. Then the body is hoisted into a hot air cylinder and the few remaining hairs soon vanish. Finally, after being cleaned the carcass is sent along the descending grooves, and hauled by iron shackles to the cold storage. Whence it is cut up, and packed in boxes for the hungry millions of the Old World. Meanwhile, the refuse goes to be made into manure and the other parts are turned into lard. Thus the hog's downward career is rapid enough; and his carcass leaves the factory as ham, pork, sausages, or manure—all utilised except the squeal.

In the season one thousand pigs are killed daily. We were amazed at the size of the sausage-making room. There is also a fruit canning department in connection with this establishment. Fruit is mostly preserved in three-pound tins, which, we were told, sell at 4s. per dozen. Here also we saw a good apple peeling machine, which peels the apple and extracts the core very much quicker than can be done by hand. A very large business is done with eggs—absolutely nothing is lost. All the offal is turned into manure, and is used for fertilizing purposes. On this island the farmer has a ready market for all his produce.

From here we went to Mr. Haszard's poultry farm. The fowl house is a long building with twelve apartments. Each apartment has a passage in front which admits one person. The fowl-run is enclosed by wood, about three feet high, with wire netting on the top. There is a small window and two trap doors at the back to allow the fowls to get in and out, and small houses for night-shelter. The varieties kept here are the Buff Orpingtons, White Wyandottes, and Plymouth Rocks; and they were by far the finest collection we have yet seen.

After lunch we were joined by Mayor Warburton and Mr. F. L. Haszard, Mr. Oliver Rattenbury and Mr. Nash. Accompanied by the ladies we visited Marshfield Cheese Factory, where the genial cheese-maker carefully explained the whole process. He went over each stage to make us thoroughly understand the operation; and afterwards the Hon. D. A. McKinnon, with a kindly courtesy, purchased one of Marshfield's finest cheeses, and ordered it to be sent to our Headquarters at Montreal. The soil about here is very red. We were informed by Mr. Moore, of the Agricultural Department, that some years ago the land was in a very bad state owing to the farmers having exhausted it by

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growing crop after crop for a great number of years. Since the introduction of mixed farming—more particularly dairying—a beneficial change has taken place. The ground is now well manured and shows good results all round. In summer time farmers get 90 cents (3s. 7½d.) per ten gallons (100lbs.) for their milk. In winter the price is about 4s. for the same amount. The skim milk is returned to them and used for feeding calves and fattening pigs. We next visited Mr. Miller's farm "Marsh Field." This is a dairy farm of one hundred acres—27 pure-bred Ayrshires are kept in milk. Twenty-five acres are cultivated at one time, the remainder being put under grass. Afterwards we visited Senator Ferguson's farm. He breeds Galloways. One bull—"Balfour"—a very fine animal, was shown to us. Unfortunately, we were unable to see the greater part of his homestead.

We then visited the Provincial Stock Farm, where we were received by the Hon. D. Farquharson, M.P. This Institution is maintained by a grant from Government, together with the assistance of the farmers. The farm is about 100 acres in extent, and experiments are made in all branches of agriculture. Shorthorns alone are kept here. Bulls are sold at a very low price. "Triumph," a splendid bull, was greatly admired. On the homeward trip we were taken over the Agricultural Show grounds. These grounds were well fitted up with produce buildings, barns, stables, sheds, and poultry houses. There is a capital trotting course on the grounds. Trotting and similar sports have been introduced at these shows to attract the general public and increase the gate money. But horse-racing is not popular. In the evening, the Mayor and Councillors met us and were most anxious to find out everything pertaining to South Africa. They all spoke of the friendly commercial relations at present existing between Canada and other parts of the Empire; and they asked us to convey their hearty goodwill and fraternal greetings to the citizens of South Africa in the hope that such sentiments would be reciprocated.

Next day, being the Sabbath, we went to church in the morning like good Christians. In the afternoon we went for a drive through an agricultural part of the district. In the evening several Canadians, who were at Paardeberg during the late war, called. It was here that we saw a potato digger for the first time. The farmer who owned the machine assured us that it gave great satisfaction as a labour saving apparatus. Some years ago this island was celebrated for the quantity of potatoes grown and exported; but mixed farming has gradually come into fashion, being found more profitable. Indeed, the majority of farmers state that it saved the island from rural depression. To-day they export bacon, butter, cheese, and fish.

CHAPTER VI.

IN NEW BRUNSWICK.

Summerside—Pt. du Chene—Sussex—Ayrshires—Rearing Calves—Good Cows from £6 to £10—Sussex Dairying Company—Government Bonus—2,500 gallons of Milk Daily—A Mineral Spring—St. John Pulp Mill—Fredericton—The Capital—A Glimpse of the Boers—The Provincial Dairy School—Sixty Agricultural Societies—Hay an Important Crop—Saw Mills—A Sight of Maine—Montreal—Ottawa.

OCTOBER 13th.—Left Charlottetown at 8.25 a.m. for Summerside. We travelled in a private saloon, passing through a well cultivated country, while beautiful scenery all along the route enhanced the pleasure of the journey. Reached Summerside, and started in the steamer "Northumberland" at 10 a.m., arriving at Pt. du Chene in New Brunswick about 1 o'clock. Mr. T. A. Peters, Deputy Commissioner of Agriculture, met us here and shortly afterwards we took train to Sussex, arriving about 3 p.m. The Mayor and leading citizens turned out to meet us. Spanking horses were inspanned in the traps, and we were driven swiftly through the country. Curiously enough, a few of the horses had been out in South Africa during the war.

Next we were entertained at Mr. Campbell's farm. Here the farm buildings were the largest we had yet come across. This *is a farm of 700 acres—mostly arable.* Mr. Campbell has 60 pure bred Ayrshires for dairying. He showed us some very fine bulls. The calves are not allowed to suck the cows, being removed soon after birth and fed by the hand. His cattle are mainly fed on straw.

The next farm we visited was that of Mr. J. D. Prescott. Here we saw 46 Ayrshires, which give 100 gallons (1,000 lbs.) of milk per day. Mr. Mitchell, the superintendent of Government Dairies of New Brunswick, accompanied us. He said that good cows could be bought from £6 to £10. Yearling heifers at £4. Afterwards we were invited to supper by the principal residents of Sussex, and spent a very enjoyable evening.

October 14th.—Visited the Sussex Dairying Company. This is a Government Institution, which provides instruction for both sexes in dairying, cheese making, etc. It has a large lecture room equipped with all modern appliances. 2,500 gallons of milk are received here daily—skim milk being used for poultry and pigs. The Government grants a bonus of 300 dollars (£60) to creameries;

150 dollars (£30) to cheese factories; and 50 dollars (£10) to separator stations. We then set off for a long drive in the country, and visited a natural mineral spring. Here mineral water is prepared for sale. After a short rest we proceeded to St. John, passing through a beautiful and fertile country.

Reached St. John at 3 p.m. We were met by the Surveyor-General—Hon. A. T. Dunn—who accompanied us on a drive. We went over the suspension bridge at the St. John River. Shortly after we reached Mr. Manchester's farm, and were shown some very fine shorthorn heifers. On our return to St. John, we were taken over a pulp mill and witnessed the making of paper.

Started on the steamer "Victoria" for Fredericton, capital of New Brunswick. Passing amongst the islands the scenery was exquisite. Here and there farmers were busy cutting hay. At our destination we were met by about 300 people, all eager to get a glimpse of the "Boers." Carriages were waiting and the Mayor—Mr. Crocket—took us for a drive around town. In the evening we were entertained at the Queen's Hotel by the Lieutenant-Governor, Hon. Jabez B. Snowball; the Premier, Hon. L. J. Tweedie; and the Attorney-General, Hon. Wm. Pugsley, being also present. We were then taken over the House of Assembly and the Government Buildings, which were specially lighted up for us. In the Museum we saw a grand collection of animals, many of which belong to New Brunswick.

The Provincial Dairy School for the Province of New Brunswick is established at Sussex. It is fully equipped with up-to-date machinery for carrying on instruction in all branches of dairying. There are three Dairy Superintendents, who, besides giving instruction in the various classes, inspect their several districts during the season. The subjects taught are butter and cheese making, cream separation, boiler management, milk testing and animal husbandry. Students may take up factory and home dairying courses. The factory course provides theoretical and practical instruction in cheese making, cream separation, butter making, and milk testing; preparation and use of starters, factory records, care of boilers and engines. The course of home dairying comprises instruction in the use of cream separators, butter workers, the Babcock milk tester, etc. These courses are free of charge, and are attended by men and women. The school is under the direction of the Commissioner of Agriculture—Mr. L. P. Farris—and a staff of five instructors. Mr. Harvey Mitchell is the Head of the Department, a most capable man, who gave us much information relating to dairying in New Brunswick.

We were informed that in this Province there are 60 Agricultural Societies with about 5,000 members. These societies have a subscription fund of £1,300 and a Government grant of £1,600. One of the most important crops is hay. In fact, the high price obtained for hay during the last two years was a strong inducement for farmers to go in for this branch of agriculture. It is said, however, that farmers will lose money by this crop

in the long run as raising hay, year after year, impoverishes the land. And the soil will naturally require a large amount of manure to bring it back to its former state. The average returns in this Province are:—Wheat, 17 bushels per acre; oats, 27 bushels per acre; barley, 27 bushels per acre; potatoes, 113 bushels per acre. The amount of cheese made in this Province last year was 1,800,000 lbs.; and of butter, 540,000 lbs.

October 15th.—We made an excursion to one of the large saw mills, which proved most interesting, and later, to the further side of the river to see Mr. Gibson's large cutting mills. In the evening we started by the 6 o'clock train for Montreal. During the night we passed through the State of Maine, and so we may say that we have been in the United States.

October 16th.—Arrived at Montreal, and started for Ottawa at 4 a.m. At the station we were met by the Deputy-Minister of Agriculture—Mr. George F. O'Halloran—and rested at the Russell Hotel, where we happened to meet Lieut.-Colonel Cameron, D.S.O., of Strathcona's Horse. The Colonel had been to South Africa with two of the contingents, and we had a most interesting chat with him.

CHAPTER VII.

THE CENTRAL EXPERIMENTAL FARM.

Ottawa—The Central Farm—465 Acres—Museums, Offices and Laboratories—Arboretum and Botanic Garden—1,200 Varieties of Fruits under Tests—New Varieties of Cereals introduced from Russia and India—Hardy and Early Ripening—Milch Cows and Steers for Experiments—Breeding and Feeding Experiments with Pigs—Varieties of Apples—A Short Agricultural Address—Rotation of Crops—Clover as a Green Manure—Rust-Resisting Wheats—Pickling in Blue Stone—A Second day of Inspection—Salt as a Fertilizer for Barley—Free Distribution of Seed—25,000 Packages given out—Paris Green for Locusts and Beetles—45,000 Letters from Farmers—An Ensilage Cutter.

OCTOBER 17th.—Ottawa, the Federal Capital of Canada, is the centre of the great lumber trade of the Ottawa River and its tributaries; and on the piling grounds, around the Chaudiere Falls, there is always a reserve stock of lumber estimated at 125,000,000 feet. To keep these filled to their fullest capacity, a number of mills cluster around the falls, fitted with the finest machinery and lighted with powerful electric lights, by the aid of which work is maintained without ceasing, day and night, during the whole season. The extent of the lumber trade of this region may be realised when it is stated that, during the past sixteen years, nearly four million pine logs have annually passed down from the Upper Ottawa and its dependent streams. The city is also lighted by electricity. Its population is 59,200.

The buildings belonging to the Federal Government are the chief attraction of Ottawa: the main one, situated on a high bluff which juts out into the Ottawa River, contains the Senate Chamber of the House of Commons. The dimensions of these halls are the same as those of the House of Lords, viz., 80 by 45 feet. Separated from the main building and distant from either end, about a hundred yards, are the two Departmental Buildings, each with a front of 375 feet in length. The growth of departmental business, occasioned by the development of the North-west, has rendered necessary the construction of a third departmental building, which has a front of 287 feet in length. The buildings together cover about four acres, and cost over $5,000,000. Ottawa is well connected with the rest of the Dominion by railways, which run in every direction: north, south, east, and west. As illustrative of the extent of country governed from Ottawa, the distance of some of the cities and towns of Canada from the

Capital may be given:—Winnipeg (Manitoba), 1,302 miles; Calgary (North-west Territories), 2,141 miles; and Victoria (British Columbia), 2,702 miles.

Ottawa possesses the chief experimental farm. As this Institution was intended to serve as a central bureau of information and also to meet the requirements of the two most important provinces, Ontario and Quebec, a site was chosen near the boundary line. The farm is located about three miles from the Parliament Building, and consists of 465 acres in all. It is divided by a public road, 400 acres lying to the west and 65 acres to the east of that road. The soil of this farm varies greatly in character, from a heavy clay to a friable loam. To the west are many handsome buildings, museums, offices and laboratories. There is also a large barn with two wings and silos, having a storage capacity of 350 tons of ensilage. The lower story of this building, being on a level with the barn-yard, affords accommodation for a considerable number of cattle; while one of the wings is occupied by the pure bred bulls and the other by the working horses. Implement and machine sheds, granaries, seed testing and root houses, sheep pens and piggeries, dairies and poultry houses, residences for the staff, and cottages for the labourers, are all admirably arranged, and bear witness in a striking manner to the generous and liberal support of a far-seeing and progressive Government.

About 328 acres of the ground are devoted to general farming and experiments with crops, 42 acres to the testing of fruits and vegetables, 20 acres to the growing of timber trees, and about 10 acres to plantations of ornamental trees, shrubs, plants, hedges and the buildings. To the east of the main road some 65 acres are devoted to an arboretum and botanic garden, where economic and ornamental trees, shrubs and plants have been brought together from all countries of the globe, together with those indigenous to North America. Here they are tested side by side, and their hardiness and usefulness determined. There are over 2,500 varieties of trees and shrubs in the orchard; some 1,200 varieties of fruits are under test, while the trial plots and fields of grain and root crops comprise a large number of Canadian sorts, together with many foreign varieties.

Indeed, among the many lines of scientific investigation carried on at the Central Farm, none have attracted more widespread attention than that of producing new varieties of cereals by cross-fertilizing. Since the establishment of the Experimental Farms, more than 700 new sorts have been so produced. Some of the varieties of grain used as a basis for this work have been brought from the northern parts of Russia, others from high altitudes in the Himalaya Mountains in India. For in these localities the earliest ripening varieties of grain are found, and in a cold country like Canada, with but a short growing season, this point is of supreme importance. After many careful tests all those of less promise are rejected and only the finest types

retained. Many new fruits have been similarly produced, especially hardy varieties, likely to be useful in the Canadian North-west.

First of all we visited the cattle barns, which are well supplied with milch cows and steers suitable for carrying on experiments relating to the yield of milk and the fattening of cattle. We saw some fine Ayrshire cows. During winter these animals are fed on ensilage; in summer they run loose on the grass fields. The cows are milked till within six weeks of calving. Some of them give as much as 5½ gallons of milk per day with 4½ per cent. of butter fat. In no case are the cows allowed to suckle the calves. For the first ten days they are fed on the mother's milk, then gradually weaned to skim milk and gruel. Here, also, were some shorthorn cows that had taken the first prize (at the Pan-American Exhibition) for giving the greatest quantity of milk in six months. Pure bred bulls are kept at this farm for breeding purposes and for the general improvement of stock in the district. A shorthorn bull, "Lord Dunsdale," bred by Lord Fitzharding, also an Ayrshire bull, "Twin Beauty," were greatly admired.

The next place visited was the piggery, which contained a good selection of Yorkshires, Berkshires, and Tamworths. Many experiments are carried on each year in the breeding and feeding of these different classes of animals, to find out the most profitable sort for export to England. The information gained by these tests has been of great practical value to the farming community. *It was ascertained that an excess of maize tends to produce* a soft pork, while maize mixed with skim milk makes it harder. One Tamworth boar weighed 800 lbs., live weight. The young boars are sold to the farmers at a low price to aid in improving their breeds.

We were taken through an arboretum and botanical gardens and shown various kinds of trees, shrubs, flowers, etc. Two of each variety are planted, and no particular care is taken since only hardy trees likely to be of use to the country are tested. In this way any farmer can easily find out the most suitable sort and the best method of culture. Next we inspected an apple orchard consisting of well-known varieties such as the "Wealthy," "McIntosh," and the "Fameuse."

The Director of the Dominion Experimental Farms—Dr. Saunders—one of the most eminent of Canadian Agricultural authorities, kindly gave us a short address on the rotation of crops. He pointed out that in Canada the usual custom is to manure the ground well for maize and roots, and then to sow oats, next barley, then wheat, and lastly, grass. Afterwards beans and peas are sown when the ground is again manured. He strongly advised us to sow in drills. He also recommended us to grow clover with grain and after the grain is reaped to plough the clover in as a manure. For clover contains a large amount of nitrogen, besides forming humus.

In regard to rust, it has been shown that certain varieties of wheat resist rust better than others, and Canadian experimenters hope in time to produce an entirely rust-resisting cereal. In

the United States experiments have proved that the varieties imported from Southern and Eastern Russia, are by far the best adapted to the greater portion of the wheat regions of the United States. They are the most resistant to drought and cold, and, on the whole, to rust also; are more certain in yield, though not yielding heavily, and produce a very high quality of grain. The principal varieties found to be the most resistant to orange-leaf rust in any part of the country if sown in good time are the winter wheats:—Turkey, Mennonite, Pringles No. 5, Rietti, and Odessa; and the spring wheats:—Haynes Blue Stem and Saskatchewan Fife. Dr. Saunders further pointed out that farmers cannot be too careful in selecting grain for seed purposes, and in all cases it should be pickled in a good rust preventive; that is, soaked in a solution of blue-stone. The grain should then be stirred in lime or plaster so as to dry it, in order that it may pass freely through the drill when planting.

Next we were taken to the implement house where there were many different kinds of farm machines, such as cultivators, ploughs, harrows, drills, sowers, reaping machines, etc. Afterwards we went to the creamery and witnessed the process of butter making and finally visited the poultry yard. Here there were many varieties of Canadian and foreign breeds. This completed our day's work. In the evening we dined with the Hon. Sydney A. Fisher, Minister of Agriculture, and met most of the leading men of the Province.

October 19th.—This morning we attended Divine Service at the Knox Presbyterian Church and, later, lunched with Lord Dundonald, Commander-in-Chief of the Canadian Forces.

October 21st.—Spent the whole day at the Experimental Farm. We passed a few hours in the Laboratory, and were shown the different methods of testing roots, grain, etc. In making experimental tests of cereals, it is usual to sow one-fortieth of an acre. The ground is ploughed seven inches deep in autumn, and left in that condition until the following spring, when it is cultivated twice with a two-horse cultivator, harrowed twice, and then the seed is sown. These experiments are carried on for five seasons, when the grain which gives the best results is selected, recommended and distributed to the different farmers. Maize is also tested here. But it is mainly used for ensilage, as the grain will not ripen properly in this climate. The average return of green fodder is 22 tons per acre. For potatoes, the ground is prepared by spreading about 12 tons of barn-yard manure to the acre. It is then ploughed, harrowed and made into drills about 30 inches apart, and six inches deep for planting. The favourite potato grown in Canada, so far as we could ascertain, is the "Carman." A spray of "Paris Green" is used to destroy the potato beetle.

We were informed that common salt, which has long had a reputation with many farmers as a fertiliser for barley, has been shown to be a most valuable agent in increasing the yield of this cereal, but much less so when applied to crops of spring wheat

or oats. Again, land plaster or gypsum has likewise proved of some value as a fertiliser for barley, whilst of little use for wheat or oats.

The Central Experimental Farm distributes samples of seed of three pounds weight to the various farmers throughout Canada, who, by *careful cultivation, soon have sufficient selected seed* to plant quite large areas. 25,000 packages of selected seed were distributed last year by this farm. The same system is adopted at the other experimental farms. The fact that the Director received 45,000 letters last year from farmers all over the country testifies to the great interest taken in this farm. In discussing locusts, which have caused considerable damage in the North-West of Canada, it was stated that farmers are supplied with "Paris Green" to experiment with against this pest. Speaking of dairying, we were told that it is considered most important that a permanent record of each cow's supply of milk *should be kept. This soon enables the farmer to find out which* cows are paying, and gives him an opportunity of weeding out the useless animals. At the farm buildings we saw an ensilage cutter working; the ensilage being packed away in the silo, where it is kept for three or four months.

The staff of Experimental Farm, Ottawa, consists of:—

The Director, Dr. Wm. Saunders, LL.D., who supervises the work of all the experimental farms, and resides at the Central Farm, but makes a personal inspection of the branch farms, at least, once a year.

The Agriculturist, J. H. Grisdale, has charge of the dairy cattle, beef production, pork production, sheep and farm crops.

The Horticulturist, Mr. W. T. Macoun, takes charge of the experiments with fruits and vegetables, and acts as Curator of the Arboretum.

The Chemist, Mr. F. T. Shutt, M.A., makes analyses of *grasses and other fodder crops to ascertain their feeding* value at different periods in their growth. He also analyzes soils and fertilisers and determines the purity of wells on farms, and conducts much other useful chemical work bearing on agriculture.

The Entomologist and Botanist, Dr. James Fletcher, LL.D., carries on investigations in reference to injurious and beneficial insects and noxious weeds, and tests the value and usefulness of many native and imported grasses for hay and pasture, also the relative merits of other fodder plants. Experiments in bee-keeping are also conducted under the supervision of this officer.

The Poultry Manager, Mr. A. G. Gilbert, conducts experiments *with many different breeds of fowls to find out the best egg* layers, the finest for table use, also the most satisfactory crosses for rapid growth and early laying, and the most economical methods of feeding.

In addition, there is a Farm Foreman, who directs the labour of the workmen and teams; while an Accountant and an efficient office staff are required for the large correspondence (both in English and French) which is carried on with farmers in all parts of the Dominion.

CHAPTER VIII.

A Day on the River.

Saw Mills—Electric and Hydraulic Power—Dominion House of Parliament—Department of Agriculture—Maps for Settlers—Government House—An Invitation to the Boers—Pine Grove Farm—£1,200 for a Cow—Breeding and Training Horses—Tea in a Log Cabin.

OCTOBER 22nd.—Mr. O'Halloran, Deputy Minister of Agriculture, called for us this morning and accompanied us to a large sawmill, owned by Messrs. Neill & Sons, situated on the banks of the River Ottawa. Vast numbers of huge logs were floating down the river, some from forests 300 miles away. This mill works day and night, and turns out 300,000 feet of lumber daily. At the mill, and in the forests connected with it, over a thousand hands are employed. All along the banks men are stationed sorting and attending to the logs, which are all marked, belonging to the different firms.

We then visited the Electric Power House, which supplies electricity to all the houses in Ottawa, as well as to the tramways. The engines, which are driven by water, have a capacity of 1,000 horse power, and produce 3,000 volts of electricity per hour. From here we were taken over the Dominion House of Parliament. It is built of stone, and is of beautiful architecture. We then visited the offices of the Department of Agriculture, which are splendidly equipped. Here we were much interested in some excellent maps of the various Provinces of Canada, showing the amount of land taken up and the amount at present available for settlers.

At one o'clock we lunched with His Excellency the Governor-General—the Right Hon. the Earl of Minto, G.C.M.G.—at Rideau Hall, and met the Prime Minister of Canada—the Right Hon. Sir Wilfred Laurier, G.C.M.G. We enjoyed a most interesting conversation with the Governor and Premier, both of whom extended a very cordial invitation to their Boer friends to visit Canada. This was, indeed, one of the most gratifying episodes of our whole tour. And the gracious reception of His Excellency dispelled any lingering thoughts on our part that the people of Canada might harbour any animosity towards us. We were now sure that the Canadian Britisher was as generous a victor as he was a valiant foe.

October 23*rd*.—This morning it was arranged that we should visit Mr. Edwards' farm "Pine Grove," which is situated some twenty-five miles up the River Ottawa. Mr. W. C. Edwards, M.P., sent his private launch, and we were met by his brother-in-law,

Mr. Wilson. We had a pleasant trip up the river, passing through most beautiful scenery. At Rockland we were met by Mr. Edwards, who is a lumber king, besides being an enthusiastic stock-breeder and farmer. Three traps with capital horses were ready and we were driven to Mr. Edwards' home, where we were received by Mrs. Edwards and the leading residents of the district. After dinner, our host drove us through the village, of which he is the part owner. His farm is situated close to this village and comprises about one thousand acres. Mr. Edwards possesses a magnificent herd of shorthorns, of which he is justly proud. He has received as much as £200 for a two-year-old cow, and paid £1,200 for the cow—"Mysie"—which he bought at the Pan-American Exhibition. We were shown a celebrated shorthorn bull—"Marquis of Zenda"—about 2,700 lbs. in weight. There are loose boxes for the cows and calves, and separate paddocks for the bulls.

Next to the horses. Here was a large yard 200 yards long by 100 yards broad. This yard has loose boxes on every side, with a large platform all round. Two thoroughbred mares, three-year-olds, were trotted out and showed splendid pacings. £200 was being asked for this pair. Close to the stables there is an enclosure used for the preliminary stage in training horses. Two high spirited ponies were let out of the stable for our inspection. This is, undoubtedly, the most perfectly arranged horse-breeding and training establishment that we have seen on our tour so far.

From here we went to the fields, where they were busy gathering turnips, and seemed to have a heavy crop. On our return we visited the stallions and were shown a four-year-old Hackney called "High Rank;" a Clydesdale, "Tom MacGregor;" and another horse, "Sleight of Hand." Besides this farm Mr. Edwards has four others, and holds annual sales at Hamilton, in the Province of Ontario.

Then we went back to the house and had afternoon tea in a log cabin, which is built exactly like those in the "bush." Not a single nail was used in its construction; even the hinges of the doors were made of wood. Tea, bread and bacon were served to us in tin pannikins and tin plates. It was in this same hut that the Prince and Princess of Wales were entertained during their recent tour through Canada. We next inspected the immense sawmills close by, where 350,000 feet of timber are dealt with daily. In connection with the farm, forests and mills, some 2,500 persons are employed.

Here in the heart of the forest is the home of the French-Canadian lumbermen. It was wonderful to see the skill with which they steer the huge rafts or deftly turn a threatening mass of logs.

After spending a most interesting day, we returned to Ottawa at 6.30 p.m. Before leaving the Capital, we must not fail to thank the Hon. Sydney Fisher, Mr. O'Halloran, Dr. Saunders, Colonel Jarvis and the citizens of Ottawa for their most kind hospitality. To-night at 11 p.m. we started for Toronto.

CHAPTER IX.

THE QUEEN CITY OF THE WEST.

Ontario—A Thousand Creameries and Cheese Factories—Manufacture of Agricultural Machines—10,000 Harrows for South Africa—Dentonia Park Farm—To Test Machinery—The Hunt Club.

OCTOBER 21th.—Ontario is the richest and most populous of all the Provinces of Canada. It consists of about 219,650 square miles, and has a population exceeding two millions. It still possesses thousands of miles of forest and wilderness awaiting the lumberman and the settler. The Province is not only famous as an agricultural region, but also contains gold, iron, silver and copper mines.

Ontario has now become an important manufacturing country. The leading industries comprise works for the making of all kinds of agricultural implements, wagons, carriages, and railroad rolling stock, cotton and woollen factories, tanneries, paper and pulp factories, soap works and flour mills.

In addition to cereals and roots, hemp, flax, tobacco, and sugar beet are profitable crops. Maize and tomatoes ripen well in most districts, while in all parts of the Province apples and grapes come to perfection. In the Niagara, Lake Erie and Lake St. Clair regions, peaches ripen in the open air, and are produced in immense quantities. As to the value of the live stock of the Province, it may be mentioned that it was estimated on July 1st, 1900, at $123,274,819 (£24,654,964). Over one thousand creameries and cheese factories are in operation throughout the Province.

This morning at eight o'clock we arrived in Toronto, justly called by Canadians the "Queen City of the West."

Toronto is the capital of the Province of Ontario and is the second largest city in the Dominion. It is the seat of the Law Courts, and the centre of education for the Province. Entered by six railways, converging from different points of the compass, situated in the centre of a rich agricultural district, and being at once the religious, educational, political, literary, legal, and commercial centre of this most fertile region, it has advanced with wonderful rapidity. It is largely Anglo-Saxon and Protestant, just as Quebec is mainly French and Roman Catholic. Its population in 1900 was 207,000.

After breakfast, we were introduced to Mr. C. C. James, Deputy Minister of Agriculture for Ontario, and Mr. G. C. Creelman, Secretary of the Fruit Growers' Association of Ontario.

We started in three carriages for the establishment of Messrs. Massey-Harris & Co., the famous agricultural implements makers in King Street West, and on our arrival were welcomed by several members of the firm, who conducted us through the works. We were taken over the various sections and saw all sorts of agricultural machinery in the different stages of manufacture. Each piece of mechanism when finished is dipped into a large tub of paint and when dry forwarded to the show room to be finally fitted up. The section of carpentry, where all the patterns are made, is a most interesting branch of this great industry. We were informed that they had orders on hand for 10,000 harrows for South Africa, and had already despatched 4,000. We were amazed at the extent of this enormous factory

After our visit of inspection, Mr. Harmer and Mr. McLeod, heads of the firm, accompanied us to Dentonia Park Farm. This farm was founded in 1897 by the late Mr. W. E. Massey, and is situated a short distance from Toronto. It was established more as a business man's hobby for making trials of different kinds of machinery than as a paying concern from the point of view of the farmer. The farm is about 240 acres in extent. It is prettily situated, and two fresh water creeks run across the land. A few years ago it was merely regarded as so much waste ground, and its present pleasing aspect is only another illustration of the enterprise of this firm. About 130 acres are used for general agricultural purposes; 50 for pasture; 10 for orchards and market gardens; and 40 for grass. In all, there are some twenty buildings on this farm, including a splendid mansion for the owners, a dining hall and commodious rooms for the employees; capacious barns, stables and stores. The famous Gordon-Walker main barn is a unique building, being four stories high, with facilities for driving up to any floor by means of slightly elevated ground. The farm is divided into different departments which are more or less independent of each other.

Here cattle, consisting of Jerseys and Ayrshires, have become a very important factor in proving what can be done in the way of producing pure milk. There are 30 milch cows. The cow stalls are large and well ventilated and kept scrupulously clean. The food for the cattle is placed in a cement trough. Buckets are never used for feeding.

The varieties of fowls here are:—Brown, Buff and White Leghorns, Light Brahmas and White Langshans. White Island Turkeys and Imperial Pekin Ducks. Emden Geese and Colonial Pheasants. In the Poultry Department, we saw three incubators containing a thousand eggs. In the fish pond there was a large supply of trout for stocking the rivers and ponds.

The agricultural section undertakes the culture of the cereals and fodder required for cattle, horses, and poultry. We were shown an ensilage cutter and a silo. The Manager informed us that in Canada ensilage would keep good for four years. He also mentioned that the calves are taken away from their mothers

immediately after birth. For the first ten days they are fed on the cow's milk, then gradually weaned on skim milk and meal. Cows are fed on ensilage and hay.

On the return journey we stopped at the Toronto Hunt Club buildings and were entertained to dinner by Mr. Harmer. We were shown the Racecourse and a capital pack of hounds. The Ladies' Golf Club is situated close by. It is nicely furnished and well fitted. Arrived at the hotel at 8 o'clock.

CHAPTER X.

THE ONTARIO AGRICULTURAL COLLEGE.

Guelph—Forty-nine Miles West of Toronto—The College—The Farm—550 Acres—A Practical Training in Agriculture—Distribution of Seed—Results of Experiments published in Bulletins—Commodious Buildings—Sheep, Cattle and Swine—Dairy Department—Ayrshire, the best Milker—Poultry Department—The Operation of Cramming—The Piggery—The Yorkshire, the Most Profitable—Grade Heifers, £4 at 18 months—Two Hundred and Fifty Students—Seventeen from the Argentine Republic—The City Hall—Monument to Canadians—A Lesson in Pasteurization—Oshawa—Two Famous Factories—Success to South Africa.

OCTOBER 25th.—This morning we started for the Ontario Agricultural College and Experimental Farm, accompanied by Mr. G. C. Creelman and Mr. W. W. Moore. On arrival at the station we were met by Dr. James Mills, President of the College, and twelve of the principal residents of the town. A wagonette was in waiting and we were driven to the College. This College, situated near the city of Guelph, forty-nine miles west of Toronto, in the midst of a fine farming district, was established by the Provincial Government, under the administrative control of the Provincial Minister of Agriculture, for the special purpose of giving a practical and scientific education to the sons of farmers. The Experimental Farm consists of some 550 acres. It is fitted with every appliance for successfully carrying out its essential aim, which is to give to the youths who attend it a thorough and practical knowledge of every branch of agriculture, which can be profitably pursued in the Province, according to the varying conditions of climate and soil, and annually distributes seeds and grains that have been grown in Canada or imported from Europe, and tested for two or three years. The results of its various experiments in grain growing, feeding, and dairying are published in timely bulletins.

The farm equipment consists of large and commodious buildings, with all the most modern improvements, and good specimens of the diverse breeds of cattle, sheep, and swine are to be seen; such as:—Cattle—Shorthorn, Hereford, Aberdeen-Angus, Galloway, Devon, Sussex, Ayrshire, Jersey, and Holstein; Sheep—Shropshire, Southdown, Hampshire Down, Oxford Down, Suffolk, Dorset Horn, Cotswold, Leicester, and Lincoln; Swine—

Berkshire, Improved Yorkshire, Tamworth, Poland, China, and Chester White Pigs—all kept for the instruction of the students in attendance at the College.

The Dairy Department is also fully equipped in all the accessories necessary for milk-testing, butter-making, cheese-making, running of cream separators, handling of milk, treatment of cream, feeding, and management of dairy cows, etc. The Poultry Department is furnished with excellent buildings, and a large number of the most valuable fowls. The Horticultural Department is supplied with the equipment required for students who wish to devote special attention to fruit growing, market gardening, or floriculture, such as orchards, vegetable gardens, and greenhouses. In connection with the College there are well equipped laboratories for practical work in chemistry, physics, biology, and bacteriology.

We first inspected the dairy building, and saw milk being received, weighed, and tested. Then visited the Cream Separator House, and, later, saw the churning. They have different apartments for experiments in churning and separation. We were shown the dairy stables, with accommodation for thirty cows. The dairyman informed us that he considered the Ayrshire was the best milker. The Holstein is a good milker, but is a most expensive cow to keep in winter time. From here we went to the poultry house and examined it with interest. After seeing the fowls and ducks which were killed for table use, we went to the "Cramming House" and witnessed the operation of cramming. The fowls are always starved for twenty-four hours before killing.

After lunching with Dr. Mills, we visited the piggery, and saw Yorkshires, Berkshires, and Tamworths. The Yorkshire is considered the most profitable pig, giving better pork than the others. We spent some time in the fields examining the dairy herds. Shorthorns, Holsteins, Herefords, Ayrshires, and Galloways are kept. Galloways are good hardy animals, and do well in Ontario. They weigh about 1,000 lbs. slaughtered and dressed. In appearance they do not look more than 600 lbs. in weight. Mr. Hodson, Live Stock Commissioner for the Dominion Government, said that if we proposed to go in for cattle, grade heifers about eighteen months' old would probably be the most suitable. These can be had from $20 (£4) and upwards. Young bulls can be had from £8 to £10.

Two hundred and fifty students attend this College. All tuition is given free to sons of Canadian citizens. Seven months is the usual term, when young farmers are allowed to return to their respective farms to assist with the ploughing, etc. There are seventeen students here from the Argentine Republic. As foreign students they pay a fee of $30 (£6) per term.

The following extract from a recent circular will give a general idea of the work done by the students in a week :—

FORENOON.

1. Some students are called at 5 o'clock in the morning to assist in farm stables, piggery, and dairy stables. These students are required to be in the stables at 5.30. They work till 6.30, and then return to the College. They are taken in rotation for this work.

2. Breakfast in the College dining-hall at 7 o'clock.

3. Students in their rooms, or reading in annex to library, from 7.20 to 8.30 a.m.

4. Roll-call, announcements, and prayers at 8.30

5. All students at lectures or work in the laboratories, for 3¼ hours—from 8.45 to 12.50 a.m.

Dinner at 12.15 o'clock.

This is the regular routine in the forenoon every day of the week, except Saturday. There are no lectures on Saturday.

AFTERNOON.

For afternoon work, preparatory, first year and second year students are divided into two divisions—half of the preparatory of the first year and of the second year being put into one division, and the remaining half of each into the other division. These divisions go out to work alternately in the afternoon for five days in the week.

Division A goes to the farm office, say, on Monday at ten minutes to one o'clock, for roll-call and distribution for work in the outside departments, being sent in rotation to the farm, live stock, dairy stable, home dairy, poultry department, carpenter shop, garden, greenhouses, and experimental department. This practical work is from one to five, or half-past five, in the winter, and from one to six in Spring, Summer, and Autumn.

The same afternoon, from 1.30 to 4 o'clock, the preparatory and first year students in Division B are in a class-room, in charge of a master, to study their notes and read books taken from the library, and the second year students in this division go to work in the chemical, botanical, bacteriological, physical, and horticultural laboratories. All the students of this division have from four o'clock to tea time for recreation on the College campus or elsewhere.

On Tuesday afternoon things are reversed. Division B goes out to work, and A remains in for study, laboratory work, and recreation on the College campus or elsewhere.

After tea, at from seven to eight o'clock (according to the season of the year), all go to study in their rooms, in charge of a master, and remain at study till 9.45 p.m.

On Thursday evening, after study, the students have a prayer meeting in their Y.M.C.A. hall; and one evening of the week, usually Friday evening, is devoted to the meeting of the College Literary Society.

On Saturday forenoon the divisions go alternately to work in the outside departments. The division which is not at work spends the time in study, recreation, or private business. Saturday afternoon is usually devoted to sports.

From this it will be seen that Guelph is not merely a farm for growing grain and raising live stock, however important that may be; but a college, equipped for educating young men on practical lines—stirring them up to observe, read, and think for themselves, making them more intelligent workers, giving them information and training which will be of use to them in their efforts to make a living, and developing in them a love for farm life and work. A large library is being built in connection with this College, towards which the late Mr. Massey gave $10,000 (£2,000). The Macdonald Institute for instruction in Nature Study, Manual Training, and Household Science will, when completed, cost $ 75,000 (£37,000). It is the generous gift of Sir W. C. Macdonald, of Montreal. After spending a pleasant and instructive day we went back to Guelph and visited a large furniture factory, and saw pianos, organs, etc., being made. Arrived at Toronto at 8 o'clock.

October 27th.—This morning we took a drive around town and paid a visit to the great store of Messrs. T. Eaton & Co. Then we inspected the City Hall, which is a handsome building, with an interior of pure marble. Just outside the hall a large statue has been erected to the memory of the Canadians who fell in the late war. Next we inspected the Council Chambers, where the Mayor and Councillors were assembled, and then drove to the Provincial Parliament. The library and different offices in this building are tastefully fitted up.

Later, we visited the City Dairy Company's plant on Spadina Crescent, which was formed for the purpose of delivering milk to the residents of the city. Mr. J. W. Palmer, who showed us over this plant, is now Director of Agriculture in the Orange River Colony. The farmer who brings milk to this firm is paid according to its relative richness. The milk is put through a process of heating in order to kill the germs and so prevent fermentation. It is sold at 6 cents (3d.) per bottle. We were shown the dirt, dust, and sand which had been extracted from the milk by this process. This was quite a revelation to us, and, indeed, we hardly like to think of drinking any more milk until it has been submitted to this process of Pasteurization.

At one o'clock we set out for Oshawa, where we arrived at half-past three, and were received by the Mayor and Town Councillors. The first place we inspected was the Schofield Woollen Mills. Here they manufacture all kinds of flannel and woollen goods. All the employés in this establishment are girls.

Next proceeding to the McLaughlin Carriage Co., Ltd., our party was divided and piloted through these extensive works by Messrs. George and Sam McLaughlin. This is the largest carriage factory in the Empire, and consists of three immense buildings. Here carriages, cutters, and carts are made. We were especially interested in the manufacture of "spiders." Seventeen complete vehicles are turned out from this factory every working day.

In the evening we were entertained to dinner at the hotel, when twenty-four guests sat down. In a toast proposed by the chairman, our healths were coupled with "Success to South Africa." Returned to Toronto about 9 p.m. in a special car kindly placed at our disposal by the Oshawa Railway Company.

CHAPTER XI.

NIAGARA AND THE LAKES.

Hamilton—The Garden of Canada—Pears for South Africa—The Codlin Moth—Apples for Export—Niagara Falls—The Whirlpool—Owen Sound—Crossing Lake Huron—Sault St. Marie—Largest Locks in the World—St. Paul and Minneapolis—The Twin Sisters—Winnipeg in Manitoba—Wheat as far as the eye could See—Grain Elevators—The Ogilvie Flour Mills—2,600 Barrels per Day.

OCTOBER 28th.—Left Toronto for Hamilton, where we arrived at 10 a.m. Taking an electric tram through town, we went on an inclined railway up to the top of the mountain. From here a magnificent view of the city is obtained. These mountains provide good shelter for the valley below, which is considered the Fruit Garden of Canada. Grapes, plums, apples, and pears are grown here in abundance. At noon, on the electric tram, we made a trip along the valley for some miles. The first farm visited was "Fruitland," belonging to Mr. W. M. Orr, who has about 35 acres under fruit. He showed us a store room where he had a large quantity of all kinds of fruit packed ready to be sent away. Amongst this consignment we noticed a quantity of "Kieffer" pears packed in bushel boxes awaiting shipment to South Africa. Mr. Orr and his daughter escorted us over their extensive orchards, which are in first class condition.

A certain insect called the "Codlin Moth" is a destructive pest during the months of June and July. But a simple and fairly effective remedy has been devised, namely, bandaging the trees. These bandages may be made of old sacking or any cheap cloth. The sacking is cut into strips about ten or twelve inches wide, and long enough to go at least twice around the tree, and is tied by twine. The larvæ or grubs crawl in between the bandage and the bark and spin their silken cocoons in which they change to pupæ *. Since the moths mature in about two weeks after making their cocoon these bandages must be examined at least once every ten days.

The cocoons are destroyed by crushing them with a small mallet. Mr. Orr never grows anything between his rows of fruit trees, as he considers green crops remove a certain amount of nourishment from the ground, and the fruit suffers in consequence.

Next to "Helderleigh." This nursery belongs to Mr. E. D. Smith, who has a large fruit packing establishment. From his extensive and well laid out nursery Mr. Smith supplies Canada and the States with all kinds of plants and shrubs. Afterwards, Mr. L. Woolverton, Grimsby, editor of the *Canadian Horticulturist*, drove us to his farm. Here they were busy packing

* The term applied to that stage of an insect which immediately precedes the adult.

for export in a most scientific manner with a machine for sorting the apples according to size before they are put into the boxes. Then we visited a place where baskets are made for packing fruit, and, later, we were shown over the Co-operative Factory, where fruit is exported in large quantities to the chief cities of the Continent: whilst the apple peels are sent to Hamburg for making wine.

From here we took train for Niagara Falls. When we arrived at the border, that is, at the United States side of the bridge, our luggage was examined by American officials. We put up at Prospect House, and after supper retired, eagerly looking forward to seeing the great Niagara Falls next morning. For although since our childhood we had heard and read much about Niagara, little did we dream that one day we too should have the pleasure of seeing this marvellous waterfall.

The waters of the Falls are divided by Goat Island. The rock on the Canadian side is worn into the shape of a horse-shoe, which gives the name to this Fall. It has a width of 1,900 feet, with a fall of 160 feet. The American Fall is straight in its line, and is 660 feet wide, with much less water than the Horse-Shoe Fall. With a favourable wind the rumbling of the Falls can be clearly heard for a distance of thirty to forty miles, and the trembling of the earth from the concussion of the water for at least fifteen miles around; whilst the column of spray is visible at seventy miles.

Niagara is, without doubt, one of the noblest works of Nature in the whole world. Her ceaseless rush and thundering roar; the vast clouds of spray that catch in their depths the dancing sunbeams; the mists that in a thousand rainbows meet and mingle in ever changing hues, and at night enfold the moonbeams in a marvellous Lunar Bow; the clamorous surging rapids, which are lost for a moment in the calm alluring whirlpool, only to rise again in the tumultuous rushing river—these, all these, formed a memorable scene, full of grandeur, imperishable, and sublime.

There are several bridges over the river below the Falls. Before reaching the Whirlpool the river takes a turn to the right, and flows at right angles to its former course. Here the confined waters come with great violence against the surrounding cliffs, and, in seeking a passage out, circle round and round, causing the great Whirlpool below. Heavy logs often float for days before finding a way out. Afterwards, we passed over to the Canadian side, and had a good view of the Horse-Shoe Falls. The quantity of water passing over the Falls is estimated at 701,250 tons per second, and the power at 4,500,000 horse-power. The Falls furnish hydraulic power for electrical and lighting works in the neighbourhood, and drive the trams in the city of Buffalo, situated several miles away. Having to catch the 2.25 train we concluded our visit, and returned to Toronto at 5 p.m. Here we met a countryman from the Cape Colony buying horses and stud cattle. Our best thanks are due to Mr. James and Mr. Creelman, and also to Mr. Harmer, of the firm of Messrs. Massey-

Harris & Co., who rendered us great assistance. We left Toronto at 8 p.m.

October 30th.—From Owen Sound we took steamer for a distance of 250 miles, crossing Lake Huron, and arrived at Sault Ste. Marie about 1 o'clock. Although this town is practically only fourteen years old it has a population of over 15,000 inhabitants. Here are the greatest locks in the world. The Sault Ste. Marie connects Lakes Superior and Huron, and is necessary because of the difference of eighteen feet between the levels of the lakes. At this place a canal was built by the North-west Fur Company in the year 1797 to enable them to carry their supply to the "Great Lone Land of the North-west." This canal had the first lock ever built on the North American continent. The site upon which this primitive lock was built is preserved and used as a fish pond, and the oaken floor is apparently as good as it was when laid over a hundred years ago. Locks of various sizes have been built from time to time, and now there are three locks in operation, two on the United States side and one on the Canadian. The larger one on the United States side is 800 feet long and 100 feet wide. The Canadian lock is 900 feet long and 60 feet wide, and is said to be the longest lock in the world. Both the Canadian and the United States locks can pass vessels drawing 20 feet of water.

The trade done by these canals is very considerable; indeed, few persons have any idea of its extent. In 1900 through the canals of Sault Ste. Marie there passed 19,452 vessels of 22,315,834 tons. The amount of tonnage per annum passing through these locks *en route* to the sea is twice as great as that which goes through the Suez Canal in the same period, and consists, principally, of wheat and iron.

The Canadian Sault Canal is operated by electricity, and, in consequence, the average time of making a lockage, including all delays to vessels in this lock, is fourteen minutes and fourteen seconds, whilst that of the United States lock, operated by hydraulic power, is thirty-six minutes and thirty-one seconds.

The total cost of building the Canadian Canal at Sault Ste. Marie was $3,770,000 (£754,000 approximately). A ship of 8,000 tons can traverse these great Lakes *—Superior, Michigan, Huron, Erie, and Ontario—and pass through the locks. The Indians call Lake Superior "Gitchee Gumme, or Little Brother of the Sea."

*THE GREAT LAKES.

Lakes.	Length.	Breadth.	Area.	Height above sea.
	Miles.	Miles.	Sq. Miles.	Feet.
Superior	390	160	31,420	602
Michigan	345	58	25,590	578
Huron (with Georgian Bay) ..	400	160	24,000	576
Erie	250	60	10,000	566
Ontario	190	52	7,330	240

Thence by train to St. Paul, Minnesota, in the United States, where we arrived about 8 o'clock on Saturday morning. From St. Paul we took an electric car to the city of Minneapolis. These cities are only six miles apart, and are called the "Twin Sisters," and each has a population of about 200,000. Some of the buildings, locally termed sky-scrapers, are very lofty, being from twelve to fourteen stories high. Not far from Minneapolis are the famous Falls of Minnehaha (Laughing Water), mentioned by Longfellow.

In the evening we started for Winnepeg, in Manitoba. The country we passed through was under wheat as far as the eye could see; it was one vast flat prairie, the soil being a rich black loam. Here we saw the huge grain elevators so common in the vast wheat growing regions. They are placed along the railway line and used by the buyers of wheat who may be awaiting the chance of transport to the coast or holding it for a rise in the market price. In this district we heard of one farmer who had 40,000 acres under wheat.

The city of Winnipeg is of recent growth. In 1871, its population was 241; in 1900, 52,400.

The town is lighted by electricity and gas. The main street —one hundred feet wide and paved with cedar blocks—is over two miles in length, and is one of the handsomest streets in Canada. Formerly, it was known as Fort Garry, and was the headquarters of the Hudson Bay Company. The citizens have faith in their town, and believe that it will yet be the new Chicago of the Canadian North-West. We greatly regretted that our stay here was so short, but we endeavoured to make the best of our time; and the Mayor, Mr. Black; Mr. Edgar of Messrs. Massey, Harris and Co.; and Mr. Ogilvie, of the celebrated flour mills, took us for a drive around the town. We inspected the celebrated Ogilvie Flour Mills, which are the largest in Canada. Here we were shown the different processes through which the wheat passes in being turned into flour. The daily output at this mill is 2,600 barrels, each weighing 196 lbs. Their export trade is mostly Inter-Imperial, that is, with the other British Colonies, and it may be of interest to add that at the time of our visit there were in the mill 17,000 bags of flour awaiting shipment to Australia.

CHAPTER XII.

THE GRANARY OF THE EMPIRE.

Manitoba—The Greatest Wheat Province in the Dominion—50,000,000 Bushels—Brandon—Snow Six Inches Deep—Fattening Steers—Yorkshire Pigs—Minorcas—The Banner Oat—96 Bushels to the Acre—Wheat—Red Fife—An Indian Farm School—10,000 Visitors—Ploughing Matches and Agricultural Meetings—Cost of an Acre of Wheat—Dairying.

NOVEMBER 3rd.—The Province of Manitoba is about three hundred miles from east to west, and contains some 90,000 square miles. In other words, it is nearly as large as England and Scotland combined. As an agricultural region it was unknown before the year 1870, when it was detached from the rule of the Hudson Bay Company, and created a Province by an Act of the Imperial Parliament. Last year the output of wheat alone from Manitoba was over 50,000,000 bushels. No. 1 hard wheat realises the highest price of any variety in the Dominion, and is unexcelled in the whole world. The yield per acre averages 25 bushels. The characteristic soil of Manitoba is a thick, black argillaceous loam, resting on a deep clayey sub-soil. This soil is able to stand more continuous cropping without manure than any other known to agriculturists.

The climate of Manitoba is warm in summer and very cold in winter, but the air is dry and bracing. Winter sets in about the end of November, and the snow usually disappears early in April. Seeding begins a week or two later, as the soil dries very rapidly. Harvest begins about the middle of August.

It was two o'clock when we left Winnipeg, and traversed a vast unbroken prairie where there is no landmark save the rising and the setting sun. All along the line we passed the homesteads of settlers, who were busy ploughing, using two, three, and four-furrow ploughs. We reached Brandon at 7.30 p.m., where the snow was lying six inches deep upon the ground.

Brandon is one of the largest grain markets in Manitoba, besides being the distributing centre for an extensive and well-settled country. The town is beautifully situated on high ground, and has good streets and many substantial buildings. It was arranged that we should visit the Government Experimental Farm on the following day.

November 4th.—This morning Mr. S. A. Bedford, Superintendent of the Experimental Farm, called on us with the necessary vehicles for our conveyance to the Farm. Here the cattle are bred entirely for fattening. The practice of crossing a pure shorthorn bull with an ordinary cow has resulted in producing a good grade cow. Steers are allowed to run on the grass from May until December, when they are put into stalls and fed up till April, when they are sold. When brought in they weigh about 1,000 lbs., and when sold 1,650 lbs. From here we went to the piggery, and saw some Yorkshires, Berkshires, and Tamworths; also crosses between Tamworths and Yorkshires. These pigs are fed on boiled potatoes and grain. Here, as before, we were informed that the Yorkshire is the most profitable breed.

Mr. Bedford estimates the cost of growing an acre of wheat at $7·87 (£1 12s. 4d.). This was the result of an actual experiment on a yield on 29 bushels. The items of cost were:—

Ploughing once, $1·25 (about 5s.); harrowing twice, 20 cents (10d.); cultivating twice, 40 cents (1s. 8d.); seed (1¼ bushels), 75 cents (about 3s.); drilling, 22 cents (11d.); binding, 33 cents (about 1s. 4d.); cord, 20 cents (10d.); stooking, 16 cents (8d.); stacking, 60 cents (about 2s. 6d.); threshing, $1·46 (6s.); teaming to market, 4 miles, 29 cents (about 1s. 2½d.); two years' rent or interest on land valued at 6 per cent., $1·80 (about 7s. 5d.); wear and tear of implements, 20 cents (10d.)—a total of $7·87 (£1 12s. 4d.).

The average yield per acre under the most ordinary care and conditions of weather should be 20 bushels, but with good cultivation the above yield is by no means exceptional, even over large areas.

We next visited the Poultry Establishment, where the same breeds are kept as already mentioned. The Superintendent considers Minorcas the best laying fowls. From here we went to the Store Room and examined some fine samples of grain displayed in bottles, and some oat straw about 5 feet 8 inches long. This was taken from a crop of "Banner Oats" which yielded 96 bushels to the acre, and is regarded as the best drought resistant variety. We were also shown a sample of wheat called "Red Fife," which has proved to be a good rust resisting grain, and produces a very superior flour, giving a large amount of gluten. At this farm it is customary before sowing to steep seed wheat in a solution of bluestone and boiling water. The ground is ploughed twice before sowing; that is, once in the spring and again before sowing. When land gets foul with weeds it is considered a good plan to plough it and leave it fallow for a time, using the cultivator at intervals to destroy the new weeds as they spring up.

We visited the implement room, and were shown disc ploughs and drills for sowing maize, oats, and wheat. There is a windmill here which works all the machinery in connection with the farm. This mill has been in use for eight years, during which time the cost for repairs has only amounted to one shilling. The Superintendent,

Mr. S. A. Bedford, kindly promised to send us some samples of grain for trial in the Transvaal. There is a school for Indians attached to the above farm. These people are taught farming as well as receiving general elementary education. There is an attendance of about 100 pupils.

The Brandon Experimental Farm consists of 645 acres, and the average yield per acre is as follows :—

	Bushels.
Wheat	27
Oats	70
Barley	37
Potatoes	350

Maize is sown for ensilage, and the whole plant—stalk and cob—is cut with a binder and allowed to remain for a couple of days before making into ensilage. In sowing maize they sow with a drill in rows 30 inches apart—about half a bushel to the acre.

The bulls kept here are available for the use of farmers and others at a nominal fee. This privilege is largely taken advantage of, with the result that the stock in the neighbourhood has greatly improved in character since the establishment of this Experimental Farm. A six months' test was made with two dairy cows to find out the best and most persistent milker. One was the offspring of a beefy Shorthorn bull; the other was from a large Ayrshire sire. The former gave 1,076 lbs. of milk, and the latter 5,240 lbs. —a clear proof that for dairy cattle the sire should be selected from a good milking strain, namely, the Ayrshire. In a poultry experiment a test was made with some Brahmas and Plymouth Rocks. These fowls were fed for a month on equal quantities of food, and at the end of the test the former had gained one pound more than the latter.

During the year 10,000 visitors went over this farm, showing the keen interest taken in this experimental work. Provincial ploughing matches are held here, and are largely attended. Besides, the farmers meet frequently during the winter months to discuss all matters relating to agriculture.

Dairying on the factory system is being conducted with great success. In 1881 there were no factories. At the present time thirty creameries and fifty cheese factories are in operation, and it is hoped that the opening up of new mines in the Lake of the Woods district will create fresh markets.

CHAPTER XIII.

THE NORTH-WEST TERRITORIES.

Regina—North-West Mounted Police—Thrashing Wheat—Free Grant Farms—160 Acres—Wheat 7s. per bag.—A Ranching Country—Calgary—An Abbatoir—A Government Creamery.

NOVEMBER 5th.—After traversing another great prairie, fertile and flat, stretching to the horizon, we reached Regina, the capital of the North-West Territories. The North-West Territories of Canada comprise the larger portion of the Dominion outside the boundaries of the different Provinces. This vast portion of the North American continent was, until recently, an almost unknown region, ruled over by the Hudson's Bay Company, and popularly looked upon as an inhospitable country, good for nothing but the production of fur, and offering inducements only to the fearless explorer or the hardy hunter in quest of big game.

With the transfer to the Dominion of Canada of the rights of the Hudson's Bay Company in 1870, and the formation of the Province of Manitoba out of a small part of the Territories, the natural advantages which the newly-acquired portion of the Dominion offered to those in search of homes became plainly evident. Extensive settlements have been made, and large districts only await the transforming touch of the industrious husbandman to be converted into happy and prosperous homes. The North-West Territories extend to the Arctic Ocean on the north, and from Hudson's Bay on the east, to the Rocky Mountains on the west. This vast extent of territory covers an area of some 1,402,800 square miles. In the year 1882 it was found advisable for administrative purposes to divide that portion of the territories, above described, into four districts, named respectively Assiniboia, Alberta, Saskatchewan, and Athabasca, and, a little later, out of the rest of the undivided remainder of this vast region were formed the Provisional Districts of Yukon, Mackenzie, Keewatin, Franklin, and Ungava.

On our arrival at Regina we were met by Mr. G. H. V. Bulyea, M.E.C., Commissioner of Agriculture for the North-West Territories. Regina is the distributing point for the country far north and south. Beyond the station the Territorial Governmental offices, Exhibition buildings, and the Lieutenant-Governor's residence may be seen on the right, and a little further, on the same side, are the Headquarters of the North-West Mounted Police. The Mounted Police consist of some 840 men, who are stationed at different posts all over the North-west. Their functions are many and

varied, for they are the Guardians of the lonely fur-trader and the solitary settler on the far-off frontier; the Magistrates who mete out stern justice in the grave crisis of the mining camp, as well as the Peacemakers in the wigwams of the turbulent tribes of Redskins. This town has a population of about 2,645 inhabitants, and is rapidly rising in importance, being the centre of a vast wheat-growing region.

Two traps were placed at our disposal by the North-West Mounted Police, and we started to have a look around the country accompanied by the Commissioner of Agriculture and several of the leading citizens. Our chief object was to see the threshing of wheat, which is done on a large scale. Finding few fences, we were able to drive straight across the prairie to the place where the threshing machine was at work. Here the hum of machinery, the dust-begrimed, shouting men, the sweating horses, the grain-laden wagons, the uncouth, unwieldy straw pile rising higher and higher, made a fascinating scene, full of life and energy.

In the north-west of Canada wheat growing is carried on on a gigantic scale. On these great wheat farms, more especially where the country is very level, agricultural machines can be used with great success. Indeed, the chief characteristic of these farms is the machinery that is used. The smallest agricultural implement is the plough, and the largest accessory the grain elevator. Such great wheat farms are usually established upon virgin lands, which are sold directly to capitalists by the railroad companies. In the first instance these lands become the property of the railroads through Government grants, and these companies sell them in turn to men of wealth, who buy vast tracts at low prices.

The first real labour is the burning of the old straw which has accumulated from the previous year. Next comes the ploughing. This is usually begun in October, and continues for a month or six weeks, according to the season. Two-furrow ploughs are commonly used, drawn by five horses. It is estimated that each plough covers an average of about 250 acres a season, and travels some 20 miles per day. From eight to ten ploughs follow each other over these immense fields. The ploughs are driven in "gangs," in charge of a foreman. Experience has shown that it costs about 70 cents (3s.) to plough an acre, and on a farm of 10,000 acres from sixty to eighty men would be employed. They receive about $25 (£5) per month, including board.

In the beginning of March the snow begins to melt, and the ploughed land is ready for the harrow. The harrowing is done by 25-foot harrows, drawn by four horses, and operated by one man, who can harrow from sixty to seventy acres per day.

The seeder, with four-horse press drills, covering 12 feet follows immediately. And the harrow and drills are worked in gangs just as the ploughs. Each drill will cover from twenty to twenty-five miles per day.

The harvest begins about the end of July, and with the invasion of labourers from the East come also car loads of new machinery. It is estimated that agricultural machinery valued

at several million dollars is annually sold in the north-west alone. The large wheat farmers say that it does not pay to repair old machinery, and, indeed we saw piles of old machines lying about the various farms. A great many extra parts are kept, and experts are engaged who do nothing else but go around the farms repairing broken-down machines.

Harvesters vary in size. The larger machines thresh at the rate of 2,000 bushels per day. The wheat is not usually stacked, but is left in shocks on the field. The grain cures very rapidly in this dry climate. The shocks of wheat are hauled directly to the thresher. It generally takes one and a half days to thresh the wheat which it took a day to cut. Time is very important, since a single rainfall might ruin the whole crop.

The wheat straw is worse than a waste product; in fact, it is considered a nuisance. A little is used for fuel for the engines and for bedding the stock; the bulk is left in great heaps until it can be burned. It is believed that in the near future a profitable industry will arise in the making of paper from this present wasted product.

The elevators for storing the grain are generally placed beside the railway. They have a storage capacity of from 100,000 to 3,000,000 bushels. The wheat is shovelled into the pathway of large steam shovels, which draw the grain up to the ends of the spouts, where the buckets seize it and carry it into the elevator and distribute it among the various bins according to grade. A cargo of 200,000 bushels can be unloaded in two hours, while spouts on the other side of the elevator are able to reload into cars —five to ten at a time—filling a car in a few minutes. The extra work of unloading and reloading is said to add only one cent to the price of a bushel of wheat.

The transportation of wheat from the fields of the North-West to England and the European markets is a trade of tremendous magnitude. Most of it goes by way of the great lakes through the Sault Ste. Marie Canal. Some of these grain vessels, called "whale-backs" can hold 250,000 bushels.

The majority of the farms are about 160 acres in extent, and are given free by Government to settlers on certain conditions. We saw very few oxen around here, everything being done with horses. We met several teams taking wheat to market, the price of which was about two shillings per bushel, or about seven shillings per bag. As snow falls from December until March, the farmers of the North-West get only one crop per year, and so have a very short season. Yet they seemed very prosperous and well satisfied. On the return journey we visited the Police Barracks, and were entertained by the Assistant Commissioner, Colonel MacIlree. Then we called on His Honour the Lieutenant-Governor of the North-West Territories, the Hon. A. E. Forget. The day was bitterly cold, snow falling most of the time, and we shivered and sighed for the sunshine of the veldt.

From Regina to Calgary we were still journeying in the wheat belt. The prairie here is very flat, and from the railway carriage

one can see a great distance over the surrounding plains. It must be a grand sight to see the wheat crops here about harvest time. We were told that there are miles and miles of reaping machines. After travelling for about six hours from Regina we entered the rolling prairie, a region which is devoted to ranching. It consists chiefly of large runs for cattle, horses, and sheep. From time to time we saw large herds of horses. In the train we met a Mr. Grant, who is the owner of a ranch near Medicine Hat. This gentleman has 7,000 head of cattle, all Shorthorns, running on his place; 1,400 horses, mostly Hackney and French Coach sires; and 17,000 sheep, Southdowns. The size of this ranch is twenty miles long by ten miles wide. He breeds cattle for beef, besides buying store cattle in Ontario for fattening. He considers no other breed can come up to the Shorthorns for laying on weight. Cattle run summer and winter in the open, and are never housed, but occasionally in severe winter are given hay. Mr. Grant was very anxious that we should come and stay at his place, but, unfortunately, our time would not allow us to make the excursion. A large staff of cow-boys are permanently employed on this ranch. Near Medicine Hat we passed several coal mines and natural gas wells.

November 7th.—Reached Calgary at 7 o'clock, where we met Mr. Charles W. Peterson, Deputy Commissioner for Agriculture for the North-West Territories.

Calgary is an important station of the Mounted Police, and a post of the Hudson's Bay Company. It is charmingly situated with the snow-capped peaks of the Rockies in the distance. It is the centre of the trade of the northern part of the great ranching country, and the chief source of supply for the mining districts in the mountains beyond.

Colonel Sanders, of the North-West Police, kindly placed sleighs at our disposal. We availed ourselves of this offer, and in the afternoon visited a large abbatoir and a creamery. This abbatoir is owned by Mr. Burns, who kindly took us over his premises. Here we saw hundreds of frozen carcases—of cattle, sheep, and pigs. Over a hundred head of cattle are killed each day, besides many pigs and sheep. Most of the meat is shipped to British Columbia. That day a herd of 500 steers had just arrived —a fine looking lot, most of them showing good breeding. They were two-year-olds, and would be left on the ranch for another year before killing. They cost £7 per head, and averaged 900 lbs. live weight.

The creamery is operated by the Dominion Government as an object lesson to farmers. A fair amount of butter is turned out and packed in neat boxes containing 14, 28, and 56 lbs. In the cold storage rooms they had a consignment ready for shipment which was valued at £1,500. We were escorted to Colonel Sanders' residence, and spent a few hours very pleasantly, the ladies accompanying us. In the evening we visited the local club, and met several of the leading men of the district.

CHAPTER XIV.

ACROSS THE ROCKY MOUNTAINS.

Luxurious Railroad Travelling—Calgary and the Rocky Mountains—Extensive Ranches—Coal Mines and Saw-mills—The Gateway of the Rockies—Banff—Buffaloes—The Great "Divide"—From Alberta to British Columbia—Lakes Wapta and Oesa—Takakkaw Falls—The Selkirk Mountains—The Great Glacier—Columbia River—Rich Mines—Thompson River—Chinese Labour—Nicomen—River Gold Discovered in 1857—The Frazer River—Indian Wigwams—Agassiz—Vancouver—Stanley Park—Gigantic Cedar and Pine Trees—The Hastings Saw-mills—New Westminster—Salmon Canning Industry—On Board the "Miowera"—Vancouver Island—Victoria, the Capital—Samples of Gold—30,000 Miners—A Panorama of Peaks—Impressions of Canada—Farewell to a Great Warm-hearted People.

NOVEMBER 8th.—There had been a heavy fall of snow and it was lying deep on the ground. We travelled in a luxurious Pullman car—a model of comfort and convenience. Mr. Charles W. Peterson, Deputy-Commissioner of Agriculture, and his wife accompanied us. Naturally, we imagined that it would be cold travelling at this season of the year, but to our surprise, the carriages were pleasantly warm and comfortable, being heated with steam pipes which run the whole length of the train, the temperature being kept at about 70° Fahr. Mr. Peterson gave us much valuable information on agricultural matters. He has a farm outside Calgary, and deals principally in thoroughbred shorthorns, selling the bulls for breeding purposes. He allows his bulls to run with the cows from July to November, so that his calves come on in the warm months, namely, from April to July. With us the seasons are reversed. As he does not go in for dairying, he allows the calves to run with their mothers for some months. Mr. Peterson has a high reputation as a cattle breeder, and can always command a good price for his bulls.

Shortly after leaving Calgary, we came in touch with the grassy foot hills of the Rockies. We passed extensive ranches in rapid succession, great herds of horses in the lower valleys, thousands of cattle on the terraces, countless sheep on the hill-tops, all making a wonderful and a gladsome picture. Here and there we saw coal mines and saw mills.

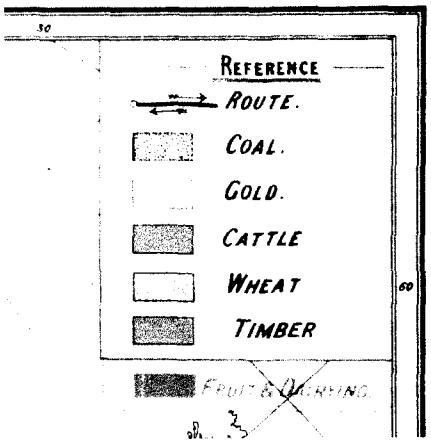
For a little time, dimly outlined in the mists, the distant peaks remained in view, but presently the mountains closed around us, and just beyond the Kananarkis Station, a curve in the line

brought the train between two almost vertical walls of dizzy height. This is the gap—the gateway of the Rockies. Down through this gorge the Bow River, fed from the far off glaciers, races tumultuously. Our friends pointed out the difference between an ordinary upland stream and a glacier fed river. Tumbling from great heights, the former may be dashed into a creamy foam, but the latter is always of a milky-green colour. This is due to the sediment of the glacial silt-fine particles, which are formed by the grinding of the ice over the rocks.

Then we halted at Banff, at an altitude of 4,500 feet. Here the air was cool and keen and sweet with the scent of the pine. Banff is a renowned pleasure and health resort, and contains a magnificent hotel, fitted up with every modern luxury, including baths supplied from the hot sulphur springs, also a sanatorium and a hospital. Just before reaching the station the train runs close to a large corral of five hundred acres, where a number of buffaloes still linger—the last of the noble monarchs of the plains. Here also, the Dominion Government have established a grand national reservation or park, of over five thousand square miles. At Banff and at other prominent places, Swiss guides are stationed during the summer months, in order to accompany parties to the different points of interest. Seventy miles to the south of Banff is Mount Assiniboia, nearly 12,000 feet high.

After toiling up the Bow Valley for some forty miles, our train crossed the "Great Divide," that imaginary line that runs across the Continent and divides the watershed; and at a station called Stephen we reached the summit of the Rockies, from whence mighty rivers start to flow, on the one side Eastward to the Atlantic, and on the other, Westward to the Pacific. And now we had passed from Alberta into the Province of British Columbia. From here the line descends rapidly, passing the beautiful Wapta Lake at Hector, and crossing the deep gorge of the Kicking Horse River, just beyond where the Wapta River rushes down in a roaring torrent. Not far from this point is the marvellous Lake Oesa or the Lake of Ice, situated at such an altitude, that it only melts for about five weeks in the year.

Further on, a day's ride from Field, are the marvellous Takakkaw Falls, but recently discovered, and amongst the finest in the whole world. Here a huge volume of water falls sheer down, over a thousand feet, from a glacier-bound tarn. The canyon rapidly deepens until, beyond Palliser, the mountain sides become vertical and closing in come within a stone's throw of each other. Down this vast chasm, the river and the railroad race together, twining and twisting, and the deafening roar of the raging water and the sound of the rushing train are echoed and re-echoed from the towering mountain walls. But it was amongst the Selkirk Mountains that we saw the grandest and most memorable scene. Here from the car windows, we could look sheer down for a thousand feet on the furious plunging river carving out the gloomy canyon, whilst above us, calm and serene, towered the everlasting range,


50
REFERENCE
ROUTE.
COAL.
GOLD.
CATTLE
WHEAT
TIMBER
60

covered with primeval forests and wreathed in the shifting mists, the fitful clouds, and the sublime eternal snows. And all the time the train clung perilously to the cliffs or swept round the rocky galleries. Sometimes we passed through the long snow sheds, built to secure the track against the overwhelming avalanches or slowed over the trestle bridges swung across the yawning chasms—a splendid tribute to the daring skill of Canadian engineers. Then a sharp turn brought us in front of the Great Glacier—a vast plateau of gleaming ice—a part of the great ice field, which covers an area of forty square miles. And again, from out of the gloomy gorges, we swept into the broad valley where the stately Columbia River flows amongst forests of spruce and fir, and hemlock and cedar, and balsam.

Ravelstoke, on the Columbia River, is the northern gateway to the marvellously rich mining camps of West Kootenay. To the south, on a branch line, is the city of Rossland, a mining camp of phenomenal growth, about which cluster a number of rich mines. After all the desolation of untrodden solitudes, rugged rocks and rude cabins, we were gladdened by the sight of trim cottages, pastures, fenced fields and herds of cattle, and sheep and horses.

Around Kamloops the principal industry is grazing, and the hills are covered with the most nutritious "bunch-grass." The vineyards and orchards show that fruit growing is also prosperous. Steamboats ply up and down the Thompson River, and we saw numerous saw mills; Chinese labour being largely used. In this district there is an abundance of small and big game—ducks, geese, caribou, bear, deer, bighorn and mountain goats

Near Drynoch is Nicomen, a small mining town, where river gold was first discovered in British Columbia in 1857. At Lytton, a small trading town, the canyon suddenly widens to admit the Frazer, the chief river of the Province, which comes down from the north and joins the Thompson. The railway now enters the canyons of the United Rivers, and the scenery becomes wild beyond description. It was by the banks of the great Frazer River that we again saw signs of life and industry. Here were the wigwams of the Indians who spear salmon or scoop them out with nets, while groups of Chinamen were at work on the sandy bars, washing out gold in the primitive method and earning a dollar (four shillings) or so, per day. We were told that there are about 15,000 Chinamen in the Province of British Columbia. Occasionally we passed the powerful dredges of the colonist, which are able to handle large quantities of the auriferous river gravels at a low cost.

British Columbia is the most westerly Province of Canada, and extends for about 700 miles north and south, and nearly 500 east and west. This vast Province has many and varied resources. Besides its enormous mineral wealth, it possesses immense forests of great commercial value. It is believed to possess the greatest compact reserve of timber in the world; while its rivers and lakes abound in fish, and the salmon canning

industry started in 1876 brings to the people of the Province some millions of dollars every season. Fruit is also a valuable and rapidly growing industry.

At Agassiz there is a Government Experimental Farm, where many varieties of fruit and grain are grown. Unfortunately, our time being limited, we were unable to visit it. Mr. R. M. Palmer, the Freight Rate Commissioner for British Columbia, who travelled with us from Agassiz, was most courteous and attentive, and gave us much valuable information regarding the Province.

As we approached the coast, the vegetation became more and more luxuriant. Forests of fir and spruce still clothed the surrounding hills, while in the valley, ferns and shrubs and creepers intertwined in marvellous profusion. Occasionally, the mountains gave way to a pleasant glade, where we saw the tiny croft, sleek cattle, and the well tilled orchard. Not long after, we eagerly inhaled the exhilarating smell of the sea, and before us stretched the splendid land-locked harbour, while out on the ocean countless crafts, great liners, and majestic battleships lay gracefully at anchor. So in due course, we reached Vancouver, the western terminus of the Canadian-Pacific Railway—2,906 miles from Montreal.

Vancouver, on the peninsula, is a city of about 30,000 people. Fifteen years ago it was burned to the ground by a devastating fire. It is destined to become a great maritime city, as it is the natural port of the Canadian-Pacific; besides, it is the chief city of the Province.

November 12th.—To-day we visited Stanley Park, the fairest pleasure ground in the whole Dominion. It is situated at the head of the peninsula, upon which Vancouver stands. Here the virgin forest is seen in all its natural grandeur, untouched by the hand of man. On either side of the road that we followed was a dense, tall, impenetrable undergrowth, just like a tropical jungle. And enclosing the road were great trees—cedars and pines—hundreds of feet in height and of gigantic growth. One ancient cedar measured seventy feet in circumference at the base of the trunk, while another had been burned out at the bottom, leaving a great hole large enough to accommodate twenty-five people. It would be easy to get lost within this forest, and it gave us some idea of the extraordinary difficulties that must have been overcome by the pioneers and explorers of British Columbia.

Next we visited the Hastings saw mills. Here we saw the whole process of handling the timber from the hauling of great cedar logs out of the water, to the shipping of the dressed timber in the form of planks on the large vessels that lay alongside the wharf.

November 13th.—We went by an electric tram at an amazing pace to New Westminster, on the Frazer River, which is about nine miles distant, and on arrival were met by several of the leading citizens. The town is the centre of the salmon canning industry, which is represented by a dozen or more extensive

establishments. We were taken to a salmon packing establishment. Unfortunately, the season was over, but we saw some salmon weighing about 40 lbs., being frozen for export to the States. We were told that the output of tinned salmon from the Frazer River last year amounted to about a million cases. The town also possesses large saw-mills, the timber being shipped to China, South America, Africa, Europe and Australia.

Mr. Trap, a prominent merchant, kindly took us in hand. We went through the market, which is worked, more or less, on the same principle as in South Africa. A great trade is done here with apples, which are nicely packed with the name of the grower and the particular variety neatly labelled on the box. We then went to a butter factory that turns out 1,500 lbs. of butter daily. The butter is packed in two-pound tins. Farmers are paid according to the amount of butter fat contained in the milk, as ascertained by the Babcock test. It was interesting to learn that they export large quantities to South Africa. This town was almost totally destroyed by fire about four years ago. We inspected the fire station and brigade, which seemed well managed and ready for any future emergency

November 14th.—To-night we sail for Australia in a ship called the "Miowera," or, as some term her, the "Weary Mary." Before going on a month's journey, a few things were required, so to-day was spent in making the necessary purchases. In the evening we went on board ship. Here we had to part with Mr. Peterson and his wife, who had so kindly accompanied us from Calgary. Mr. W. W. Moore of the Dominion Agricultural Department and Mr. R. M. Palmer went with us as far as Victoria.

Victoria is the capital of British Columbia, and the seat of the Provincial Government, and the chief city of Vancouver Island. It has a population of about 25,000. It was gold that brought the city into being. In the year 1858 some Indians brought to Victoria a few samples of gold from the Frazer River and immediately some thirty thousand of miners invaded the country. To-day, Victoria is a wealthy well-built town with large shipping and manufacturing interests. Three lines of trans-Pacific steamers call at this port. The suburbs are beautiful; lovely gardens, spacious grounds, pleasant lawns, and charming houses, all help to form ideal homes in this land of sunshine and genial weather. And the sportsman will be glad to hear that Vancouver Island is still the haunt of the wild bear.

The seal fur, salmon canning, fish and lumber trades have been greatly developed during recent years and the harbours of Victoria and Esquimalt are thronged with shipping, to an extent unknown a few years ago—an earnest of the business that will be done there in the near future. The city has direct steam communication with San Francisco. A submarine cable across the Gulf of Georgia connects it with the mainland, and thence with the other Canadian cities. The telephone system and electric light have also been introduced, as is the case in most of the cities

of Canada. Having an hour to spare, we paid a hasty visit to the imposing Government Buildings and Museum, which cost £800,000, and were well worth seeing.

Near Victoria is Esquimalt, a small town, and the Headquarters of the North Pacific Station of the British Navy. Here there is a splendid harbour, arsenal, dockyards and hospital.

At three o'clock we continued our journey to Australia. Our last sight of the Rockies was one of unrivalled grandeur. For before us lay one vast panorama of snow-capped peaks which stood out like lonely sentinels at guard over the sunlit shores of Victoria and Vancouver.

Before our departure it may be well to put on record a brief summary of our impressions regarding the country and the people. In the first place, we could not fail to be struck by the magnificent lakes and the immense rivers. Indeed, we would gladly exchange some of our sunshine for the vast stretches of water that we constantly passed, and we often wished that we could carry back a few Canadian lakes, in order to irrigate the veldt.

Again, we marvelled at the forest wealth of Canada. Wooden bridges, wooden houses, wooden barns, and wooden fences are universal, and emphasised in a convincing manner, the inexhaustible timber reserves of the country. Amongst the many admirable agricultural conveniences, we were, perhaps, most of all impressed by the great value and general adoption of the silo, for the preservation of fodder—chiefly maize (mealies)—and we strongly recommend the construction of silos all over the two Colonies, in order to store maize, lucerne and grass, etc., for use in seasons of drought. The live stock of Canada are worthy representatives of a stock-loving people, and we look forward to the day when South African buyers will attend the annual horse and cattle sales held in Toronto and Hamilton.

The great and widespread development of the dairy industry and the astonishing growth of creameries and butter factories were constant sources of delight and surprise. The fruit industry is making rapid strides, and we had much to learn concerning careful handling and systematic packing. Yet, we are glad to reflect that, with a little care, our own fruit cannot be surpassed and might easily lead in the markets of the world.

To us the Canadian farmer seemed to have small reason for complaint in the matter of transportation facilities. A magnificent trans-continental railroad, electrically controlled canals, navigable rivers and broad lakes are all valuable auxiliaries in conveying produce to the great market centres.

At every turn it was plain that a great trade is possible between the Dominion and South Africa.

At present we need Canadian timber, Canadian flour, and Canadian cheese and butter, agricultural implements and machinery besides many classes of manufactured wares, and we may be certain that what she sends will be of the finest quality.

But although we were impressed by the vastness and the wealth of the country, it was the people themselves that appealed to us most of all. They are sober, industrious, law-abiding, happy, and free, and proud to be subjects of the British Empire. From the time we landed at Montreal, till the day of our departure, at Victoria, we met with an overwhelming kindness and hospitality, and it was with sincere regret that we said farewell to Canada, to a great, warm-hearted people—the citizens of a splendid country.

Our best thanks are due to the Hon. Sydney A. Fisher, Minister of Agriculture, and all the heads of the various agricultural colleges and experimental farms, and to Mr. Moore, who accompanied us throughout our whole tour.

CHAPTER XV.

The Commonwealth of Australia.

A Touch of the Sea—The Hawaiian or Sandwich Islands—Cocoanut and Sugar Industries—The Fiji Islands—Brisbane—The Capital of Queensland—Sydney—An Australian Welcome—The Hawkesbury Agricultural College—South African Students.

LEAVING Victoria, British Columbia, in the afternoon, we were soon out on the Pacific Ocean, and, at midnight, ran into a gale that lasted almost two days, during which the most of us suffered from sea-sickness.

November 24th.—We called at Honolulu, the capital of the Hawaiian or Sandwich Islands, which were discovered by the Spaniards under Gaetano in 1549, and explored by Captain Cook in 1778. The islands were formally annexed to the United States in 1898. Most of the immigrants are Japanese. The capital, Honolulu (39,305 inhabitants), is in the Island of Oahu. The islands are mainly mountainous and volcanic, but the soil is highly fertile and productive. Sugar and rice are the staple industries, while coffee, hides, bananas, and wool are also exported. At the time of our visit there were fifty-five sugar plantations, employing 39,587 labourers, of whom 27,531 were Japanese, 4,976 Chinese, 2,417 Portuguese, 1,460 Hawaiians, and 2,095 Porto Ricans. We stayed here for a day, and went ashore and inspected the *cocoanut and sugar plantations. The original inhabitants—the* Hawaiians—are a fine looking race. We were told that most of the natives are fairly well off, and, like all aboriginals, are not fond of work. Tropical fruits grow luxuriantly.

November 25th.—We left at noon, and up till the 5th of December had beautiful weather. We passed several groups of islands, and touched at Suva, the principal island of the Fiji group. Fiji comprises a group of islands exceeding two hundred in number, some eighty of which are inhabited. The largest is Viti Levu, with an area of about 4,250 square miles (about the same size as Jamaica). The next largest is Vanua Levu, with an area of about 2,600 square miles. The Island of Rotumah was added to the Colony of Fiji in 1880. Including Rotumah, the total area of the group is 8,045 square miles. At the last census the population of the Colony numbered 117,870:—2,447 Europeans, 17,105 Indians, 94,397 Fijians, Polynesians, Rotumans (in Fiji), half-castes, etc., 3,921. There are five sugar mills in the Colony, with an aggregate nominal daily output of 204 tons of dried sugar; one tea factory, with an aggregate nominal of daily output of 400 pounds of dried tea; twelve boat-building yards, one soap works, five sawmills, one tobacco factory. In 1901 there was under

cultivation by European and Indian settlers:—Bananas, 3,115 acres; cocoanuts, 25,244 acres; maize, 1,158 acres; sugar-cane, 26,393 acres; yams, 244 acres; tobacco, 321 acres; peanuts, 208 acres; tea, 236 acres; rice, 1,992 acres; pineapples, 122 acres. At the close of 1901 there were in the Colony 2,455 horses, 24,320 cattle, 1,210 sheep, and 14,860 goats. Fiji was ceded to Queen Victoria by the chiefs and people of Fiji, and taken over by Sir Hercules Robinson on October 10th, 1874. The Government is administered by a Governor appointed by the Crown, assisted by an Executive Council consisting of the Attorney-General, the Receiver-General, and the Native Commissioner. Laws are passed by a Legislative Council, of which the Governor is president. It comprises six official members and six unofficial members nominated by the Crown. The official members are the Chief Justice, the Attorney-General, the Receiver-General, the Commissioner of Lands, and the Medical Officer. The Governor of Fiji and High Commissioner for the Western Pacific is Sir Henry Moore Jackson, K.C.M.G. It is not so long ago since the inhabitants were cannibals, and, in fact, even at the present day we were informed that some of them would not mind a bit of human flesh. We went ashore and saw the cocoanut industry, in which a large export trade is done. The kernels are broken up into small pieces, dried in the sun, and exported under the name of *copra*. This copra is employed in the manufacture of oil, which is used for making soap and candles. A certain company in Sydney has recently started a large crushing plant for the production of raw oil and oil cake.

We left Fiji and arrived off Brisbane (120,000 inhabitants), the capital of Queensland. It is built on both banks of the river of the same name, and is the centre of an industrious and thriving agricultural community, besides having a large and increasing foreign trade. The river is only kept open for ocean steamers by constant dredging, yet it has been so much improved by artificial means that steamers of from 5,000 to 6,000 tons can ascend a distance of twenty miles. Here we remained a day, and then sailed for Sydney, the capital of New South Wales, where we arrived on the 13th December.

On Sunday morning the health doctor came on board, examined the passengers, and gave the ship a clean bill of health. Then we steamed up the harbour to the wharf. Sydney has a population of 488,000, and is the oldest town in Australia. It possesses one of the finest natural harbours in the whole world, while its bays and inlets, its rugged promontories, its lovely gardens, and magnificent residences charmed and delighted us at every turn. Sydney is the chief emporium of the Colony, and now ranks as a great world port. To give an idea of the extent of this magnificent harbour it may be stated that it has a shore line extending over 3,000 miles; and, further, the largest ocean liners can berth at any quay. As a recent writer has said:—"Wool from the great plains about and beyond the Darling, copper from Cobar and the neighbouring mines, gold from the various fields

scattered throughout the Colony, silver from the Barrier ranges, coal from the Blue Mountains, tallow and hides from the pastoral districts—all these find their destination in the great port of Sydney." From the wharf we went immediately to the Hotel Metropole, where we were delighted to find letters from the Transvaal, as we had received no news for a whole month.

December 16th.—We had an interview with the Hon. Sir John See, K.C.M.G., Premier of New South Wales, who promised to do all in his power to make our trip both pleasant and successful. He told us that we would find the Australians ever ready to meet us with the hand of friendship, and to help us in every way. He then gave us free passes over all the railways in New South Wales.

December 17th.—We had an interview with the Governor of New South Wales, Sir Harry Rawson, R.N., K.C.B., who received us cordially and welcomed us to Australian shores. He has been several times to the Transvaal, and assured us that he would always take a warm interest in the welfare of South Africa. We conversed for about an hour on Agriculture, the Governor remarking that it was the backbone of any country and the foundation of all commerce, industry, and true prosperity.

December 18th.—Our real business began. This morning we started for Hawkesbury College, and were met at the railway station by the Hon. John Kidd, Secretary for Agriculture; Mr. O'Keefe, his secretary; Mr. W. S. Campbell, Director of Agriculture; and several others. A special carriage was reserved for us, and after a pleasant two hours' journey we reached our destination, and were met by Mr. Potts, Manager of the Farm, who had a wagonette waiting, in which we drove to the College. There are over a hundred students at this institution studying agriculture in all its branches, amongst whom are five lads from South Africa. It is a Government College, and has 3,700 acres in connection with it. The soil seemed not to be of the richest sort, which, in our opinion, is probably the fairest test for experimental work. We were taken first to the lecture room, which is suitably equipped with desks, black-boards, etc., and has ample accommodation. Here lectures are given by the several professors on agriculture and allied subjects, and, wherever possible, accompanied by ocular demonstration, so that the student cannot fail to take a practical interest in his work. Take a typical case. A cow or a horse is brought into the class-room and all its points are freely discussed. In this way a student is able to judge more accurately in the field. The same method is adopted with machinery. A plough or cultivator is brought into the lecture-room, taken to bits, and the students are taught how to put it rapidly together again. Samples of grain and other products are also discussed in lectures, which are illustrated by limelight lantern slides. Further, a professor of veterinary science gives lectures on the various subjects of his profession. Fully equipped laboratory rooms are at the disposal of the students. The order of the day is fifty students at work in the fields and fifty receiving lectures on alternate days. At the commencement of each week

they are told their special work, and do eight hours work every day. A diary is kept of all work done on the farm.

This college is an excellent institution, everything being conducted on the most modern lines. We visited the stables, where 86 horses are kept for working purposes. These were all heavy animals, and were fed on crushed maize (kernels and cobs), oats and chaff. The grain and the cobs of maize crushed together form an excellent ration. In the machine and implement shed everything is of the very latest design. With the exception of maize and roots the crops had been reaped. The maize was looking strong and healthy, and is sown in drills. In an adjoining paddock we saw six ploughs at work, with a student in charge of each, the land being ploughed straight and the furrows well turned up.

The piggery was next visited, the different sorts kept being large, medium, and small Yorkshires; also Berkshires and Tamworths. For one Berkshire boar £100 had been refused. Boars bred on farm are sold at £5 and upwards. Students, if going to farm on their own account, are allowed to purchase pigs at a reduced rate. Berkshires are considered the best for a warm climate; Yorkshires are liable to get sun-scald. It was a pleasure to go round the pig pens, everything being so nice and clean. Next we walked to a paddock of virgin soil, where a five-furrow disc plough was at work. It was drawn by six horses, ploughing deep, and turning the soil well over.

Ayrshires, grade Shorthorns, a few Jerseys, and some of the celebrated Illawarra breed are kept here for dairying, and we were fortunate in being present at the milking, which is mostly done by machinery, two cows being milked at the same time. Although their legs were tied they seemed to take kindly to the mechanical milker. Students are taught butter and cheese making. We were next shown over the museum, and inspected all kinds of grain grown on the farm and specimens of wheat showing rust, etc.

The orchard was next visited, where orange, peach, apricot, plum, pear, and apple trees are planted about 20 feet apart on the square system, and laid out in straight lines. Orchard trees are trained in the form of a balloon, and are kept well cultivated. Orange trees are kept free from branches for about three feet from their roots, so as to allow the scarifiers to work close up to the tree trunks. The grape vines, such as the Muscatel and Black Hamburg, are planted out 8 by 8 feet, while some of the wine varieties are placed 5 by 5 feet. We were taken to a building in the centre of the orchard where they dry and can the different sorts of fruit. Some are dried for table; others for cooking purposes. Many of the boxes were beautifully got up. The trays on which the fruits are dried are made of wood, about 3½ feet long and 2 feet wide. They are keeping a few ostriches and Angora goats here to see whether they can be made to pay. Unfortunately, our time was limited, and we were unable to see them or the poultry.

CHAPTER XVI.

NEW SOUTH WALES.

The Coolangatta Estate—Emus—The Illawarra Breed—150 Acres of Land—Fifty Cows—Government Stud Farm—Some Fine Cows—A Butter Factory.

DECEMBER 22nd.—We started for Berry, on the South Coast, where we were met with vehicles for our conveyance to the Estate, and after an hour's drive—passing through splendid country for pasturage—we arrived at the homestead of Dr. Hay, of Coolangatta. Here we saw the famous herd of Ayrshires. The Coolangatta Estate is a very extensive property, and, as the grazing is excellent, dairying is carried on extensively. The house is a handsome building, with a large verandah at the back and front. The ground is laid out with ornamental trees, and close by is a small camp of emus—Australia's celebrated bird. The soil here is very rich, and, owing to its proximity to the sea coast, the rainfall is abundant.

It may be mentioned that Dr. Hay has been breeding Ayrshires for the last twenty years. At present his herd comprises 1,200 head of mixed cattle, of which 80 Ayrshires are in milk. Here also we saw the Illawarras. This is a distinct type, consisting of a cross between the Ayrshire and the Shorthorn, and now called after the Illawarra district. Speaking of the Illawarra breed, Mr. Alex. Hay remarked:—"That, while these cattle require good country, Ayrshires, on the other hand, will thrive on almost any kind of soil. On rich pasturage the Illawarra is generally adopted by small farmers, but on poorer country Ayrshires give the best results." The Illawarra cow, "Favourite," gave 7 gallons per day for several months. Her annual production was over 1,200 gallons. Another Illawarra cow, "Blossom," bred in Victoria, produced 2 lbs. 3 ozs. of butter per day.

With reference to the dairying industry, Mr. Hay informed us that a farmer with 150 acres of land like that of Coolangatta should milk 40 to 50 cows all the year round. From these cows, if carefully selected, he should have a return of £400, and an additional return of 25 per cent. on pigs, calves, etc. The bull calves are killed, except those from pedigree stock, as it has not been found profitable to fatten stock on a dairy farm.

On this Estate there are about 150 farmers with from 100 to 300 acres each. Some years ago they adopted as a minimum 200 pounds of butter per cow or 500 gallons of milk for the season. Their average for each cow after the third season came out at 650 gallons of milk or 260 pounds of butter. Pedigree Ayrshire heifers, not in calf, 1 to 2½ years old, sell for about 20 guineas, and young selected bulls for much the same price.

Although well adapted to rich pasture lands, Ayrshires are eminently the cows for the dairy farmer whose lands are not particularly fertile. The average weight of full grown cows is about 1,000 pounds, but the tendency is to breed them to a somewhat greater weight. In all-round milk production they are unsurpassed. Ayrshires, when crossed with ordinary cattle of good size, produce a fine dairy animal, but, though usually quiet and docile, they are apt to be shy and nervous, and their teats are often too small for easy milking.

To Dr. and Mr. Alexander Hay our best thanks are due for a most enjoyable and instructive day. On our arrival at the hotel we were entertained by the Agricultural Society of the district, and we have no doubt that the presence of the Hon. John Kidd, Secretary for Agriculture, and Mr. W. S. Campbell, Director of Agriculture, added to the importance of the occasion.

About fifty sat down to dinner, and Mr. Morton, a large stock owner, occupied the chair. After dinner, in the course of a speech, the Hon. John Kidd answered many questions relating to agriculture in a business-like and straightforward manner. Here, as in our own country, farmers evidently are not backward in airing their grievances. After sitting for about five hours it suddenly dawned upon us that our wives were missing, but we found that they had been well looked after by the daughter of the Minister of Agriculture.

December 23rd.—Started this morning to visit the Government Stud Farm, which is a short distance from this town. Mr. O'Callaghan, dairy expert, accompanied us. This farm was started four years ago by importing different breeds of pedigree stock as follows:—Shorthorns, Ayrshires, Jerseys, Guernseys, Holsteins, Kerries, and Dexter-Kerries. The main aim of the farm is to lease out bulls at a small cost to farmers to encourage them in the art of breeding. We were especially interested in the Kerry cattle, which, as is well known, are so named from the County of Kerry in Ireland. They have often been called the "poor man's cow" from the great service they have rendered to the cottager in country districts. They are amongst the smallest of dairy breeds, and the average weight of full grown cows is usually between 600 or 700 lbs. In many instances the height does not exceed 40 inches. The ability of these little creatures to give milk on poor lands is simply surprising, and the milk is rich in butter fat. Kerries are very hardy, and will prove profitable under the most adverse conditions. Their weak points are their small size and the long time they take to mature. The Kerry is a neat little

animal, considerably smaller than the Jersey. It has a small, deer-like head, with thin, up-standing horns. The colour is usually black, though red is not uncommon.

There were three Dexter-Kerries in a paddock by themselves —nine to twelve months old, and much smaller than the ordinary Kerry. For a person keeping a cow for private use these animals are excellent, as they consume but a small amount of food, and are easily worked with. During three months a Dexter-Kerry gave 2 lbs. of butter or about 48 lbs. of milk per day, and for five months 4 gallons or 40 lbs. a day. The Dexter-Kerry is a stouter and more compact animal, shorter in limb and stronger in bone than the true Kerry. Altogether this proved a most interesting herd when the history of each cow was heard. The farm is managed by an overseer and a couple of men, assisted by any college students who may wish some practical experience. A farm conducted on similar lines would be of great value to the Transvaal.

We next visited the Berry Butter Factory, which is run as a co-operative society, and distributes a large amount of money amongst the farmers every month. Later we returned to Sydney.

CHAPTER XVII.

AN INLAND TRIP.

The Effect of Drought—Dry Land Culture—The Currajong—122° F. in the Shade—Mosquitoes—An Arid Region—Not a Blade of Grass—A Garden of Eden—An Artesian Bore—A Suggestion for the Transvaal—A Visit to Orange Butter Factory and Orchard—Cherries and Hail—Bathurst.

JANUARY 2nd.—To-day we set out for Bourke, accompanied by Mr. W. S. Campbell, Director of Agriculture, Mr. Allen, Fruit Expert, and Miss Kidd, daughter of the Secretary for Agriculture, who kindly came with the ladies of the party. Bourke is situated about 500 miles inland. Our friends wished to give us an insight into the interior of New South Wales, and suggested that we might like to see an artesian bore. We travelled all night, and next morning passed through a large expanse of cleared land, This year the crops had been a failure owing to the drought. Some farmers of the Wellington district plough as much as 4,000 acres of land for wheat, and depend altogether upon the rainfall. Take a single case of this dry land culture. At Narromine, Mr. Mack has 10,000 acres under wheat and oats. His return for one season averaged over 30 bushels per acre. In good seasons the whole district will run about 20 bushels to the acre. On leaving Wellington we traversed some uncleared land and virgin forest. Here was one dense mass of trees of all kinds. We were shown a tree called the "Currajong," the branches of which are used for feeding sheep in times of drought. The drought had been very intense, and not a blade of grass was to be seen. We were told that in good seasons this country is like a flower garden, the pasturage being most luxuriant. It was evening when we reached Bourke, and were received by Mr. Chapman and Alderman Nash, who apologised for the absence of the Mayor and other members. The heat was intense during the day, and it did not get much cooler during the night the thermometer registering 122° Fahr. in the shade. We certainly never experienced anything like it in South Africa. Formerly, the Bourke district was a very large sheep centre, but during the last eight years there has been such a continuous drought that very few sheep are now left. In years gone by Bourke was one of the most prosperous towns in the State, but now, alas, you see many empty houses. During the night the heat and mosquitoes were awful, and sleep was impossible.

Next morning was somewhat cooler, and as our principal object in coming here was to see the artesian bore, we started for a place called Pera Bore, which is one of the State Experimental Farms. We crossed the River Darling, which was at that time very low. In ordinary seasons this river is navigable for a distance of 2,400 miles, small steamers trading up and down. Mile after mile we traversed this country, and not a solitary blade of grass was to be seen. At last on reaching Pera Bore Farm we found a pleasant contrast; coming forth from the dreary solitude of those desolate plains it seemed as if we were suddenly entering Paradise. Here indeed was a veritable Garden of Eden. Orange groves, orchards, vineyards, and vegetable gardens all looked healthy and fruitful. Amongst other things, we tasted some splendid melons as good as could be wished for. We were taken to the artesian bores, three of which are on this farm, which is about 600 acres in extent. The main one is about 1,500 feet deep, and a strong stream of water rises up through a nine-inch pipe. At certain intervals large tanks have been erected on stands about 8 feet high. These are always kept full, and the water flows from them to all parts of the farm by means of shutes and furrows. The ground is very level, and of a porous nature. The flow of water from the bore is continuous. The water has a certain mineral taste, but is not unpleasant to drink. We were very much struck with this bore, and believe that by such means large tracts of land in the Transvaal that are now barren for want of water could be converted into fertile grain-producing districts. It would be well worth the while for our Government to send experts throughout the country to report on the possibility of obtaining a sufficient supply of water from artesian bores for farming and domestic purposes. Indeed, we are sanguine that in many districts artesian veins might readily be discovered within a short distance of the surface. From Bourke to the arid interior, goods are mostly conveyed by means of camels, each bearing a load of about 800 lbs. Camels are invaluable in such a dry country, and hundreds are bred for transport purposes.

January 5th.—At the invitation of the local agricultural society we started this morning for Orange, and arrived in the evening, where we were met by the Mayor, Mr. Smith, and the members of the agricultural society.

January 6th.—This morning two drags were waiting to take us round the country. The president of the agricultural society, his daughters, and several ladies kindly accompanied us. The district round Orange is very fruitful and the climate favourable. The soil is a chocolate colour and of good depth. The fields are nicely enclosed with hedges, and the ground is well worked. We drove about fifteen miles around the country, which is extensively cultivated. The potato crop was looking particularly well. After coming from Bourke the climate seemed cool and pleasant here. We then drove back to the hotel, and in the afternoon started on a tour of inspection of the butter factory. Our party was now largely augmented, and we were escorted by quite a caval-

cade. The factory was started about eighteen months ago, and the plant was different to any that we had hitherto seen. The churns are of the "Streamlet" type, being stationary, with circling fans inside. In connection with this place there is a neat little cold storage building, and we wish the workers every success.

From here we went to Mr. Hawke's orchard, which is about 60 acres in extent, and planted with vines, apples, pears, apricots, peaches, etc., all looking healthy and nicely cultivated. We were told that this gentleman paid £3,000 for this place ten years ago, and is making a large amount of money out of it. This has been done by hard work and good management. We visited several other orchards, one of which was entirely devoted to cherry trees. Unfortunately, just as the cherries were ripening a heavy hail-storm did much damage. However, a fair quantity was still left, and we were not slow in helping ourselves. Thus we spent a most pleasant day, and we would heartily thank the people of Orange for their courtesy in showing us their beautiful country; nor must we fail to record a special vote of thanks to the ladies for their most charming entertainment.

Left this evening by train for Bathurst, where we were joined by the Hon. John Kidd, Secretary for Agriculture, and the Hon. J. Meagher, member of the Federal Parliament, and some other gentlemen.

CHAPTER XVIII.

THE BATHURST EXPERIMENTAL FARM.

Furrow Irrigation—Conservation of Moisture—Tomatoes for Canning—Large Water Grass—An Orchard—Shorthorns and Polled Angus—Drought and Overstocking—For Mount Victoria—Sheep dying from Starvation—Limestone Caves—Lighted by Electricity.

JANUARY 7th.—This morning we started in a drag for the large Government Experimental Farm which is established at Bathurst, and were first taken to a piece of ground of about 16 acres, which is under irrigation for potatoes, cabbage, tomatoes, onions, etc. The water is pumped up from a river near by. Pipes are laid which convey the water over the land. Everything is sown in rows between which a small furrow is opened out for the water to run down—not like our system of allowing it to run over the plants. Where the ground gets dry a cultivator is run through the furrow, levelling the ground again, thus keeping it from getting caked and hard. This method conserves the moisture and acts as a soil "mulch." When it becomes necessary to irrigate again they open a fresh furrow in the same way. The potatoes, onions, and cabbage looked well, and particularly a two-acre plot of tomatoes, for which there is a great demand for canning purposes. From these two acres they realised £135 last year. They are sold by the case, which is about the size of a gin case. This is sold for six shillings. Again, from a three-quarter acre plot of asparagus beds £56 was realised. The plants were set in rows close alongside the furrow. Rhubarb, turnips, and all root plants do well at this farm. Small plots of ground are set aside for experimenting with different grains and grasses, etc. The soil is black loam, which is heavily manured. From here we went to the Experimental Farm proper. It is situated about a quarter of an hour's drive from the town. Mr. Peacock, the manager, took us to the orchard, which is 41 acres in extent, and planted with apricots, peaches, pears, plums, and apples. All are in rows about 25 feet apart, the ground between being well cultivated. The apricots were fine and large, with a beautiful flavour; the plums just ripening. A demonstration of spraying and budding was given by Mr. Allen, Fruit Expert for the State. In pruning apple trees we were told that one should always prune so that the trees tend to bear most fruit towards the centre, thus lessening the loss from storms, etc. This orchard was only seven years old. A fine apple, called

the Cleopatra, was exhibited. Thirty students are in attendance, and study farming in all its branches, but, being holiday time, only a few were present. From the orchard we went to a place where a thrashing machine was at work. This machine puts through 3,000 bushels per day at a small cost. It would be well for our own farmers to co-operate and purchase a similar one for the Transvaal. From here we went to a store house, where all kinds of grain are stored before distribution to the farmers. Hudson's Early Purple wheat was pointed out to us as being good against drought, Algerian oats and Black Winter oats against smut. Next we visited a field where experiments were being carried on with different kinds of grain. This was most interesting, and was intended to show the different effects of manure on the various cereals. Here a farmer can see for himself the advantage of care and cultivation in agriculture. No irrigation is employed. Plots of the different cereals and grasses are planted side by side. This farm consists of 610 acres, besides the part reserved for experimental work. Oats, wheat and barley are sown, and after a period of seven years are compared so as to find out the best and most payable varieties. The house where the students live is under the care of the manager and his wife. A spacious room is provided for the students, and every attention is paid to their welfare and comfort. We were entertained to a most sumptuous lunch, after which we inspected some farms in the neighbourhood. The first place visited was the farm of Mr. Holmes, who is a large breeder of Shorthorns, and is an exhibitor at the Melbourne and Sydney Shows, where he holds annual sales. At the last sale he informed us that his young bulls averaged £46. We were shown fifteen bulls from one to three years of age. These animals looked splendid. He only sells the bulls, and allows the calves to run with the cows. We noticed that in many of his paddocks he had sown lucerne, and allows his cattle to keep it fairly short.

We next visited Mr. Lee's farm. This gentleman is a large breeder of stock, and has a splendid house and grounds. He met us on horseback, and took us to a paddock where we saw eight capital Shorthorn cows, running with an imported three-year-old bull. This farmer breeds for beef, and has also a herd of Polled Angus. His pasture is full of rich and succulent grasses, and he allows his cattle to run in it day and night. We next intended to visit the farm of Mr. Webb, but, unfortunately, the lateness of the hour prevented our so doing.

In the evening we were entertained by the Hon. Mr. Meagher, at whose house we met several leading sheep farmers. They had lost heavily through the recent drought. A good deal of this loss, which is attributed to drought, should be put down to overstocking, *i.e.*, putting more sheep on the land than it is capable of carrying. After a very pleasant and instructive visit to Bathurst and the district we left for Mount Victoria, *en route* to visit the Jenolan Caves. After leaving Bathurst we passed through some very good country, until we came to the coal and iron districts, mining being carried on just beside the railway.

We passed over the Zig-Zag Railway, which is most interesting; reached a height of 3,500 feet, and enjoyed one of the grandest views in all our travels.

Arrived at Mount Victoria, and left soon after for the caves. Here we parted from the Hon. Mr. Kidd, his secretary, and Mr. Allen, the Fruit Expert, with many expressions of mutual regret. Mr. Campbell remained as our guide. We took a coach, and with nine other passengers proceeded to the caves, a distance of 36 miles, passing through what are called the Blue Mountains. Below the road, far down in the valleys, over fifteen hundred feet, there was nothing but one vast continuous forest scene of wild and rugged grandeur. Reached Hampton, which is half way, and, after changing horses, continued our journey, passing through poor and hilly country—as far as pasture is concerned. As we proceeded we passed a mob (the word used in Australia for a large flock of sheep) of sheep—about 5,000—trekking for veldt. They were very thin, and here and there we saw the dead bodies of those that had died from thirst and starvation. The last part of the journey was mostly down hill, with some excitingly sharp turns on the road. As we neared our destination we passed through an arch under the mountains, about three hundred yards in length, and lighted by electricity. Finally, we arrived at the Cave Hotel, which is beautifully situated, having accomplished 36 miles in four hours and five minutes. The Jenolan Caves constitute one of the grandest sites in the world. The caves are situated in a deep valley; they are in groups, of dazzling splendour, and lighted throughout with electric light. In the Bone Cave are numerous remains of Wallabies (Kangaroos) and other animals which have become encrusted with limestone. One lovely spot in the Imperial Cave is called the Crystal City; the stalactites are very beautiful, while immense masses of snow-white limestone hang from the roof in all directions. Indeed, nothing could exceed the beauty of these caves. An accommodation house erected by the Government offers every convenience to tourists. These caves are somewhat similar to those at Krugersdorp, although our Transvaal caves are much smaller.

CHAPTER XIX.

The Wagga-Wagga Experimental Farm.

Wagga-Wagga—A Five Furrow Disc Plough—Cross-bred Sheep—A Piggery of Berkshires—Grasses and Grains—An Orchard—8,000 Fruit Trees—Canning and Drying Fruit—A Station with 35,000 Sheep—Points in Breeding.

JANUARY 11th.—It was evening when we started for Wagga-Wagga, travelling all night and arriving early next morning. Here we were met by Mr. Gormly, Member of the Upper House, and Mr. McKeown, manager of the Experimental Farm. Next we proceeded to the Experimental Farm, which is about half an hour's drive from town. It is 3,000 acres in extent, of which 500 are under cultivation. There are several fine buildings. In one paddock we saw a five-furrow disc plough, drawn by five horses, in charge of one man. This plough will plough six to nine inches deep, and at the same time pulverizes the soil better than an ordinary one. Mr. McKeown considers this the best plough that he has known during his whole experience of farming. In Australia the cost of such a plough is £30, and the discs last for about one year.

We visited several of the paddocks, and were much interested in the experiments of crossing Merino, Lincoln, and Shropshire sheep. We were informed that the cross-bred turns out a large sheep for slaughter purposes, but the wool is somewhat inferior. These lambs at four months old kill at about forty-four pounds. The progeny of a Shropshire and Merino give very fine wool, and are considered more profitable animals than the Merinos for a farmer with a limited amount of ground. In a small fold sown with lucerne there were 14 sheep, namely, Lincoln-Merino and Shropshire-Merino. These were about seven months old, and were being fed on lucerne as an experiment. In an adjoining pen there were 11 pure bred Shropshires.

The manager said that the best cross for producing a heavy sheep, and at the same time good for putting on flesh, is to procure a Lincoln ram and cross it with a Merino. Next take the offspring of this union and cross it with a Shropshire ram. Afterwards we went to the piggery, where only Berkshires are kept. They sell young boars from 40s. to farmers in the district. There was a fine looking herd of Jerseys, and a fair display of poultry, the best layers being the Buff Orpingtons and White Wyandottes. Here also most interesting experiments were being conducted with all

kinds of grasses and grains. We only hope that similar tests will be started in the Transvaal, so that our farmers may derive information of practical nature, which cannot fail to prove of the greatest assistance.

Finally we visited the orchard, which is 84 acres in size, and contains about 8,000 fruit trees. Here is a partial list of the different sorts:—480 varieties of apples, 90 of peaches, 30 of nectarines, 50 of apricots, 95 of cherries, 30 of figs, 20 of Japanese plums, 15 of olives, 61 of persimmons, 8 of mulberries, 2 of quinces, 7 of almonds, 125 of plums, 200 of pears, 5 of walnuts, 26 of chestnuts. In the centre of the orchard a nice display of fruit was laid out on a table for our inspection. They were busy canning and preserving on this farm. For drying fruit an evaporator is used. It is worked by means of hot air, and as much as half a ton of fruit is dried at one time. Large and delicious plums were exhibited such as we have never seen before. We would strongly recommend some of these trees being imported into our own fruit-growing districts. The "Giant Prune," "Skipper," "Syracuse," and "Japanese Prunes" are some of the finest, and most likely to prove suitable for the Transvaal. Having spent a most interesting day, we returned to the hotel.

January 13th.—At the invitation of Mr. Mulholland we made an excursion to "Oura," which is about twenty miles from Wagga. We were accompanied by Mr. W. S. Campbell. About half way on our journey we were joined by Mr. McNichol, a large breeder of horses, cattle, and sheep. This gentleman is an authority on stock, and is a well known judge at the various shows.

At Mr. Mulholland's station we were met by the owner and his family. The buildings on this station consist of a handsome dwelling-house, several outhouses, stables, and a large shearing shed. After dinner, at which twenty-two sat down, we inspected the stud sheep. Mr. Mulholland breeds the Vermont Merino solely. Next we saw a mob of 5,000 Merino sheep being rounded up by dogs. It was wonderful to watch the dogs sorting out the sheep from one pen to another.

Mr. Mulholland's stud rams and ewes are certainly the best we have seen, and we could see at a glance that he takes a keen interest in breeding sheep. His sons are likewise enthusiasts, and were most courteous in explaining their system of working. The size of this run is about 35,000 acres. The wool received from the 30,000 sheep last year was 536 bales. The clip from his sheep averaged 8½ lbs. in weight, and from his lambs 4¾ lbs. The main points observed here in breeding sheep are as follows, namely:—Weed out those that have any blemish, and change your rams from time to time in order to avoid in-breeding. Never muster your sheep in a mob without first dipping. By careful attention to these matters a clean and healthy flock of sheep should result. Mr. Mulholland goes in largely for lucerne, which he stacks in one huge stack, and keeps it in reserve in case of shortness of veldt. It is cut when in flower, stacked the same day, and makes splendid hay.

CHAPTER XX.

ON THE BANKS OF THE MURRUMBIDGEE.

The Rabbit Pest—£500 per annum to keep them down—Vermont Merino Sheep—Gum Trees for the Transvaal—Buck Jumping—Twenty-eight Shearing Machines—Over 300 Sheep shorn by one man—A Wine Factory—Lake Albert—Rabbit Poisoning Machine—A Thousand Destroyed in one Night.

JANUARY 14th.—This morning we left Mr. Mulholland's station after a most enjoyable visit, and we shall long remember his kindness and courtesy. Before leaving we had a long talk on different matters, in the course of which he mentioned the rabbit pest, and informed us that it cost him £500 per annum to keep them down. He said that we should be very careful not to allow this pest into South Africa. He also spoke of sending one of his sons out to South Africa with a flock of pure bred Vermont Merino sheep for breeding purposes. We are of the opinion that the Government should give earnest heed to this matter, as it would be of great benefit to the Colony. Another problem of even greater importance is that of plantations. Take, for instance, the blue gum—Australia's typical tree. It has been of immense value in low-lying and unhealthy districts. In South Africa it has already been proved that gum trees grow quickly and thrive well, and there is every reason to believe that these trees would tend to make the malarial districts of the Transvaal much healthier, and, combined with the drainage of swamps, greatly lessen the danger of the fever stricken regions.

We next crossed the Murrumbidgee River, and arrived at the station "Bolambro," managed by Mr. Gunn. Mr. Mulholland, Junr., accompanied us, and we were met by Mr. Gunn, Junr., and Mr. Potts. On the way to the homestead we were shown some two-year-old Shorthorn bulls; the herd consisted of about twenty—a fine looking lot, and valued at £15 per head. A large amount of lucerne is kept here in case of a dry winter. We inspected some store cattle. They are bought up cheap and fattened, and then sold at a good price to the butcher. This is a most profitable branch of cattle farming in good seasons. Horse breeding is another great industry here, and among those in the stud paddock were a Clydesdale stallion, "Sir Robert," "Exterminator," a horse of the coaching breed, and several nice fillies showing good

points; also a horse called "Silver Master," rather strongly built, with good depth of body, and about 15 hands high—something like the ordinary stallion kept in the Transvaal for breednig purposes.

From here we went to see two well known horse-breakers, Dempster and his son, and it was plain that stories we had heard of buck jumping in Australia were not exaggerated. First of all a young colt that had never been handled was brought into the yard, when Dempster very cleverly threw a halter over its head, whereupon the young animal looked as if he would like to tear the man to pieces, and gave a vicious plunge, but, the rope being pulled tight, he received a nasty fall for his pains. Next, the colt was driven round in a circle for some time, then let out to amuse himself at will until the afternoon, when a saddle was put on his back and he was ridden. Afterwards a real buck jumper was brought into the ring and saddled. This animal looked as mild as a lamb, but when young Dempster mounted it bucked furiously, but could not unseat him. He then mounted a chestnut colt, and displayed some marvellous feats of horsemanship. It was an excellent performance, and interested our whole party very much. We next saw some thirty pure bred Clydesdale fillies.

Then we visited the shearing shed, and saw 28 shearing machines all worked by steam. Behind each machine there is a pen, where the sheep are confined during shearing time. A door opens, and the sheep are brought in one at a time. After being shorn they are passed through another door, and the number recorded by the "Boss of the Board." The shears used are somewhat similar to those used for clipping horses. One man shears about 100 per day, for which he receives 20s. and finds himself in everything. Over 300 sheep have been shorn in a single day by one man. At the end of the shed there were tables where the different qualities of wool are sorted by wool experts. The wool is packed in bales, pressed, and marked, and is then ready for transport to the coast. We inspected the engine and sharpening rooms, and finally came across a herd of about one hundred Shorthorn cows which, considering the veldt on which they were grazing, looked remarkably well. The bulls were pictures. As this veldt is somewhat similar to that in the Transvaal, these animals should do well in our Colony. We then went to the homestead, which is prettily situated, and were received by Mr. Gunn, Senr., and entertained to lunch. This estate is 45,000 acres in extent, and carries 30,000 sheep, 2,000 head of cattle, and many horses. After a long day we drove back to Wagga, a distance of 20 miles.

January 15th.—This morning we went to Caldwell's vineyard and cellars at Lake Albert. In ordinary seasons this lake is an extensive sheet of water, but on the occasion of our visit it was perfectly dry owing to drought. The vineyard, considering the season, looked well, and the cellars were full. We sampled the principal wines, some of which were very old vintage, and before our departure we were presented with a case of one dozen assorted wines, which was highly appreciated. After returning to town

we visited the station of Mr. Booth. Unfortunately, most of the stock were away on an out-station, where the grazing was richer. The homestead here is nicely situated, with out-buildings and offices adjoining. We were shown a fine Clydesdale stallion, "Lord Richmond." 100,000 sheep are kept on this station in the season, but at that time there were only 50,000, 1,000 breeding cattle, and several horses. We were shown about 150 stud ewes (Gibson's Tasmanian Merino breed), and were told that these sheep give better wool than the Vermont Merino. The Tasmanian is a larger bodied sheep than the Vermont, but the latter carries more wool. These ewes were very fat, and this is doubtless a disadvantage for ewes which are intended for breeding purposes. We were then shown a machine for distributing rabbit poison, the man in charge informing us that he had destroyed as many as a thousand in one night.

Having to catch the night train for Sydney we had to hurry back to the railway station. Our best thanks are due to the Hon. J. Gormly, M.P., and Mr. J. S. T. McGowen, M.P., and we can never forget the kindness of Mr. and Mrs. Mulholland. Half the population of Wagga-Wagga were present at the station to see us off.

CHAPTER XXI.

SYDNEY AND ITS SUBURBS.

A Technical Museum—Samples of Wool—Electric Power House—Fertilizers—Parramatta—A Citrus Orchard—A Progressive Government—Training Ship—400 Boys—Introduction of Eland—The Cabinet of New South Wales—An Imperial Speech—A Trip on the Katalina—A Heat Wave—A Night with Burns.

JANUARY 16th.—Arrived at Sydney, the capital of New South Wales, and paid a visit to the Hon. John Kidd, Secretary for Agriculture, with whom we had a long conversation on agricultural matters, gaining much information regarding up-to-date methods of farming, which we hope will prove of some value to our fellow countrymen. In the afternoon Mr. W. S. Campbell, took us to the Technical Museum, where we saw the different varieties of wool produced in the State, besides many other things of great interest. We sincerely hope that the Governments of the Transvaal and the Orange River Colony will establish similar institutions in order that our young men may thereby gain the advantages of a sound technical training. From here we visited the Electric Power House, which not only lights the houses and streets of Sydney, but also supplies the power for the tramway system, which is said to be the finest in the world. The furnaces are fed by automatic machines, thus saving a great amount of manual labour. Everything is kept scrupulously clean.

January 17th.—This morning we had an interview with Mr. Shirley, a large manure merchant, who kindly gave us a few hints about commercial fertilizers in New South Wales. As the climate is similar to ours, the successful experiments carried on in that State might with advantage be tried in the Transvaal. Then we started for Parramatta, some fifteen miles from Sydney, to visit some orange orchards. We went by rail, and afterwards were taken in a trap round the fruit-growing districts, accompanied by Mr. Allen, Fruit Expert. After two hours' drive we came to Mr. Fagan's orchard, which is planted with oranges, naartjes, peaches, plums, etc., the ground being well cultivated. The orange trees when compared with ours seemed small, but they looked healthy and apparently bear well. All these orchards are kept entirely free of weeds, and the surface is frequently stirred by harrowing. There is no doubt that the Government of New South Wales spare no expense in encouraging the fruit industry, and with such a capable man as Mr. Allen, we are convinced that it will continue to prosper.

On Sunday, at the invitation of Mr. Frank Coffey, who resides at North Sydney, we crossed the Harbour bar in a ferry boat. We landed at Milson's Point and went by train to Willoughby, and then proceeded to Mr. Coffey's residence, which is a fine large mansion, surrounded by nicely laid-out grounds, orchards and gardens. This gentleman takes a great interest in horticulture, and has a fine selection of fruit trees. He has written several books dealing with fruit growing. Here we spent a pleasant day, and returned to the hotel in the evening.

January 19th.—This afternoon, accompanied by a number of the leading citizens, we made a trip on the Government launch to the training ship "Sobraon." Before going on board the vessel we inspected the spacious playgrounds on Cockatoo Island. Here we visited the carpenters' shop, where the boys are taught everything relating to wood work. These boys number about 400, and are taken off the streets of Sydney and trained until the age of eighteen, when they leave the ship and become sailors or enter any trade for which they show some aptitude. We went on board and, after inspecting the schools, returned to the deck, where the boys were all drawn up in a line and put through their drill, which was admirably performed. They were dressed very neatly, and the captain and officers deserve great credit for the efficiency and high standard which these boys have attained. After tea the boys gave us some selections from their excellent band, and on our departure they manned the yards and gave us three hearty cheers. To us this training ship seemed a striking proof of the good that can be achieved by a progressive Government in improving the morals and awakening the intelligence of the unfortunate members of a community, waifs and strays, many of them rescued from the slums who, if left to themselves, would wander about the city and become a danger to society and a loss to the Commonwealth.

This morning Mr. Benbow called for the purpose of getting some information about the Eland. This gentleman has an idea that the Eland would thrive in the back blocks of New South Wales, and he has been corresponding with many people about the matter. He wishes the Government to introduce a few as an experiment. To-day we lunched with the Premier, the Hon. Sir John See, K.C.M.G., and met the State Governor, Sir Harry Rawson, R.N., K.C.B., and other Cabinet Ministers of New South Wales. There were about twenty of us in all. After lunch several excellent speeches were delivered.

Sir John See, in proposing the toast of the South African delegates, coupled with the name of Captain Kirkpatrick, said :— "I do not regard this as a formal gathering, but more in the light of an informal function tendered with the special object of showing respect to our guests as Ambassadors from South Africa on a visit to these shores. I think the idea that was in Lord Milner's mind when he made representations to Mr. Chamberlain that a deputation of this kind should visit England, Canada, and Australia, was that these gentlemen, who at one time had been antagonists of ours, should have the opportunity of gaining, not only informa-

tion regarding our methods of agriculture, but a wider experience of the conditions of the people of the British Empire. I recognise that in the Boers the British and the Colonial soldiers met foemen worthy of their steel. They fought valiantly, and they fought determinedly, and from all accounts fairly. What the cause of the quarrel may have been I am not going to enter into, but will content myself with saying that I think the result will without doubt eventually mean great benefit to both sides. If we look back upon the history of the Great Empire to which we all now belong we read of great and bitter struggles between England and Scotland, and between other parts of the British possessions; yet to-day the various territories forming that Empire are so united and so friendly disposed towards one another that they constitute the greatest living power the world has ever seen. When we realise the civilising influences of the British rule we may well feel proud to belong to a people so desirous of promoting the best interests of humanity. It may well be said that a system such as that under which we live is the best for the government of mankind.

I have already alluded to the bravery shown by the Boers in the field, but it was obvious from the first that there could be but one result of their conflict with Britain. My friends here to-day, as representatives of South Africa, will, I think, admit that the British people are magnanimous, that they fight as Britons can, and when they have won hold out the hand of friendship to those they have conquered, and simply make them part and parcel of the system under which they themselves live. That is, I think, the feeling of the British people to-day in regard to South Africa. Mr. Chamberlain is at present, as we know, touring South Africa on a very important mission, and it is pleasant to see that all his utterances are appreciated. There can be no doubt that, in entrusting you gentlemen with the business of your trip, a wise selection was made by the authorities, for we see ample evidence that you intend, as far as the future is concerned, to do your best for South Africa as a whole. You have, I understand, already visited England and Canada, where you were received with a hospitality which has, I hope, left a favourable impression on your minds. Now you have come to Australia, which, as you know, supplied some of the best men that took part in the recent trouble. I do not think that in your visits to any part of the Empire you will find people more generous or more ready to acknowledge the good work you performed in the endeavour to maintain what you considered was right in the interests of your country. You will find, the further you go, that you have simply come amongst your own people, people whose hearts go out to you and who will spare no effort within reason for the purpose of bringing you into closer touch with the British Empire. In regard to the wisdom of Mr. Chamberlain and Lord Milner in sanctioning your visit, I feel assured that you will be able, when you return, to report most favourably on the treatment received in New South Wales and elsewhere. You have not heard one adverse comment

on the object of your visit wherever you have been, but have, I am proud to say, been received with open arms, and with all the kindly disposition and characteristics of the race. By the cables in this morning's papers we saw that something like £30,000,000 is to be subscribed by the British people for the purpose of immediately re-establishing settlers on the land and in other ways repairing the losses suffered during the war by those who opposed the Imperial Government. I also notice that the confidence that has been restored in the country is encouraging the expenditure of some £50,000,000 in developing it. Nothing to my mind develops the industries of a place so much as confidence, and although you no doubt were at first disappointed at the result of the fighting, I am one who feels convinced that what you probably at the outset regarded as a disadvantage will before very long appeal to you and all your fellow countrymen as a decided advantage. We in the Commonwealth possess the right, as a part of Great Britain, to enact such laws as we think best for our own welfare, and the assent of the Imperial Government is never refused. We might pass a tariff that did not in every way commend itself to the home people, but still they have always relied upon our knowledge of what is best for our own particular part of the Empire. We recognise in the King the centre-pin of the British Dominions, but in all other respects we are a self-governing people, left to ourselves to work out our own social and commercial conditions. Take the case of the recent Durbar in India. At that function millions of people gave evidence of their recognition of the advantages they had derived under British rule, and demonstrated in many ways their allegiance to the King.

I want to extend to you, gentlemen, a most hearty welcome in the name of the people of New South Wales. When I first met you I immediately decided to spare no pains to make your visit in this State an enjoyable and instructive one, and I have been very pleased to learn from Captain Kirkpatrick that wherever you have gone you have encountered warmer hearts than even the weather itself. You will, I hope, take back pleasant recollections of New South Wales, and I have no doubt that you have been perhaps a little surprised with our agricultural developments. As I have said, the New South Wales Government and people have cordially welcomed you as friends and members of the Empire. You will in time forget the past, and we as a people feel that your best efforts will be used towards the consolidation of the Empire and its interests as the years go on, knowing that you will realise more and more that what has happened in South Africa has been for the good of all. I welcome you as representatives of His Majesty the King, and wish to express gratitude to your people for having fallen into line as they have done. It is pleasant for Britishers to note the success that has marked Mr. Chamberlain's visit to South Africa, and that the population has recognised his sagacity, force of character, and wisdom in dealing with such an important matter as the settlement of affairs in that valuable portion of His

Majesty's Dominions. I have much pleasure in proposing the toast of 'The Delegates from South Africa, coupled with the name of Captain Kirkpatrick.'"

The toast was honoured with extreme cordiality, and so terminated this most delightful entertainment, which will linger long in our memory.

This evening we boarded the steamer "Katalina," bound for the Northern Rivers. We were accompanied by Mr. W. S. Campbell, Director of Agriculture, and Mrs. Kidd, wife of the Secretary for Agriculture. It would seem as if the fates had decreed that of late we had fared too well, for now the weather became very rough, and during a whole day and a half the vessel pitched most terribly and, to say the least of it, we felt rather miserable.

January 25th.—We entered the Clarence River. This river is about half a mile wide, and on each side along the banks there were large plantations of sugar cane and many plots of maize. During the past month a great "heat wave" passed over this district, and the early maize crop was entirely destroyed. This, of course, meant a great loss to the farmers. It was sad to see such terrible damage, as the crop would probably have yielded heavily. In consequence of the destruction of the crop maize was 25s. per bag, an extraordinary high price for this district. Now, in regard to the sugar industry: the cane is cultivated by the farmers, but harvested by the Sugar Company, who have large mills all along the river. The Company pay the farmers a certain price for each ton of cane, and hire men to help in the harvest. The return of cane is from 20 to 50 tons per acre, according to the season and variety.

We reached Grafton, which was our destination, and went straight to Mrs. Roche's Hotel. In the afternoon we were met by the Mayor and Councillors of Grafton, and received a very hearty welcome. As in the Transvaal, Scotchmen are always to the fore, and this being the birthday of Robert Burns, a big banquet was held, to which we were invited. Tables were laid on the verandah, and about seventy sat down. It was a typical Scottish night, with songs and toasts and speeches, continued well into the morning. And indeed we were glad to be amongst these genial Scotchmen, who come together once a year on the 25th of January to celebrate the birthday of their immortal ploughman poet.

CHAPTER XXII.

By the Clarence and Richmond Rivers.

An Experimental Farm—Mosquitoes and the Stinging Tree—A Native Queen—Grafton Butter Factory—Sixty-seven Islands—Harwood Sugar Mills—Chatsworth Island—Wolbain—Coffee Plantations—Woodburn—Forest of Gum Trees—130 feet in height—Tallow-wood Tree—Bush Fire—Italian Settlement—Cane Sets Supplied *Gratis*—A Government Bounty.

JANUARY 26th.—After a drive through a number of small farms which were suffering from the drought, we arrived at the site of a new Government Experimental Farm. At present it is only partially cleared of bush, but the situation is excellent, and it should make a splendid place. A certain large tract of bush is reserved to show the different varieties of trees that are indigenous to Australia. Here there are the two extremes of soil, *i.e.*, good and bad. This is of great importance, for although many men can make large profits from good land, there are comparatively few farmers who can make more than a bare living on poor soil. We tried to penetrate for some distance into the dense bush, but soon beat a hasty retreat on account of the mosquitoes and also being afraid of a tree called the "stinging tree," which, if merely touched, produces agonising pain for several hours. It is said that if a horse rolls amongst the leaves he goes mad with pain. Curiously enough, there is antidote in the form of a herb called "Cungeboy," which always grows near at hand. The juice of this plant rubbed on the afflicted parts mitigates the pain. We came back to the temporary tent of Mr. Bulkeley, who had just completed a distinguished career at the Hawkesbury Agricultural College, and had already begun experimenting with maize and grasses.

A settlement of Australian Aboriginals is situated close to the farm, so we availed ourselves of the opportunity of visiting them. We lunched with Mr. Johnson, Inspector of Police, after which we were taken to the Native Children's School. These children, although they seemed anxious enough to learn, could hardly be considered very bright. From here we visited the location, and were introduced to the Queen. She wore a great brass plate attached to a chain round her neck, and we should say that she must be about a hundred years of age. She sang two rather weird songs, and, after accepting a couple of sixpences,

consented to have her photograph taken. The Australian blacks are undoubtedly the worst class that we have seen on our journey. They will not work, and are dying out before the advance of civilisation. Thence we drove to Grafton, passing through some fine country. Here the fields were sown largely with maize, but, unfortunately, ruined by the "heat wave" already mentioned.

We next visited the Grafton Butter Factory on the banks of the River Clarence. Here an up-to-date system of dairying has already been started, and the farmers are looking forward to good results accruing from this enterprise in a short time. In the middle of the river there is an island which is a great pleasure resort for the residents of Grafton and district. In the evening we were entertained by Mr. Monroe and some other gentlemen at the Club. The Inspector of Stock told us of the great losses which cattle farmers have recently sustained in this district owing to the prolonged drought. On the River Clarence there are 67 islands, the majority being held for revenue purposes by the Government; the remainder are under cultivation.

From Grafton we went in the Government steam launch, "Vivandiere," for a trip down the river to Harwood, the residence of Mr. Holden, Manager of the Colonial Sugar Company. At MacLean, a small village close to the river, there is a large quarry, which furnished the stone for the building of the breakwater. At Mr. Holden's place we were shown over the sugar mills—a gigantic establishment, and altogether beyond our powers of description. After lunch we steamed up an arm of the river to Chatsworth Island. The scenery here is beautiful, there being wooden houses on either side of the river, large stretches of sugar cane plantations, with occasional plots of maize and bananas; and here the farmers seemed most prosperous. Still continuing our journey up the river we arrived at a place called Wolbain, and were met by Mr. Bale, the present occupier. This farmer has large coffee plantations. He also grows bananas, pine-apples, and maize in abundance. At the time of our arrival he was busy plucking his coffee beans. He sells all his coffee wholesale at one shilling per pound, or retail at one shilling and threepence per pound. In reaping the coffee the pods are placed in the sun to dry, and then put through a machine which separates the shells from the beans, which are then left out in the sun to dry. This coffee bean is more or less white in colour, and much like what we call "Java" coffee. Around the plantation several banana trees are growing, which give considerable shelter to the coffee. This is all Government property. The present occupier pays a certain rent, and has to grow his produce to the satisfaction of Government experts, who pay periodical visits to the farm.

We came back to the launch in a small boat and continued our journey down the river for a short distance. Then we landed, and two vehicles were in waiting to take us to a place called Woodburn, which is situated on the Richmond River at a distance of some 25 miles. We started about 5 o'clock, and drove through a dense forest of all kinds of gum trees, some of which were

as much as 130 feet in height. We passed several troops of horses and cattle running at will in the forest. Here for the first time we saw the "Tallow-wood tree," which we were told is a very useful wood for wharf piles, railroad sleepers, and mine posts. It was very dark as we changed horses about half way, but with good roads, fresh horses, and jovial spirits, we managed to get along. A part of the forest was burning, and so we got some idea of a bush fire. The greatest danger lies in the falling trees. We were informed that quite recently two men—father and son—had met their death in this way.

Before reaching Woodburn we passed through what is known as the Italian Settlement. Some settlers originally received a large grant of ground from Government which at that time was practically valueless, but which is now, owing to the industry of these people, a thriving settlement. About 10 p.m. we arrived at Murray's Hotel, Richmond River, very tired after a long day's travelling. Along the Richmond River a great deal is done in the culture of sugar cane. We were met by Mr. Taylor, Inspector for the Colonial Sugar Company. His duty is to visit farmers and see when the cane is ready to cut for the mill. The Company try to secure the most profitable cane for the farmers to plant, supply it *gratis*, cut the cane at their own expense, and pay 12s. per ton for it. The Government allows 4d. per ton as a bounty, and a further 1s. per ton is allowed by the Company for cartage. The farmer has to wait two years for the first crop. It is then good for two successive cuttings (rattoon crops), when the cane becomes exhausted, and must be replanted. We were informed that a great number of farmers are giving up cane growing and are going in for dairying, which they find more remunerative, and in place of receiving a lump sum once a year as in cane culture, they receive monthly payments for their produce.

CHAPTER XXIII.

To Broadwater and Ballina.

Sugar Mills at Broadwater—Experiments with Sugar Cane—100,000 Tons of Cane—70 Milking Cows—200 Gallons Milk Daily—Ballina—Breakwater—Butter and Bacon Factory—£4,000 per month to Farmers.

JANUARY 27th.—We left Woodburn in the Government launch, "Uana," for the sugar mills at Broadwater, and after a pleasant trip down the river, with sugar plantations on each side, we reached the Company's wharf. Here we were met by Mr. Barry, manager of the mills, who took us to his home. We were then shown over the mills, which are much larger than those we saw at Harwood. The different processes that the cane goes through from the time of its arrival at the mill until it is turned into sugar were duly explained. We were then taken to a room where experiments were being made with sugar cane, and shown about a hundred different varieties. In a good season Broadwater Mill crushes about 100,000 tons of cane, producing about 10,000 tons of raw sugar.

We returned to the house and were shown over the gardens, and after partaking of lunch boarded the launch again for a visit to the Company's farm. This farm is 621 acres in extent, and is let out on the share system to a farmer, who kindly showed us round. Here they go in largely for dairying, and keep a herd of 120 milking cows: grade, Shorthorns, Ayrshires, Jerseys, and Guernseys. These are a good milking strain, and show what an ordinary herd may become by careful attention to breeding and culling. Only pure bred Shorthorn bulls are used. It is believed that if a bull of a good milking strain is crossed with any strain of cow in nine cases out of ten a good milker will result. Here also were a few Red Devons—very hardy cattle.

In a good season the daily average amount of milk obtained is about three gallons per cow; in bad seasons this falls to two gallons. As a rule some 70 cows are milked, which yield about 200 gallons of milk daily. The average amount of butter fat in the milk is about 3·8 per cent. Calves are not allowed to suck, but for the first ten days are fed by hand on their mother's milk; afterwards on skim milk mixed with oil cake, etc., and they look strong and healthy. The cows looked well considering that they were exclusively fed on grass. There is a cream separator on the farm, and all the cream is sent to the butter factory.

From here we proceeded down the river and arrived at Ballina, where the Government Engineer joined us and took us to see the breakwater. This is truly a vast undertaking, stones being brought from a long distance to break the force of the waves and retain the shifting sand. We went to the mouth of the bar and watched the huge waves dashing against the solid stone. It was a splendid spectacle. Next we returned to Ballina, a small, thriving town, and put up at Webster's Hotel. In the evening we were met by the Mayor and townspeople, who called to welcome us, and afterwards entertained us to supper.

January 28th.—This morning we visited the Ballina Butter and Bacon Factory, where they seemed to be doing a big trade. This is a farmers' co-operative affair. Mr. Webster, the Managing-Director, informed us that they pay out £4,000 per month to the farmers, and charge 1½d. per lb. for making and selling the butter. Shareholders receive a dividend of 7½ per cent. This establishment cost about £3,000.

CHAPTER XXIV.

LISMORE AND BYRON BAY.

Alstonville—Wollongbar Experimental Farm—Dairying and Factories—£200,000 paid to Farmers—North Coast Co-operative Company—Mountains and the Tweed—Fields of Maize and Sugar Cane—Ferns, Orchids, Mosses, and Cedars—The Whip Bird.

JANUARY 28th (*continued*).—In the afternoon we left Ballina in two wagonettes for Wollongbar Experimental Farm. We started in a heavy downpour of rain and the horses were not of the brightest as they had come from Lismore that morning, a distance of twenty-one miles. The greater part of the road lay along a fine creek called the "Settler" and a thickly wooded country, which is known as the "Big Scrub." The height of the trees average over a hundred feet and are very close together; at the foot there is one mass of tangled creepers and "Lawyer Vine," so thick in places that a man cannot penetrate without using a "brush hook." The soil on which the "Big Scrub" grows *is extremely fertile, composed of volcanic basalt and decomposed vegetable mould, with an average of 16 per cent. humus.* The depth of the soil is generally about twenty feet. The cost of clearing is £10 per acre; when the land is cleared and grassed it is worth from £20 to £50 per acre. The grasses sown are Large Water Grass (*Paspalum Dilatatum*), Cocksfoot, and Prairie. On land well laid down with these grasses, two cows to three acres can be kept the whole year round. A family can live comfortably on 40 acres. This is one of the best districts in New South Wales for pig-fattening, which, in conjunction with dairying, is a paying concern. Eight large butter factories and three bacon factories are kept in full swing the whole season.

We arrived at Alstonville, and on account of the rain were compelled to remain here for some time, after which we proceeded to the Experimental Farm; the manager, Mr. Gorman, receiving us. This farm is nicely laid out with beautiful ornamental trees, forming an avenue to the front entrance. After lunch, we were shown over the sample room, where all sorts of seed grain, potatoes and turnips are stored. Of the samples of potatoes shown to us, "Up-to-date," "Brownell's Beauty," and "Manhattan" took our fancy. We were then taken to the stock and milking yards. The breeds of cows kept are the Ayrshire, Shorthorn,

Holstein, and Jersey. One Ayrshire cow according to an accredited record, returned last year £19 worth of butter, and in addition her bull calf sold for £20. Here we saw some calves being fed out of a bucket by means of an artificial teat. They have some very nice Ayrshire heifers and Holstein calves. The creamery is worked by a 3 h.p. engine. The milking sheds are kept scrupulously clean and are washed out every day with lime and water. A Mr. Dixon-Cook was good enough to show us his dairy cattle and took great pride in pointing out his celebrated Shorthorn bull, "Perfection," which is considered the best bull in the district.

On the Experimental Farm, grass, maize, potatoes, bananas, and pineapples are also grown. Here 1¾ acres planted with pineapples returned £78 last year. Leaving the Experimental Farm, we passed through a finely wooded country with here and there a plot of maize, and reached the town of Lismore, which is situated in a valley and is a busy little place. We were met by Mr. Coleman, M.P., Mr. Baker, the Mayor, and Councillors. Mr. Coleman gave us some very interesting statistics, showing the vast progress dairying had made in the district since 1893. From three factories the sum of £200,000 was paid to farmers last year. The classes of cattle considered the most profitable are pure-bred Ayrshires, Shorthorns and their crosses.

January 23th.—We left the town at 6.30, accompanied by Mr. Ewing, M.H.R., a gentleman who has been in the district a quarter of a century, during which he had seen many changes. A few years ago land could be had for a mere trifle. At the present time it is worth as much as £50 per acre. He quoted as an instance one farm which fifteen years ago was worth £400, and which was sold the other day for £10,000. This is due in a large measure, to the enterprise shown in dairying and to the introduction of co-operative butter factories. In this district an average cow yields butter to the value of 20s. per month. The milk cans are carried to the factories at the rate of 3d. per can. Each tin contains 10 gallons.

Next we crossed over to the Byron Bay Factory, which, by the way, is the most easterly point in Australia. There is a jetty here from which steamers run to Sydney. From this factory they turn out as much as 225 tons of butter in a month. This butter is shipped to London in boxes containing 56 pounds. The factory is called the North Coast Co-operative Company, and it has a branch at Lismore. Near this point Mount Warning rises to a height of about 4,000 feet above sea level. We then crossed over the River Tweed. On reaching our hotel, the Mayor was waiting to receive us, and after lunch accompanied us for a drive through the district. Large fields of maize were just ripening, and here and there we passed an occasional sugar plantation; but everywhere the paddocks were stocked with dairy cattle; with as many as 50 to 200 in one herd. As we drove further along, we came into thickly wooded country, where we saw the "Stag Horn Fern," growing on the tree tops, while orchids encircled

the branches. Mosses and ferns were likewise growing luxuriantly. Here a considerable trade is done in timber, and we saw a large number of cedar and other logs, pine and teak, lying ready to be transported. Proceeding still further, we passed many pretty creeks, which all added to the picturesque beauty of the scene. For the first time on our travels we heard the "whip bird," which when flying makes a noise similar to that produced by the crack of a whip. After a very pleasant drive we returned to town.

CHAPTER XXV.

FROM TOOWOOMBA TO GLEN INNES.

Tweed Heads—Breakwater—Brisbane—Toowoomba Mountains—Darling Downs—Drought—Loss of a Million Sheep in Four Years—On the Verge of Ruin—Artesian Wells—Glen Innes—The Co-operative Creamery—Chaff Cutter worked by Steam—The A.A. Land Company—Maize—100 Bushels to the Acre—Stacks of Oats—Ensilage for Winter Feeding—Kent Park—Balaclava—Black Loam—Seven Feet Deep—Lincoln Sheep—9 lbs. Wool per Sheep—Black Merino—15d. per lb. of Wool—45,000 to 50,000 Lambs Yearly—After Drought—3,000.

JANUARY 30th.—Left Murwillumbah for Tweed Heads, going down the river in a steam launch. Everywhere there were palms, ferns and luxuriant undergrowth, making a very beautiful scene. From time to time the launch threw off a mail bag or anything that might be required at the different points of call. The river winds continually; sometimes the mountains come into view and then again suddenly vanish, only to re-appear a little further on. At Tweed Heads there is a breakwater in course of construction. It was about 11 o'clock when we took coach for South Port *en route* for Brisbane, Queensland.

After half-an-hour's drive, we reached the beach along which we drove five miles; the road then turned inland until we came to a large sheet of water, which we crossed, the water being up to the body of the wagon. Turning back towards the beach, we drove for another five miles and then turned inland as before and arrived at a large creek. Here we had to alight and cross by boat, the coach going over empty. Continuing our journey, we came to the "half-way house," where we changed horses and turned towards the beach again, while the next turn inland took us to a splendid road which ran right into the town. This is the popular bathing place of the State of Queensland. We were met by the Hon. David H. Dalrymple, M.L.A., Secretary for Agriculture, at present the Acting Premier of the State, and several other leading citizens. A special coach was attached to the Brisbane train and during the journey we enjoyed a most interesting conversation on agricultural matters. We reached Brisbane about 7 o'clock. Miss Dalrymple met the ladies and accompanied them to Brisbane. Our first intention was to take a trip through Queensland, but we decided to defer this until later on.

January 31*st.*—This morning we left Brisbane for New South Wales—free passes being presented to us over all the railways in Queensland. From Forest Hill we traversed a fertile country with fields of maize and paddocks of lucerne. We passed through the Toowoomba Range of mountains with its dense forest, and arrived at the town of Toowoomba. The railway line passing over the mountains is about 3,000 feet above sea level. This district is called the Darling Downs and is certainly the fairest district we ever have seen; fields upon fields of maize and lucerne growing on a black rich loam. Before the devastating drought, a large number of sheep and cattle were running in this region. It is maintained that more than a million sheep have died here during the past four years. Fortunately, they had good rains of late and the dams and tanks were full. In certain districts sheep and cattle breeding are carried on successfully for several years, then all of a sudden, a drought comes and sweeps everything away. In the early days many people went in heavily for sheep farming and for a time were doing splendidly, but a few bad seasons followed in quick succession and left many on the verge of ruin. There is, at certain periods, a heavy rainfall in the interior, but the excessive heat quickly absorbs all the moisture. In many parts artesian wells have been sunk with great success; but in some places the water was found to have a salty taste and could not be used for irrigation. We reached the border of New South Wales; here, owing to the line being of a different gauge, we had to change trains, and then started for Glen Innes. Around here the country is so poor that it would certainly take about ten acres to feed a cow. At Glen Innes we were met by the Hon. John Kidd, the Mayor and Councillors.

February 1*st.*—This morning a drive around the Glen Innes District and the surrounding farms was arranged. At 9 o'clock we set off in two traps, accompanied by Mr. Chatty, the Chairman, and other members of the Agricultural Society. Mr. Chatty is also Chairman of the Co-operative Creamery of the district. He goes in largely for dairying and keeps the Ayrshire breed of cattle. He milks about 80 cows. The Co-operative Creamery has a capital of £3,000 in £10 sbares; no shareholder being allowed to hold more than 20 shares. In organising this Institution the advice of experts was obtained, and it is now a flourishing concern. The sbares are held entirely by farmers of the district. Milk accounts are settled monthly.

From here we drove through a fine looking country, the soil being very rich. Farmers grow oats and maize and potatoes chiefly. Luckily, we arrived at harvest time and saw them busy reaping oats. The oat straw is cut up into chaff and afterwards pressed into bags. The bags when filled weigh 100 pounds. They are then sent to the Sydney market. The chaff cutter is worked by steam. Most of the land around here belongs to the A.A. Land Company, who clear it of bush, etc., and lease it out to farmers in lots of from 90 to 100 acres for seven years, at a rental of 10s. to 20s. per acre per annum. We were informed

that some of these tenants make a profit of £11 per acre in good seasons. The average yield of oats per acre is about 40 bushels; maize about 80. Here we saw a splendid patch of maize which averaged about eight feet in height and was expected to yield some 100 bushels to the acre. On one farm we saw three stacks of oats. We measured them roughly and found the dimensions of each to be as follows:—8 yards broad, 13 yards in length and 30 feet high; the estimated weight being 135 tons, or nearly three tons to the acre. This was the yield from 45 acres of land. On the Company's farm, they conduct experiments for the benefit of the farmers. Here there is an orchard of 40 acres. Ensilage is used for winter feeding. We next visited a Mr. Lindsay, of the farm "Kent Park," who deals principally with Lincoln sheep. He also grows a good deal of hay. We consider this equal to any district that we have seen in New South Wales. Besides a splendid soil, it has the advantage of a good rainfall.

We then visited the farm "Balaclava," owned by Mr. Ross; Mr. Campbell, Director of Agriculture, accompanying us. This farm is 15 miles from Glen Innes and is about 14,000 acres in extent. On the way we passed some very fertile valleys. First we inspected a lucerne paddock which was looking remarkably well; next we examined a marvellously rich soil, a black loam fully seven feet deep, situated by the side of a stream. Mr. Ross has about 6,000 sheep of the Lincoln breed. After a long experience he has found that they give an average of nine pounds of wool per sheep. Although this wool does not command such a high price as that of the Merino, he considers that the heavy weight of carcass and the extra yield is of greater value than the higher price obtained for Merino wool. In reply to a question as to whether they were hardy, he replied, "As hardy as the Merino, but they require better grass." He strongly recommended us to give them a trial.

In an adjoining paddock we saw about 20 stud rams. Mr. Ross also stated that a Merino ram crossed with a Lincoln ewe, throws a good sheep, which grows a fair quantity of wool. Another farmer here goes in entirely for the black merino, and receives as much as 15d. per pound for the wool. Owing to the severe drought, the number of lambs was very much less than usual. For instance, on one station where they generally have from 45,000 to 50,000 lambs yearly, only 3,000 were marked last year.

Mr. Ross' sons live on the farm and work it. They go in for breeding ponies and have some very good animals. Mr. Ross obtains about £30 a pair for his ponies when trained. Before leaving, we visited a 60 acre paddock planted with maize.

CHAPTER XXVI.

FROM MAITLAND TO SYDNEY.

Agricultural Show Grounds—Field after Field of Lucerne—£4 5s. per ton—Maize—£600 from 40 Acres—Land £100 per acre—Butter Factory—Nine tons of Butter Weekly—Herefords—Across the Paterson River—Breeding Race Horses—West Maitland—A Welcome—Brothers and Sisters of the Empire—Newcastle—The Great Coal District of New South Wales—Samples of Wool for a Japan Exhibition—Clyde Engineering Works—A Soap Factory—On Board the "Mokoia" for New Zealand.

FEBRUARY 2nd.—In the evening we started for Maitland and arrived there at 7 o'clock. After breakfasting at Atkinson's Royal Hotel we separated into two parties, and drags were engaged at Mr. T. Judge's to take us through the district and to the Agricultural Show Grounds. In the first drag were the ladies of the party, the Secretary for Mines and Agriculture—the Hon. John Kidd—Messrs J. Gillies, M.L.A., Robert Scobie, and R. F. Graham, vice-presidents of the Hunter River Agricultural Association, Elias Bowden and two of our party, namely, Lane and Rood. The second drag contained Messrs W. S. Campbell—Director of Agriculture—W. Logan, Jas. Ferris, W. J. Sloan, R. A. O'Keefe, a representative of the *Mercury*, and Jooste. In the first place we went to inspect Mr. Scobie's vineyards and orchards. Here the grapes looked especially luscious.

Next a long drive aronnd the district. We passed field after field of lucerne which yields six crops each year. After cutting, it is left on the ground for twenty-four hours before being stacked. When ready for market it is made into bundles weighing from four to five hundred-weights. At that season it was worth £4 5s. per ton. The average yield per acre is about three tons for each cutting. Farmers are doing well in this neighbourhood. Besides lucerne, maize is extensively grown. We were told that some of the farmers make as much as £600 per annum from 40 acres. Here the holdings are small and range from about 60 acres upwards. The land is very expensive. Just before our arrival one block of 40 acres was sold for £100 per acre.

Mr. John Lavis' Bowthorne Creamery and Butter Factory, one of the most successful industries in the northern district, nd in which almost every modern appliance, including refrigerating achinery, has been introduced, was next visited. We were

received by Mr. Lavis, who showed us over the factory, in the management of which we were particularly interested. Here they turn out nine tons of butter weekly. Mr. Lavis also showed us over his piggery, where he has made special arrangements for the feeding of the pigs with butter milk conveyed from the factory in pipes to two 400 gallon iron tanks, whence it is forwarded by additional pipes to the various troughs. The pigs were all in excellent condition, and including, as they do, some of the best strains of noted imported Berkshires, were greatly admired.

In the afternoon we visited "Tocal," the farm of Mr. Reynolds, who is a large breeder of Herefords. We were also shown a two-year old bull called "Baronet" and a heifer, "Phyllis," of the same breed. These animals looked superb and we have seldom seen more magnificient animals. We also saw a great Devon dairy cow and calf, the cow being almost as broad as she was long. The Devon yearling bull, "Sardow," by "Knight Errant" (imp.), was also much admired. Of the prize Hereford bulls the finest in our estimation was "Kroonstad."

We then crossed the Paterson River and reached Mr. Frank Reynold's station. He goes in largely for breeding horses. We were shown a stallion, "Medallion," by "Sir Tristram," an imported horse, which is closely related to the great English horse, "St. Simon." This was truly a fine animal. Several thoroughbred colts and some forty brood mares attracted our attention. Mr. Reynolds sells at Sydney and gets large prices for his horses. His Hereford cattle were quite equal to those of his brother. We admired especially three of his stud bulls and some eight-month old calves. Mr. R. F. Graham, who is an extensive cattle and horse breeder, considers Herefords good, hardy cattle, and recommends a Hereford with a Jersey in order to produce a good milking strain. He also believes in the Red Devon as being a good milker, hardy, and giving good weight; but he says Shorthorns are only successful where the grazing is abundant. A mixed breed of heifers of a good milking strain would cost £4 per head. He strongly advised us to go in largely for lucerne.

After thanking Mr. and Mrs. Reynolds for their kind hospitality, we left "Tocal" for West Maitland, arriving at the Royal Hotel about half-past four o'clock. That evening Mr. Gillies, M.L.A., made a powerful and sympathetic speech, in which he thanked the Hon. John Kidd and our party for the pleasure of our visit. It was, he said, with open arms that they welcomed the friends from South Africa—as brothers and sisters of the great British Empire—and they hoped that we would never have cause to regret our new relationship. He was delighted to note that we were fair representatives of the brave people with whom they had but recently joined hands across the sea; and he trusted that the harmony now existing between us would long continue to prevail. Lastly, he trusted that on our return to our homes, we would be able to give a good account of what we had seen throughout the length and breadth of Australia. Afterwards,

we drove to the station and caught the train for Sydney, passing Newcastle, the great coal mining district of New South Wales, and reaching the Capital late in the evening.

February 3rd.—This morning we went to see the samples of wool which were being sent to an exhibition in Japan. It was a most interesting exhibit.

February 4th.—In the afternoon we went out to the Clyde Engineering Works, where they manufacture all kinds of agricultural machinery. Here we saw the manufacturing part of the business, where ploughs, harrows, cultivators were in the making.

February 6th.—Visited Messrs. Lever Brothers, of the Sunlight Soap Company, who have established a large cocoanut-oil factory at Balmain. Here the copra is reduced, and the oil shipped to England for use at Port Sunlight in the manufacture of the celebrated Sunlight Soap.

February 7th.—On board the "Mokoia" bound for Wellington, New Zealand.

CHAPTER XXVII.

NEW ZEALAND.

Wellington—Government Buildings—Largest Wooden Buildings in the World—Freezing Works—Ngahauranga—3,000 Sheep Killed Daily—Cold Storage Rooms—20,000 Carcasses—A Slaughter House—2,000 Barrels of Tallow—An Enormous Business.

FEBRUARY, 11th.—We arrived at Wellington and were welcomed by Mr. J. D. Ritchie, the Secretary for Agriculture. In the evening we had an interview with the Premier—the Right Hon. Richard J. Seddon, P.C.—and several of his colleagues. After a most interesting conversation Mr. Seddon promised that everything would be done to make our trip both pleasant and profitable.

February 12th.—Wellington, the capital of New Zealand and the seat of the Government, is the most important commercial town. Situated at the extreme south of North Island it lies in the centre of the Colony, and is a town of great activity, being largely concerned in the wool and frozen meat trade, while its magnificent harbour would easily hold the shipping of the world. The business portion of the town is built on a narrow fringe of level land that has been reclaimed from the sea. Here immense warehouses are crowded together; and as the building space in the city is rather limited, many private residences are erected on terraces worked out of the sides of the hills. Wellington, named after the hero of Waterloo, is one of the breeziest cities on earth, and certainly deserves its local title of the "Windy City."

Curiously enough, it looks as if it had been thrown against the hill side and had somehow managed to stick fast in spite of gales and hurricanes. Indeed, we heard a story of a certain sea-captain who suggested putting out to sea for safety during a fierce gale in the city. Not far from the jetty stands the Government Buildings, which are said to be the largest wooden buildings in the world. In former days the city used to be periodically shaken by earthquakes, and wooden houses were erected in order to lessen the danger. But earthquakes are less frequent now, and the citizens are beginning to renew their faith in the stability of the earth by putting up more substantial stone and brick buildings. The city is lighted by electricity; the population, which is over 50,000, is rapidly increasing. In this neighbourhood the deep black soil seems almost inexhaustible; not far

distant are some of the richest pasture lands in the world, and the finest bush in the Colony. In addition to the usual industries of a seaport Wellington has foundries, factories, saw-mills, soap works, meat freezing works, etc.

We went to the top of a hill above the city on an inclined railway called the Kelbourne and Karori Tramway. At the summit we had a magnificent view of the bay, and after dinner visited the Wellington Meat Export Company's Works, which are about six miles out of town, at a place called Ngahauranga. Mr. Ritchie and several others accompanied us. We were taken into a house where some men were busy scraping wool off sheep skins, the skin being put into boiling water and chemicals. The wool is scraped off by hand with iron scrapers; it is then put into a rotary machine which revolves at great speed and the water is all squeezed out; afterwards, it is spread out on the floor and dried by means of hot air: next it is packed in bales. Some 3,000 sheep are killed here daily, besides cattle and pigs; and about 100 men are employed. All the refuse—such as blood, bones, and entrails—is put through a special process, placed in bags and sent out as manure, which is largely used in the Colony. In a cold storage room we saw about 20,000 frozen carcasses tied up in linen bags ready for shipping. Carcases too large for export are sorted out and melted down for tallow; the lean meat, however, is first cut off, packed in tins, and exported. The tallow is run into barrels, which, when full, weigh about 7 cwts.; it is then shipped to England, America, and Holland, and made into margarine and soap. At this establishment a single store contained 2,000 barrels of tallow; and it was quite evident that an enormous business was being done.

Anxious to see the actual slaughtering process we next proceeded to the slaughter house. Here was a long corridor with pens of sheep. A door is opened, and one sheep at a time is dragged out till there are six. The operator places his knee on the body of the sheep, cuts its throat, and with a back stroke breaks the neck and opens up the throat to let the blood run out, and so on till all six are killed: next they were quickly dressed. One man can kill and dress 12 sheep per hour. Thirty-seven men were employed at this work, and they work eight hours per day.

CHAPTER XXVIII.

FROM WAIPAWA TO NAPIER.

Waipawa—Summit—1,144 feet above Sea Level—Wairarapa Valley—Bigwell Estate—30,000 Acres—Paddocks—Te Aute—Maori College and Church—Cricket, Medicine and Law—Lincoln Sheep—10 lbs. of Wool per Sheep—£500 refused for a Bull—Calves and Gentle Treatment—40,000 Sheep on one Run—Napier and Hawkes Bay.

FEBRUARY 13th.—This morning we left by train for Waipawa, travelling through a very fine country, and apparently much superior to New South Wales. As far as pasturage is concerned it is a perfect Paradise. Finally, we reached the highest point—a railway station called "Summit"—situated at a height of 1,144 feet above sea level. Here the scenery is simply grand, and on a small scale quite equal to the Rocky Mountains in the North-West of Canada. Three miles further on our train began a marvellous descent made possible by what is termed the Fell System of grips. Briefly, this systems consists of two ordinary rails, having between them a cogged rail, which is tightly gripped by two cogged wheels placed under the engine. In the Wairarapa Valley there is a large lake of the same name; close to this lake is the Bigwell Estate of 30,000 acres. Here were cattle and sheep in large numbers. After passing Masterton we traversed the Tarawera range of mountains and entered the bush country, where land is worth £10 per acre. At Woodville we branched off for Hawke's Bay; a fine pastoral country and well watered. Here large quantities of rape are grown for fattening lambs. At Takapau a Mr. Johnston has about 40,000 sheep, besides a large herd of shorthorn cattle. A few miles further on some farmers were reaping oats; the country here is very level. Mr. Ritchie pointed out an estate, some 50,000 acres in extent. The Government recently bought this large property at £6 per acre, and are now dividing it up into lots of 1,000 acres, and letting it out for settlement on a 999 years' lease at 5 per cent. on the purchase price. We stopped at Waipawa, which is a fair sized town.

February 14th.—At 9 a.m. we started in a wagonette to inspect Mr. Rathbone's farm, which is only a quarter of a mile out of town. Here our party was increased by Mr. Miller, the

Stock Inspector. In a paddock of fine pasturage, consisting mainly of English grass and clover, and we were shown two shorthorn bulls, a six-year-old called "Baron Somerton," and a two-year-old, the "Duke of Beaulieu." Both were roan coloured animals. In another paddock we saw three fine-looking heifers from the "Baron." These showed good breeding. A cow 17 years old was pointed out—the mother of the herd. At that time Mr. Rathbone had 40 bulls for sale, ranging in price from £20 to £100. He had also a good number of grade bulls for sale at £20 each. In a third paddock were three capital shorthorn cows, one of which is credited with rearing two bull calves which were sold for £80. We were told that steers bred from shorthorns mature more quickly than those from any other breed.

Next we passed through a forest; and finally came out on the banks of the river Waipawa. Here in a paddock some cows and calves were grazing—a fine-looking lot with straight backs and broad hips. Truly a treat to look upon. We heartily wished that we could have transported them to the Transvaal. Mr. Rathbone, Jr., informed us that he had about 30,000 sheep and 2,000 head of cattle. The sheep are a Lincoln cross. Last season he sold a thousand head of fat cattle—all grass fed. He annually buys a lot of lean cattle and turns them into his pastures to fatten. Mr. Rathbone keeps over one hundred animals for stud purposes. They are fed indoors in winter. This farm is about 30,000 acres in extent. There was a pleasing richness about the pastures which consist chiefly of clover, rye grass, and cocksfoot.

After lunch we started for Archdeacon Williams' place—"Te Aute." He is the son of one of the old Maori missionaries, but has retired from the church and now lives on a large estate devoting his time to breeding cattle and sheep. Here the country is very much like the Transvaal. On the way to the house we passed a paddock in which were many stud rams—Leicester and South Downs—and proceeding up the avenue we came to the Maori College and Church. The grounds are studded with trees of all kinds and nicely kept. Mr. Wilson took us i.. ..nd. He manages the estate for his uncle, who is about 70 years of age. We were taken to the cattle yards and shown some pure-bred shorthorn cows; Mr. Wilson remarking "These are not my best." We, however, thought them quite good enough for South Africa. Afterwards we went to the grounds of the College, where a number of Maori boys were playing cricket. They are fine looking lads, well built, with good muscle and big bones; several of them are studying medicine and law. In a paddock near by we noticed some Lincoln sheep. Mr. Wilson informed us that the average clip is 10 lbs. per sheep. In a second paddock we saw twenty pure bred shorthorns, and one bull, the "Duke of Derrimut." It was then that we did not wonder that Mr. Wilson had said the first lot were not his best, for in all our travels never have we seen such splendid cattle. The ordinary bull calves average about £25, but the best are worth as much as £200 to £300. £500

was refused for the bull the "Duke of Waterloo." We were next shown three bulls, 18 months old, which were worth £50 each. His cattlemen handle the calves from birth; consequently, they become very tame. This, Mr. Wilson maintains, is the secret of success in the management of cattle. His herd is never less than 2,800; and, in fact, is sometimes as high as 3,400. He has also 40,000 sheep on one run.

After spending a couple of hours here we started for the station, where we took train for Napier, and arrived about 6.30 p.m. Thence we proceeded to the hotel, which is built on the terrace and commands the sea. Here the Esplanade, finely laid with ashphalt, stretches out along the beach in a semi-circle for about a mile; while the mountains flung out on either side form what is called Hawkes Bay.

CHAPTER XXIX.

In the District of Marekakaho.

A Large Vineyard—Hastings—Lincoln and Shropshires—Marekakaho—Clydesdales—Dipping Sheep—Shearing with Machinery—Thirty-seven Machines—9 lbs. of Wool per Sheep—An Old Transvaaler—Eketahuna—Agricultural Show.

FEBRUARY 15th.—This being Sunday we could do nothing in the way of visiting farms. But in the afternoon some friends took us for a drive, and we halted at a fine vineyard belonging to a certain lady. A large quantity of wine is made here, and the cellars were well stocked; but we were not invited to sample any of the casks, probably on account of it being Sabbath. On the return journey we enjoyed a beautiful drive along the Bluff. Here ships from all parts of the world call and take cargo to Europe; and it seemed to us an ideal place to spend a summer holiday.

February 16th.—We left for Hastings, accompanied by Mr. Ritchie, and were again joined by Mr. Miller, Stock Inspector. Here a drag was waiting to take us to a Mr. McLean's station, some ten miles distant. On the way we met a mob of 3,000 sheep on their way to the railway station, where they would be trucked for one of the large freezing establishments. Along the road we passed paddock after paddock of sheep, mostly Lincolns and Shropshires.

At Marekakaho, Mr. McLean's station, we were welcomed by the manager, who mentioned that the station consisted of 49,000 acres; and carried 60,000 sheep, 3,000 head of cattle, and 400 horses. The breeding cattle numbered about 1,000, with an annual average return of 850 calves. In the run were some 200 steers—all in splendid condition. They would probably average about 1,000 lbs. dead weight. We outspanned at the station, and walked around the kraals. Here were some stud cattle, viz., two young bulls, 5 months old; five cows, each with a heifer calf, and two with bull calves. A bull, "Royal Duke 3rd," was a splendid animal. We greatly admired a champion heifer and three young bulls. In speaking of the price of cattle we were informed that 18-month-old heifers are worth £7 to £10 each. Bulls from £25 upwards. Of course, this is for pedigree stock.

In the horse paddock there were some fine Clydesdale fillies. The stallions were next shown; the two-year-old "Inverary," the champion "Clyde Bank," imported, and "Rotterdam," were all magnificent animals. The chestnut thoroughbred "Jet d'Eau," a New Zealand Cup winner, was also a fine animal. Then

we inspanned, and after half an hour's drive reached Mr. McLean's residence, where we inspected the outbuildings, men's whare (quarters), stables, stock yards, machinery, and wool sheds. A batch of fifty mares and foals, and a Kentucky trotting horse took our fancy: the way in which this animal could get over the ground was truly astonishing. Further, we saw some Clydesdale mares and foals, and several ponies of all sizes. The price of the ponies varied from £12 to £15, whilst Clydesdales are sold from about £35 to £40. It is hardly necessary to remark that Clydesdales are heavy draught horses used for farm and wagon work. In conversation with the owner regarding breeding ponies he stated that a mare—the offspring of a thoroughbred stallion with a Clydesdale—mated with a Welsh pony stallion would produce an excellent pony.

Next to the dipping of sheep. The pens being full it was a fine sight. The sheep are run from the pens down a shute into a semi-circular tank, which is made of cement and is about twenty yards long. There is just space enough for one sheep at a time to swim through the tank, which is filled with one or other of the numerous sheep dips. Men stand alongside, and with a crooked stick press the head of the sheep under the water so that the whole body of the animal is thoroughly immersed. The shearing is done by machinery, thirty-seven machines going at full swing. One man can shear 200 sheep per day. The average return of wool is about 9 lbs. per sheep. Two thousand acres of oats and barley are sown for fattening lambs; besides, there are rich grass lands. It was here that we saw the largest number of cattle, sheep, and horses together, and taken all round the quality was first class. The management and arrangement of the buildings were worthy of the highest praise. In a short space of time we gathered an amount of interesting information which it is quite impossible to put down on paper. After a pleasant day we bade good-bye and returned to Hastings. We intended visiting the Hon. J. D. Ormond's station, but, unfortunately, time would not permit us. Just before reaching our destination we inspected an orchard of about a hundred acres planted with vines, peaches, plums, etc. Packing for the English market was in full swing, and the fruit was excellent. Here we met an old Transvaaler, Mr. Clarkson, who is farming in this district. To converse with him was quite like being at home again.

Mr. Beamish, a large cattle and sheep farmer, kindly invited us to visit his station "Whana Whana," but, again, much to our regret, we could not spare the time. His run consists of some 30,000 acres; he has 38,000 sheep; 2,000 cattle, 750 of which are breeding animals; besides many horses. His chief breeds of cattle are Shorthorns and Polled-Angus, which he usually sells when one year old.

February 17th.—This morning we started for Eketahuna on our way to Masterton to attend the Agricultural Show.

CHAPTER XXX.

TWO DAYS AT TE RONGITUMA.

Masterton—Te Rongituma—An Agricultural Show—A Morning Ride—Stores, Freezers and Fats—"Colonist," worth £1000—Beagles—Prices of Stock—Hereford for Beef—A Transformation—Clearing the Bush—Wellington Department of Agriculture.

FEBRUARY 18th.—At 1 p.m. we arrived at Masterton, and were met by Mr. Stuckey, who owns a large farm in this district. His place is called Te Rongituma, and is about nine miles out. We had lunch at his town house, and next proceeded to the show grounds, where live stock, produce, machinery, etc., were exhibited. We were particularly interested in the live stock department. There was a splendid assortment of sheep, consisting of Lincolns, English Leicesters, Border Leicesters, Romney Marsh, South Downs, Shropshires, and Merinos. The South Downs and Shropshires have fine big carcasses, and should do very well in the Transvaal. The wool is short, the average obtained from each animal being about 7½ lbs., but a good price can be had for it. Amongst cattle, Shorthorns, Herefords, Jerseys, Ayrshires, Polled-Angus, were all exhibited and made a very good show. We especially admired Mr. Stuckey's Herefords. This gentleman carried everything before him. Clydesdales were the best horses exhibited.

At 3 o'clock a general procession took place opposite the grand stand. About fifty well mounted Maories headed the march to the accompaniment of the band; next followed the prize winning ponies, and horses in single and double harness. Altogether it was a superb turn out. Afterwards came the jumping competition, then races and a trotting match. We were seated in the circle with the judges and stewards, and our opinions were requested on many points. The jumping competition was excellent, not a single horse refusing to take the somewhat stiff jumps; but in the driving match the drivers seemed rather awkward with the reins. Towards the finish four mounted men with rifles cleared three hurdles very prettily, and then dismounted while one man brought the three horses back over the hurdles. In many respects this show differed from those we have seen in South Africa, but we think several items in the programme might be adopted with great advantage in the Transvaal and Orange River Colony.

Leaving the show grounds we accompanied Mr. Stuckey to his farm, arriving about 8 p.m. After dinner we had a long and interesting chat with our host on the subject of cattle breeding.

February 19th.—At 6 a.m. we started on horseback for an inspection of the Estate. The first herd of interest consisted of of some Hereford heifers and steers, most of which had been reared for store cattle. The farmers in the "Back Country," or hilly districts usually sell their stock as "stores"—not fat enough for market. These "stores" are bought by farmers who have cultivated lands where they can "top off" the sheep and cattle on English grasses, rape, turnips, and green forage and sell them in, say, six months—the sheep as "freezers," the cattle as "fats." Of course, many farmers have both agricultural and grazing lands.

Wending our way up zig-zag hills we came to another fair-sized herd of store cattle. Still ascending we reached a large clover patch where a flock of sheep were grazing, likewise some Clydesdale fillies; continuing our journey we next encountered a herd of pure bred Herefords; handsome and well fed, these animals looked the picture of health. From here we travelled to the highest point in the district, which is called Stuckey's Kop. It is 2,000 feet above sea level. Here we were glad to rest for a little. On our homeward journey we inspected large flocks of Southdown sheep. Getting down to the plains again we came across a yard with a number of pure bred Hereford cows and calves, some two-year-old bulls, also some fine Clydesdale fillies. Further along, we were shown another herd of Herefords. Next we inspected some mares and foals which took our fancy. From here we went to a paddock near by which was reserved for 26 bulls; all young, save one—an eight-year-old Hereford called "Colonist," worth £1,000. In an adjoining paddock there were about a hundred fine looking steers ready for market. Just at this moment Mr. Stuckey met with a nasty accident. While rounding up some cattle for us to see, his horse put its foot into a hole and fell heavily, coming down on the top of his master. Though badly bruised Mr. Stuckey pluckily mounted again and accompanied us, but we were afraid he must have suffered considerably. We then went to see his Clydesdale stallion—"Middle Stamp"—which is unquestionably a very fine animal. Here also was a special paddock for calves which have been weaned from their mothers. The cows are kept in an adjoining paddock. A few Jersey cows supply the household with milk and butter. Lastly, we were shown a fine two-year-old Clydesdale stallion, "Sandy MacArthur." This terminated a very pleasant morning's work, during which time we were four hours in the saddle. Just before going into lunch we saw some beagles, as the small hounds kept for hunting hares and other small game are called.

After lunch we adjourned to the office and had an interesting chat on agricultural matters. Referring to the price of stock Mr. Stuckey informed us that he would deliver free on board at

Wellington 10 bulls at £20 and 15 heifers at £15, all pedigree Hereford stock. Southdown rams can be purchased at £5 per head. He advocates cross breeding for weight; as for instance, a Lincoln ewe with a Southdown ram or a Merino ewe with a Southdown ram. To improve his pasturage Mr. Stuckey sows English grasses. After a long experience with Herefords, he considers them to be the hardiest of all cattle. He recommends them solely for beef. Those we saw would be hard to beat; giving good weight and being moderate milkers. His Southdown sheep are likewise worthy of praise. This visit was a striking proof of what can be done by an energetic man in a short time. Twenty-three years ago this beautiful farm was all forest. Since that time 3,000 acres of land have been cleared of heavy timber. Verily a vast undertaking in a country where the bush is so hard to handle! But much of the best land in New Zealand is covered with heavy bush, which has to be cleared before grass can be sown. After having felled the trees a month or so is allowed for the fallen timber to dry. Then the whole is burnt. The lighter logs are rolled into the gullies. Grass seeds are now sown; and aided by the immense quantity of vegetable ashes soon take root. When the grass is a few inches above the ground cattle are turned in to facilitate the gradual clearing by breaking up the smaller timber. This bush land is particularly valuable and if lying close to a railway line it is often profitable to spend a considerable amount of money in order to prepare it for cropping. In clearing land the stumps of trees present the greatest obstacles, and it often becomes necessary to burn them out of the ground, or drag them out by traction engines, or lift them by powerful levers. Ploughing and harrowing tend to remove many of the larger roots; while the remainder are left to rot in the course of time. The finest dairying land in the Taranaki Province was once heavy bush.

Mr. Stuckey has now a fine house, substantial and well-planned outbuildings, and good veldt for his animals. This property is fenced off into different paddocks with neat gates at the entrance. Indeed it is fitted up with almost every modern convenience. Bidding good-bye in the hope of a speedy re-union we drove to Masterton to catch the 3.30 train for Wellington. In the train we met Mr. T. W. Kirk, F.L.S., Government Biologist, and Mr. Blundell, Government Stock Inspector at Wanganui. We reached Wellington at 7.30.

March 20th.—Visited Mr. Kirk's office and spent a very instructive hour with this gentleman, examining specimens of seeds, etc. Next we proceeded to the Veterinary Department, where we met Mr. J. A. Gilruth, M.R.C.V.S., Principal Veterinary Officer and Bacteriologist. He informed us that he had twenty-five experts under him who were all kept busy. We spent a considerable time visiting the laboratories and other places of interest. Here we also met Mr. J. A. Kinsella, who is the Dairying Commissioner.

CHAPTER XXXI.

FROM LYTTELTON TO CHRISTCHURCH.

Lyttelton—Christchurch—The Sunnyside Lunatic Asylum—Flax—Mangels—Peas—Cow Shed—Fifty Cows in Milk—1,200 Gallons of Milk per Annum—Stud Racehorses—The Cathedral—The Moa—War Curios and Carvings—Cocksfoot Grass Country—Lake Ellesmere—Eighteen Miles Long and Twelve Miles Broad—Little River—The Mill—Cocksfoot Grass for Seed—An Annual Output of 80,000 Bags—Lincoln College—Thirty Students—Sheep Feeding Experiment—Fifty Self-Binders—Wheat—54 Bushels per acre—4s. 1d. per Bushel.

IN the evening we started by steamer for Lyttelton, and after a good passage arrived next morning about 9 o'clock. On entering the harbour the view of the city and the surrounding country was very beautiful. Large steamers come up this harbour and land cargoes at the wharf. After landing we took train to Christchurch, where we arrived at noon.

Christchurch, the City of the Plains, the centre of a rich agricultural and pastoral district, is the headquarters of that frozen meat trade which has proved such a source of wealth to the Colony. It is seven miles from the sea, and is connected by railway with Port Lyttelton. A range of hills between the city and the sea is pierced by a tunnel more than a mile long. The city is on the Canterbury plain and is intersected by the beautiful river Avon, the banks of which are lined with weeping willows. The houses of Christchurch are mostly constructed of wood and painted red. It is a pleasant town, with everywhere the appearance of old-world comfort and contentment. The city and surrounding country were settled in 1849 by the "Canterbury Association" of which the Archbishop of Canterbury and Lord Lyttelton were prominent members. The intention of the founders was that the settlement should consist solely of members of the Church of England, but curiously enough, Christchurch, although it retains a distinct Anglican air, is now the stronghold of Methodism in New Zealand. The combined population of the city and suburbs numbers over 60,000.

The Canterbury Plains, so famous for mutton and cereals, are about 220 miles broad. On the east they are bounded by the sea, and on the west by the splendid mountain ranges, whose peaks are crowned with perpetual snow. These plains are watered

by seven noble rivers and innumerable streams; some of which when in flood are over a mile wide. Here also amidst marvellous scenery are several of the glacier fields, for which New Zealand is justly renowned. Sheep and cattle raised on these plains command the highest price on the London markets. In the selection of this site the Canterbury Association made no mistake.

At 2 o'clock, accompanied by Mr. Pemberton, the secretary, and several other members of the Canterbury Agricultural and Pastoral Society, we started for a drive in a drag drawn by four spanking horses. We first visited the Sunnyside Lunatic Asylum. Dr. Levigne, the head of this establishment, is an enthusiastic agriculturist and keeps a stud of very fine Ayrshire cattle. At this Institution the inmates work on the farm and in the vegetable gardens, thus providing for their own needs, as well as lessening the cost to the State.

Then we were shown the bull "Prince Charlie," some two-year-old heifers and cows. These were all choice animals. Next we visited the piggery. It is a long building with ten pens on each side and a space in the centre to allow the men to pass up and down for the purpose of feeding the animals. Each pen contains five pigs; on the one side fifty pigs were being fattened for market, while on the other side were the sows for breeding. Attached to this building is an enclosure for the pigs to run about in and at the end a sleeping shed.

In the adjoining paddock we saw a crop of flax. The flax fibre is made into rope and binder twine, as it is not fine enough for making linen. This industry might well be introduced into South Africa. The plant is a coarse variety of the Irish flax. The flax seed, or as it is commonly termed linseed, is used in the manufacture of linseed oil. The residue left after the oil is pressed out constitutes the valuable feeding material known as linseed cake or linseed meal. The whole seed is sometimes scalded and fed to calves. We also saw several fields of mangels, which are used for feeding cattle. In another paddock we saw twenty-five one-year-old heifers. These showed splendid breeding. Peas are largely grown at this place.

We were then taken to the cow shed, where there were about fifty milking cows. Everything is kept scrupulously clean, and the cows are groomed after milking. The milk of each cow is weighed and the amount placed against the cow's name or number in the Daily Register. By means of this record you can see at a glance the quantity of milk given by every cow for each day during the milking season. Dr. Levigne informed us that he would not keep a cow that gave less than 800 gallons of milk per annum. One cow was pointed out as having given sufficient milk in one week to make 25 lbs. of butter. This was ample proof that the Ayrshires are good milkers, and confirmed what we had already heard about this breed at Dr. Hay's farm in New South Wales. Next we went to Mr. J. B. Reid's stud farm to

see his racehorses. Here we saw some splendid stallions, mares, and geldings, all of which are descended from the celebrated "Musket," the sire of "Carbine."

To-day being Sunday we took a walk around the town of the Cathedral, which, by the way, has been twice shattered by earthquakes. It is now being rebuilt. In the afternoon, accompanied by Mr. Ritchie, we visited the Museum, and were much interested in seeing the skeleton of the now extinct bird called the "Moa." It stands about twelve feet high. The natives affirm that some of these birds still exist in the inaccessible forests of the interior. We also admired the war curios and carvings of the Maori people.

February 23rd.—Started this morning for Little River—in the Cocksfoot Grass Country. On the way out we passed a lake 18 miles long and 12 miles broad, which is known as "Ellesmere." All kinds of wild fowl and black swans congregate on this water.

At Little River we were met by Mr. Crooke, who drove us to his house. After lunch we were taken to the mill where they were busy thrashing out the cocksfoot grass for seed. This is a large industry, the yearly output being 80,000 bags, each bag weighing 80 lbs. The present price is 5½d per lb. They sow 25 lbs. to the acre, and get a return of three bags. Cocksfoot was originally sown for sheep on hilly and poor country. But it grew so well on this otherwise waste land that the sheep have now vanished in favour of the grass seed industry. A Mr. Montgomery informed us that he had 1,300 acres of cocksfoot under crop.

Leaving here we proceeded by train to Lincoln College and were met by Professor Lowry, the Principal, who invited us to his house. On the road we passed several fields of wheat just harvested. The College is a handsome structure with extensive grounds. It is practically self-supporting, but receives a small annual grant from the Government. New Zealanders deserve great praise for having such a splendid Institution where young men can receive a thorough technical training under the able tuition of Professor Lowry. Here we again met Mr. Michael Murphy, sometime secretary of the Agricultural and Pastoral Society, who is still greatly interested in agriculture. There are over thirty students attending this College, which cost about £10,000. After lunch, conducted by Professor Lowry, we made a tour of inspection of the farm buildings and live stock, and saw several varieties of sheep, including Leicester, Shropshire, Border Leicester, and for the first time the Dorset Horned. Experiments are being conducted here by crossing Southdowns and Merinos with Dorsets, and crossing the lambs for fattening.

In a paddock we saw a fine lot of rams, namely, Border and English Leicesters, Southdowns, Shropshires, and Lincolns. These were all for sale. One Lincoln ram was pointed out for which 23 guineas had been paid. A Dorset ram crossed with a Merino ewe gives a heavy lamb, weighing 40 to 45 lbs. at five months. Tests were also in progress with the thousand headed kale for fattening lambs. In another paddock cows, heifers, and bullocks

were being fattened as an experiment. We saw some capital Shorthorns and Herefords, and a fine lot of Clydesdale mares and foals. In a wheat field two *American reapers* and binders drawn by three horses were at work harvesting a heavy crop. We closely examined the binders, which were certainly a marvel in construction and most interesting to watch at work. At one farm in this district—Longbeach—Mr. Grigg uses fifty of these binders to reap his wheat and oats.

After bidding good-bye to the Professor we returned to the railway station, where we fell in with a farmer who told us that it had been a very good season for wheat, he himself having harvested 54 bushels to the acre. He had just sold this wheat at 4s. 1d. per bushel, and calculated that the whole cost of production, including rent, sowing, ploughing, and cartage, was £1 12s. per acre. We reached Christchurch late the same evening.

CHAPTER XXXII.

HILLS UPON HILLS OF SHEEP.

Kiarakia—Merinos—Shelter Belts—A Scotch Shepherd—Wool Washing—Southdowns—Dipping Regulations—Rakaia River—Studholm.

FEBRUARY 24th.—This morning we started by rail for Sir John Hall's station—"Kiarakia"—and left the train at Glen Tunnel Station. We were accompanied by Mr. H. Overton, who, in the absence of Sir John, looks after the place. There are 30,000 sheep on this station, chiefly Merinos. Turnips and rape are the only crops grown, and of the latter there were 1,400 acres under cultivation. Rape and turnips are used for fattening lambs. At the last clip 808 bales of wool were obtained. We left the homestead in two wagonettes, and drove over the station for about fifteen miles. It is one vast sheep country; every hillside is literally covered. You wonder where they all come from.

One thing in particular attracted our attention. Trees are planted in rows about five hundred yards in length. These provide shelter for the sheep from the cold in winter and from the heat in summer. This idea might well be adopted by farmers in the Transvaal. The shepherd who met us (it is unnecessary to state that he is a Scotchman) has been on this station for thirty-seven years.

First we saw in a paddock about 1,500 wethers, Merinos and cross breds. These cross breds were fine and large and in good condition. Then we came across 500 stud Merino ewes in a separate paddock, next 1,000 lambs, and in another paddock 1,000 cross breds (Leicesters and Merinos), and still further along 1,500 cross breds (Merinos-Southdowns). We were then shown a flock of 5,000 pure bred Merinos, which, in our opinion, were nearly equal to those in the Transvaal before the war. About 300 choice lambs and 70 Merino rams, with a few Southdowns, made a fine flock. In another paddock we saw 300 Merino rams and 1,000 extra fat lambs. We were told that the latter would bring 15s. each. Then 3,000 Merino ewes, and lastly 2 Merino rams, which had just arrived from Mr. Gibson's place in Tasmania, and cost £50 each. Those mentioned were all in different paddocks. The shepherds bring them together with dogs, which are all trained to the work. The farm buildings are well built, and the dwelling-houses prettily situated. We met one of Sir

John's sons, who, with Mr. Overton, explained many points regarding sheep farming. Cross breeding is carried on in the following manner :—

Leicester ram-Merino ewe.—This gives wool next to the Merino in quality. Cross the ewe with a Southdown ram and you get a good sheep for fattening; cross the progeny with a Leicester ram and you get a three-quarter breed, which gives a good lamb for fattening purposes. On this estate the rams are put with the ewes about April and allowed to run for about five weeks. The yearly turn over is about 9,000 sheep and 5,000 lambs. From here we proceeded to Coalgate Station, and then took the train back to Christchurch.

February 25th.—Visited Mr. York's place. This gentleman has a fine orchard, also a large wool washing establishment. Then we drove to Mr. Overton's place, which is about half an hour out of town. He goes in for breeding Southdowns and sells the rams. We noticed two ewes and a ram imported from the breeder—the Duke of Richmond—and twenty-four ewes, nine imported, also from the Duke, which were altogether too fat for breeding purposes. Mr. Overton was trying to reduce them to proper condition. He sells rams at £30 each, and the demand is greater than he can supply. Mr. Overton is a great believer in Southdowns, and maintains that the crosses from this breed give the best lambs for fattening.

We regretted we had not sufficient time at our disposal to see more of his stock, but we had to catch the 11 a.m. train; so after bidding farewell we left for the Christchurch cattle market, which is held three days in the week.

In the pens large numbers of fat cows, oxen, and sheep were being sold by different auctioneers. One part of the yard is devoted to the sale of breeding sheep and store cattle, so that farmers know exactly where to go. In the yard there is a dipping tank for sheep. The New Zealand Stock Act provides that any man putting sheep in a public sale yard that are either scabby or have lice is subject to a heavy fine. Consequently, dip is furnished at a small fee to those owners who wish to make certain that their sheep are clean. Government Stock Inspectors attend the sale yards to enforce this regulation. This is in addition to the law requiring all sheep to be dipped twice a year. To this strictly enforced law New Zealand owes its present freedom from scab.

Took train for Waimate at 11 o'clock, and during the journey passed over a bridge one mile long built across the Rakaia River. Changed trains at Studholm and entered a fine grain country.

CHAPTER XXXIII.

A CEREAL COUNTRY.

Waimate—Reapers and Binders—An Estate—10,000 Acres—A Chaff Cutter—Draining Ploughs—Wheat—A Golden Harvest—Glenary Railway Station—Land £15 to £20 per Acre—Taieri Downs—Oats—Eighty Bushels per Acre—Milton—Government Poultry—Pottery Works—A Woollen Factory—Dunedin—Province of Otago—The Scotland of the South.

WE reached Waimate and were met by Mr. Douglas, whose guests we were to be during our stay. There were crowds of townspeople at the station when we arrived, amongst whom were many school children, who were evidently curious to see what we looked like; driving away amongst the cheers of the youngsters, we proceeded to Mr. Douglas' farm. From the homestead we went to a field where they were busy cutting oats with two self-binders. The binders were drawn by three Clydesdales; each team working three hours at a stretch, relays being kept on the field so that no time was lost. The estate is 10,000 acres in extent, of which 5,000 are under oats, 500 under wheat, 800 under turnips and rape. The sheep are the Border Leicester breed. Mr. Douglas buys stock for fattening, which he keeps for a couple of months and then sells.

February 26th.—We got up early and inspected the stables, wool shed, implement houses, and pens for sorting sheep, and the piggery, in which were Berkshires and Yorkshires; also the blacksmith and carpenter shop, church, and store. Here, in fact, there was quite a little village, and the whole was well laid out.

We were shown a chaff-cutting machine. As the oat sheaves are cut the chaff falls into bags and is pressed down by a very heavy weight. One hundred lbs. are pressed into each bag, and as much as five tons can be cut and bagged in an hour. It struck us as being a better system than that in vogue in the Transvaal, where a certain amount of waste is unavoidable. By this method nothing is wasted.

At noon we went in a drag and four horses for a drive around the property. We passed through a narrow gorge and reached some fairly open country. Here, for miles upon miles, huge

tracts of wheat and oats were ready for reaping. On our way we passed a large stretch of ground formerly under water, but now good fertile land due to proper draining. Draining ploughs have been used with excellent results in many parts of New Zealand during the past few years. Thousands of acres of cold clay lands have been reclaimed by them and converted into fertile agricultural and pastoral land. The plough is worked by horses (10 to 12 in a team) or by a traction engine, and it is estimated that drains can be constructed at a cost of a penny a chain or even less. The land here is now worth £20 per acre, and produces the finest wheat and oats.

We drove out about six miles. Everywhere there were sheep. On returning home we came across a wheat field of about 500 acres belonging to our host. We had heard of the "Golden Harvest." Certainly it was here of a truth: for before us lay one limitless sweep of living gold—the ripening grain—glowing under a splendid sun. It was indeed a wonderful scene, and such as we shall not soon forget. We have never seen grain growing on so grand a scale.

After dinner Mr. Douglas' drag with four fresh horses was waiting to take us to the Glenary Railway Station, a distance of twenty-three miles. We followed the river for a long distance, the surrounding country being largely stocked with sheep. The price of land about here is from £15 to £20 per acre. The harvest was in full swing and we again saw several binders at work in the wheat and oat fields. We travelled the distance of twenty-three miles in 2¼ hours, which, considering that the roads were heavy, was fairly fast.

It was with much regret that we parted from Mr. and Mrs. Douglas, and we were much indebted to Mr. Douglas for his trouble in showing us so much of the country, as well as to Mrs. Douglas, who was kindness itself, and made the ladies and, in fact, everyone very comfortable, and we will long remember their hospitality.

From Glenary to Dunedin. The scenery along the route is very good. High up on the hill a monument has been erected to the late Sir John MacKenzie, Minister of Agriculture, who died last year. The railway line runs close to the sea along here, and the view is very good. We reached Dunedin thoroughly tired out after our long railway journey.

February 27th.—This morning we turned out early and took train for Milton, traversing a part of the Taieri Downs, which is a fertile cereal country, some farms yielding as much as 80 bushels of oats and 50 bushels of wheat to the acre.

At Milton we went to see the Government Poultry Farm and were taken in hand by the manager. This place is four acres in extent, with a river running through one end. The fowl-houses are built of wood, and are neatly arranged with nice runs. The usual sorts of fowls are kept; from November until the month of June all the stock hens are kept in a pen by themselves. A

rooster is then put with every 15 hens until November. These hens are fed on pollard and bran. In reply to the question, "which are the best layers," the manager replied "Any sort as long as they lay regularly; but it is desirable to keep birds of good weight so that if required they can be used for the table."

From the fowl-house we went to the duck runs, and saw a fine collection of Pekin and Aylesbury ducks. We were informed that the Pekins are the hardier, and are ready for the table in ten weeks. Some birds of this breed weigh 8 to 10 lbs. at three months.

Speaking of lice on fowls we were informed that lime is good for washing fowl-houses, but does not destroy lice, and is by no means a preventive. The best known remedy is to spray with a solution of carbolic. The manager has no faith in incubators, as after a long experience he has found that only 50 per cent. of the eggs hatch out, whereas with sitting hens 80 per cent. can be relied on.

After lunch we visited a large pottery works, which proved very interesting, and we see no reason why the same industry should not be carried on in the Transvaal.

Next we went to Mossgiel, a woollen manufactory, and saw the process of making tweeds, blankets, and shawls, and all woollen goods. We also hope to see this industry started in our own Colonies at no distant date. Here the whole process of manufacture can be witnessed from the time the wool is in its raw state until it is finished as a blanket. The manager very kindly presented each member of the party with a beautiful rug as a memento of our visit.

Next we journeyed to Dunedin. If Christchurch is an English town, Dunedin, with Port Chalmers, is assuredly Scottish. Dunedin, in the Province of Otago, was founded in 1848 by the Scotch Presbyterians, who bade farewell to their native land with the words:

"O God of Bethal by whose hand
Thy people still are led."

Its foundation was largely the outcome of the Scottish disruption which resulted in the formation of the Free Church of Scotland in 1843. The Otago pilgrims were led by the Rev. Dr. Burns, a nephew of the Scottish poet. In educational matters the Province of Otago is easily first in New Zealand. And here in Dunedin there is a well equipped University, with faculties of Art, Science, Law, and Medicine, and a staff of twenty-eight professors and lecturers; excellent High Schools, and two of the finest Presbyterian churches in the Southern Hemisphere. Truly the citizens of Dunedin have not forgotten the precept of their great countryman who strove to erect a kirk and a school in every parish. After visiting several of the principal buildings we took a cable tram to the top of a high hill from which we had an admirable view of the town and the surrounding country.

Otago has been called the Scotland of the South. Amongst the mountains and the lakes the scenery is wild and rugged; yet many parts of the Province are well suited to agriculture. Sheep and cattle thrive and cereals and many semi-tropical fruits grow well. Over the whole of New Zealand Otago leads in the production of oats, so the Scotch folk of the South need not go without their porridge. The energy of the people in this corner of New Zealand is evident from the fact that there are nine freezing and meat preserving works, and over five hundred industrial establishments. Further, although the whole population is only about 175,000, the value of manufactured goods is over £2,000,000 per annum.

CHAPTER XXXIV.

A North Coast Trip.

Cleaning Grass Seeds—New Zealand Creamery—Technical College—Woollen Establishment—Lyttelton—Palmerston South—Wellington—Palmerston North—Weraroa—Government Experimental Farm—Angora Goats—Black Garton Oats—Awapuni—Agricultural Show Grounds—2,000 Head of Cattle—Hawera.

FEBRUARY 28th.—This morning, accompanied by Mr. Fraser, Stock Inspector of the District, we inspected the Grass Seed Cleaning Works, of which Messrs. Moritzon & Co. are the proprietors. At this establishment large quantities of cocksfoot, rye, flax, and other seeds are cleaned. In highly cultivated ground many weeds grow up with the crop, and it becomes necessary to separate with special winnowing machines the good seed from the bad. It is then possible to sell to farmers clean seed of the several varieties of grasses.

We next visited the New Zealand Creamery, an enormous factory which turns out from seven to ten tons of butter weekly. Looking at the great mass of butter ready for shipping we wondered where or when it would be consumed. All butter and cheese factories are examined by Government Experts, who report if everything is being done to maintain the reputation New Zealand has already gained in the English and European markets. We were much impressed by the up-to-date methods adopted here.

We next visited a Technical College, where a great number of country school teachers study trades which are likely to be of use in their profession. The women take courses in cooking, sewing, and domestic science; while the men go in for carpentry blacksmithing, etc. We then proceeded to Messrs. Ross & Glendenning's woollen establishment, and were shown many varieties of shawls, blankets, etc., all of which are manufactured in the South Island.

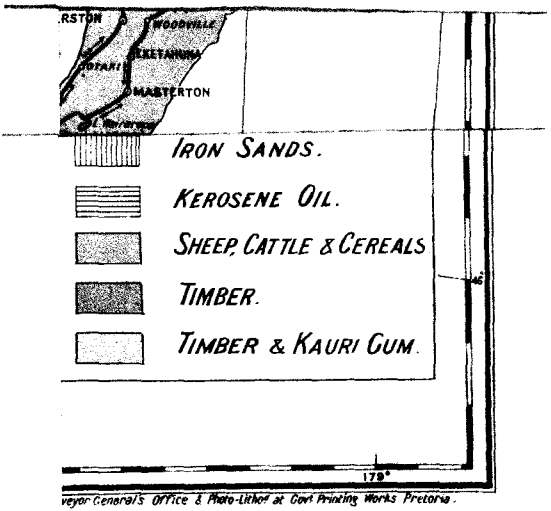
At 11 o'clock we started by express train for Lyttelton; and on leaving the station were given a hearty send off by the many friends whom we had met during our short stay in the district. At Palmerston South we were met by Mr. Douglas, Sen., of the Mount Royal Estate. This is a run of 23,000 acres, and carries 35,000 sheep. At Ashburton we were introduced to Mr. Taylor, a nephew of Mr. Blignaut, well-known in the history of the Orange River Colony. From Christchurch we proceeded to Lyttelton and took boat for Wellington, arriving next morning about breakfast time.

March 1st. — Spent a very pleasant afternoon with Mr. Ritchie, Secretary for Agriculture, who has a delightful home.

March 2nd.—Started for Palmerston North on what is called the West Coast Trip. We travelled by the only proprietory railway in New Zealand, namely, the Wellington and Manawatu. After passing through several tunnels we came to a fine open piece of country. Here were many Maori settlements, such as Otaki. We left the train at Weraroa, and got into a trap which was in readiness and drove to the Government Experimental Farm. This farm is 800 acres in extent, and has only recently been taken over by the Government. Mr. Ritchie explained the many difficulties that had to be overcome in clearing the bush before farming operations could be begun. Land here is worth £25 per acre. We had a long walk over the farm and came to a part of the bush that was not yet cleared. This gave us a good idea of the labour that was required before this farm could be cultivated. Twenty-one Angora goats have been imported; we hold that the veld here is too rich for these goats. They thrive better in poor country, and like plenty of room. The orchard is, as yet, only in its infancy, but notwithstanding some of the trees were bearing fruit; while the vegetable gardens were in good condition. Onions, carrots, rhubarb, and celery were all flourishing. A small plot of ground was being prepared for experiments with grasses. Towards the farmhouse we saw some fine fields of "Black Garton" oats; just the sort that should answer well in the Transvaal. Next we inspected the dwelling-house and the men's quarters. After lunch we visited a fairly large building where the stallions are kept. It is conveniently fitted up, and the horses are available for the use of the farmers of the district at a small fee. One imported stallion that cost £225 is a fine-looking animal, and should throw good stock. In an adjoining paddock were some mares and foals of the type sent out to South Africa during the war. Finally, we were shown some shorthorn cows, and a two-year-old bull bought from Mr. McLean, whose station we had already visited.

Leaving here we took train for Awapuni for the purpose of seeing Mr. Luxford's herd of Ayrshires, and were met at the station by several townspeople, amongst whom were a Maori Chief, his wife, and daughter. Mr. Luxford's farm is only 160 acres in extent; but the soil is rich and the pasturage splendid. He has 50 acres under oats and turnips, and milks fifty cows, which give a daily average of 3½ gallons per cow. There is one cow that yields as much as 6½ gallons daily. Here, again, Ayrshires have proved the best milkers. His bulls and heifers are all pedigree stock; he sells freely, but the demand is much greater than he can supply. By means of an excellent artesian well water is conveyed to all parts of the lands.

We then drove to Palmerston North. After being introduced to several members of the Agricultural Society, we went to the Agricultural Show Grounds. This place is nicely fitted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up with stables, cattle sheds, poultry sheds, machinery houses, etc. Here we remained for about an hour. In the evening we were entertained by the local club.

March 3rd.—This morning we left town in a drag, accompanied by Messrs. Luxford, Duncan, Blundell, and several other gentlemen. The first call was made at Messrs. Nathan Bros.' farm, which is situated about four miles out of town. We were met by Mr. Nathan, who took us to the stables where there were two specially fine stallions, viz., "Pretoria" and "Hereward the Saxon." The latter has taken prizes at several shows. We were told that the owners of this place do a large trade in horses. Border Leicester sheep are kept here, and looked remarkably well. Although dairying is not carried on here there are, however, several creameries in the district. A good harvest of "Black Garton" oats had just been reaped.

Next we visited Mr. McHardy's farm. His father was the celebrated shorthorn breeder of New Zealand, and a very popular man. He died about three years ago. The estate is now being worked by the sons. It consists of 1,600 acres; there is a second property at Hawke's Bay. Immense quantities of turnips are grown on the Hawke's Bay estate for feeding about 2,000 head of cattle. The bulls and heifers are all pedigree stock, and make from £15 upwards. It was astonishing to note the amount of care taken with the calves; and the high selling price set us marvelling. We sincerely hope that systematic breeding may be taken up in the Transvaal in the near future. For we are convinced that the same success could be easily attained with an equal amount of care and attention.

Thence we drove to the Fielding Railway Station, journeying by train to Hawera, where we were received by the Mayor (Mr. Robins), and eight of the City Fathers, and after lunch we were driven round the town.

CHAPTER XXXV.

The Momohaki Experimental Farm.

A Cheese Factory—Mount Egmont—8,000 Feet High—Waverley—Thrashing Machines—Poultry Establishment—Experimental Plot of Grasses—Wanganui—Local Races—Island of Motoa—Pipiriki.

MARCH 4th.—Started this morning from Hawera, accompanied by the Mayor and six other gentlemen, including Mr. Dean, Stock Inspector of the District. This is chiefly a dairying country, the land being worth about £25 per acre. After passing through a small valley we were taken to a cheese factory which is owned by Mr. Robins. The cows in connection with this place return an average profit of £10 per annum, and the manager maintains that this is one of the most profitable branches of farming. We would strongly urge farmers in the Transvaal to take a greater interest in dairying. For in addition to the advantage of being paid ready cash a constant supply of manure adds largely to the value of the land. When at this place we were within a few miles of Mount Egmont, which is 8,000 feet high, its summit being covered with snow.

We left Hawera for the Momohaki Experimental Farm. Proceeded by train to Waverley, and after a drive of about five miles reached the farm. Here oats and turnips for fattening lambs are the main crops. In one paddock we saw a large flock of Border Leicester rams, and in another field a lot of six-month-old ewes. The Government sells pure bred bulls to farmers who have good cows. After lunch we inspected the farm buildings and the orchard, which is neatly enclosed with well trimmed hedges, and contains many different kinds of trees.

In the farmyard we saw a thrashing machine which is worked by means of a 7-H.P. oil engine. It consumes four gallons of oil in eight hours and cost £350. There was also a belt attached which ran a machine for crushing oats, maize, etc. We would recommend all our own farmers who can afford to purchase such machines to lose no time in doing so, as they save much time and labour. Cultivators, disc ploughs, drills, etc., in fact, all the implements on this place were of the latest design.

Next we paid a visit to the Horse Department, and were much impressed by "Danger Signal," a Shire stallion recently imported, which was presented to the Colony by Lord Rothschild. The other stallions seen were "St. Ryferium" (£320), "Basuto" (£350), "Ananias" (£160), and "Saxony." These were a fine-looking lot, and we particularly admired "Basuto."

Then we proceeded to the Poultry Establishment, where there were over 400 ducks, mostly Pekin and Aylesbury. There

is a great demand for ducks' eggs, and 10s. a dozen is readily paid for them. The incubator is largely used, and is considered a success.

Afterwards we went to visit the cattle and sheep, and saw a good ram (Border Leicester) that had recently been purchased for £20. In conversation with Mr. Ritchie we were informed that in cross-breeding, whilst the first lot may be good sheep, continual crossing of the progeny will often lead to degeneration. Lastly, we were shown an experimental plot of grasses in which cocksfoot had made the best growth. This concluded our visit. We then took train to Wanganui, where our wives, whom we had left behind for the last two days, rejoined us.

March 5th.—Having a day to spare we decided to visit the local races. The Race Club kindly provided us with tickets of admission. We were much interested in watching the large assemblage of Maories. They had their faces profusely tattooed all over, while the married women were tattooed under the lower lip to about half way down the chin. Their manner of greeting, viz., by rubbing noses, amused us greatly.

We arrived at the racecourse at 11 o'clock in a drag which was placed at our disposal. The course was nicely laid out with flower beds, ornamental trees, etc. The attendance was large and the racing good. We enjoyed the day very much and saw many fine animals.

March 6th.—We started up Wanganui River at 7 a.m. on a steamboat. The Wanganui is one of the most beautiful of forest rivers. Mile upon mile its broad waters flow between green banks studded with the flax, the mimosa, and the golden plumes of the tall pampas grass. Sometimes, we passed canoes with the natives, naked and kneeling, paddling with their faces to the prow. Mr. *Ritchie, having to go back to Wellington, left us here, after promising* to meet us again at Auckland. Mr. Blundell accompanied us on this trip. About twenty miles up we came to some rapids which were very shallow, but our boat being flat-bottomed glided easily over. It is no easy matter to cross these rapids against the current. However, this is done by fastening a wire some distance upstream, when by the aid of a windlass the boat is pulled up. We passed several Maori settlements. At one place there is a large island in the middle of the river called "Motoa." This island is celebrated for a fight that took place on it about thirty years ago. This occurred between the friendly Maories and a tribe called the "Haukaus." The Haukaus were entirely wiped out. A monument was erected in honour of the dead. Here and there the banks of the river, covered with dense tropical vegetation, rose to a height of at least three hundred feet. Everywhere were palm trees. It was a beautiful trip, and the scenery was magnificent beyond expression. The reflection in the still clear water was simply marvellous, in fact so strangely confusing that at times it was hard to tell whether you were standing on your head or your heels. We arrived at our destination, a place called Pipiriki, and proceeded to the hotel.

CHAPTER XXXVI.

In the Land of the Geysers.

Waioura—Mountain Covered with Snow—A Volcano—Lake Taupo—500 Feet Deep—Communication by Carrier Pigeons—Wairakei—Huka Falls—Weird Sights—Rotorua—Waitapu—Largest Geyser in the World—Haka Dance—Thermal Springs—Maori Settlement—Pohutu.

MARCH 7th.—Started this morning with coach and five horses for Waiouru, a distance of forty-two miles. Shortly after leaving the town we passed through a densely-wooded country. Indeed the road has been cut through heavy bush, and on either side there were large trees of all sorts. Here we entered a lovely gorge about two hundred feet deep, the sides of the valley being clothed with ferns and shrubs and flowers, while a small river with water as clear as crystal added to the beauty of the scene.

At 1 o'clock we arrived at a small settlement called Raetihi, where we had lunch, and after obtaining fresh horses proceeded on our journey. The soil is rather poor about here. A little dairying is carried on, and a creamery has been established in the vicinity. After a short time we came in view of Mount Ruapehu, a large mountain thickly covered with snow. It is 800 feet above sea level. At Kariora there is a small wool washing establishment; the wool of this district having to be washed on account of the dirt, grit, and sand due to the volcanic nature of the soil.

Some miles from Waiouru we entered a woodland of enchanting beauty, and we travelled through the silence of a primeval forest. Gigantic Kauri gum trees, palms, and fern trees met and mingled in the tangled scrub and intertwining creepers. The Kauri gum, a product of the Kauri pine, is peculiar to New Zealand. The resin which exudes from this tree flows into the earth. The gum is hard and of a bright yellow colour. It is found in the soil or on the sites of old Kauri forests, as well as at the foot of growing trees. This gum is used in the manufacture of varnish. The gum fields to the north of Auckland employ about 7,000 men. The work is not as profitable as gold digging, but there food is cheap and plentiful and the climate warm and genial. The annual output is placed at about one thousand tons, valued at £50 per ton and upwards according to quality. The Kauri pine itself supplies excellent timber. After having traversed forty-two miles since morning we halted for the night

at Waiouru, with a solitary house and a roadside hotel situated in the midst of a large and miserable plain, bleak, bare, and wind-swept like the highveldt in the Eastern Transvaal. While far away, close to the mountain, a volcano spouting forth volumes of smoke added to the desolation and dreariness of the view.

March 8th.—After breakfast we started for Tokaanu. The country through which we travelled seemed to become more and more desolate, nothing but burnt ash and sand as far as the eye could see. In fact the only vegetation seems to be the "Tussock," which is a grass so poor and scanty that it would require ten acres to feed one sheep.

The English gorse plant is much used for live fencing, and stock of all kinds are to be seen nibbling at the young green shoots. A progressive farmer possessing some 20,000 acres of pumice land in the far North—useless for all purposes and absolutely barren—conceived the idea of planting gorse for fodder. He dug large trenches and planted the gorse in rows; finding the stock throve well, he continued the process over the whole area, and is now feeding 35,000 sheep on 20,000 acres of gorse.

At midday we arrived at a station, changed horses, and again resumed our journey through a forlorn and deserted country. Away in the distance we saw a mob of wild horses. Oftentimes, the Maories catch the young colts, which, however, are of little value. At Wangamato we changed horses again, reaching Takaanu at 6 o'clock; along this stage we passed several rivers. The Hot Springs are situated near by, and one can see steam arising out of the earth all around. Here we had a warm bath, which was very refreshing after a day of sand and dust. The earth is quite warm, and now and then we came across a hole with water at boiling temperature. The Maories cook all their meals in these hot water holes by placing a perforated tin containing the food within reach of the steam. A steamer leaves here daily for Taupo, which is a fairly large town about twenty-five miles distant. In Summer time this is a popular resort for tourists who come from Auckland and Rotorua, and then go up the Wanganui River to Wanganui, and from thence to Wellington.

March 9th.—Took steamer across the Lake Taupo. It is the largest lake in the North Island, a veritable inland sea, twenty-five miles long and twenty broad, and is said to be 500 feet deep. Twenty-seven rivers run into this lake. Rapid communication is carried on by means of carrier pigeons flying from shore to shore. When our steamer left the shore a pigeon was despatched with a message announcing the number of passengers on board. At Taupo we were met by Mr. Hull, Stock Inspector. After lunch we went to the Spa, a distance of three miles. Here we were in the land of Hot Water and Mud Springs. It is nicely laid out and provided with large accommodation for hot and cold mineral water baths. We were taken in hand by a guide who showed us the many wonders of the place. A geyser throwing water up every hour to a height of fifty feet, the boiling mud, and the hot springs are all wonderful sights.

The hotel, which was formerly a Maori house, contains many of their carvings, now very valuable.

March 10th.—This morning we started for Wairaki, another place of wonders, a distance of six miles. On the way we passed over a suspension bridge hung across the Huka Falls. These falls are destined to be the means of supplying great electric power, and already they have been favourably reported upon by an engineer of repute.

On reaching Wairakei, we went to see the Aratiatia Rapids, accompanied by a guide. As at the Huka Falls, the river becomes very narrow at a certain point, and being the only outlet of Lake Taupo the force with which the water dashes down these rapids is almost appalling. It was well worth going to see.

The Waikato is the largest river in New Zealand, and is navigable for about one hundred miles, flowing noiselessly from the mountains to the sea, through noble primeval forests—untouched by the hand of man—on again into the pleasant open country, fertile through the toil of the farmer.

After lunch we were taken in hand by the celebrated guide "Bob," who showed us the most weird sights imaginable, such as geysers, boiling mud, and hot springs. It would be instructive to stay several days here to see more of these extraordinary phenomena. But no geyser that we saw spouts so well or so continually as "Bob", and he requires no soaping.

March 11th.—This morning we started in a coach and five horses for Rotorua, a distance of fifty miles, traversing a most miserable country. After one change of horses we reached Waitapu. Here we again saw geysers, hot springs, etc. Waimangu is the largest geyser in the world. It throws a stream to the height of 800 feet. Leaving Waitapu, after a monotonous journey, we reached Rotorua, and we were all glad that our coaching tour was over. In the evening we were invited to see the Haka Dance, a performance given by the Maories. It was novel and amusing.

March 12th.—This morning we crossed the beautiful many islanded Lake Rotorua, whose waters are of a dull, dark green even on days of the brightest sunshine. Here is the famous Sanatorium of the New Zealand Wonderland, a charming resort on the loveliest of lakes, and only a comparatively short distance from the city of Auckland.

In the great volcanic eruption of 1886 the famous Pink and White Terraces were buried out of sight. Lake Tarawera then disappeared, and with it New Zealand lost forever its most famous attraction. But the Wonderland remains. The thermal springs district covers an area of about a thousand square miles. In the centre is Rotorua with its lovely lake. This quaint little place has sprung up solely owing to the benefit to be derived from its curative waters. Here there are good hotels and comfortable boarding-houses at reasonable charges.

The Government has erected a Sanatorium and an excellent hospital, and retains a resident medical officer. The charge of board, lodging, and attendance is one guinea per week.

This region is decidedly uncanny, and we do not wonder that nervous people do not care to reside in it. The air is pregnant with a strange sulphurous odour, and steam rises out of the ground in every direction. Here is a geyser, and there a pool of boiling blubbering mud. You must walk carefully if you do not wish to tumble into a mud-hole or a pool of boiling water. There seemed to be only a thin crust over the subterranean fires. Some of the springs are pleasantly warm.

After lunch we went to visit the camp of the Maories, which lies in the sulphurous shadow of Whakarewarewa, the famous valley of the geysers and the boiling springs, well termed the "Suburb of Hell." Here on all sides scalding spluttering fountains are rising, and the ground is hot and inflamed. On entering the valley it was amusing to see a police notice warning the public that anyone found soaping a geyser would be heavily fined. This mysterious announcement was soon explained. A geyser is capricious. It may slumber long; but no one can say when it will awake. Further, it was discovered that a bar of ordinary soap thrown into a geyser funnel will rouse it into furious action within a few minutes; and thus soaping a geyser might easily imperil the neighbouring villages.

This vicinity is one mass of hot springs and boiling mud. The chief geyser is called Pohuto (Splasher). Geysers are uncertain things; they may become active at any moment without warning. Wairoa was at work when we arrived, throwing up a steady white column; but Pohuto wanted an emetic. For our entertainment a bar of soap was dropped into the pit, and from a point on the grey hillocks of Silica we awaited the result. The soda of the soap mingling with the mineral gases causes effervescence. Presently, we heard a roaring, rumbling noise underneath, the hollow ground shook, bubbles rose to the surface, then suddenly the gasping water leapt from the hissing throat, and a huge column of boiling mud and water shot upwards fully one hundred feet and continued to play for about five minutes. This is truly a wonderful place, but we should not care to reside permanently by the sides of these uncertain geysers.

Maggie, a comely half-caste girl, showed us the wonders of the place. She proved a capital guide, and told us a great deal of interesting Maori history. Some of their legends are very curious. Maggie, though well educated, prefers the life of a native, and has been made custodian of the Maori carved house —Raura—where the wooden gods are kept. In this building there are marvellous carvings all done with a stone chisel, since the Maories possessed no steel implements before the British settlement.

In the evening we visited the gardens, where another Haka dance was held to the accompaniment of the band. The Haka

is getting somewhat tame owing to an advancing civilization. In all its native glory it is said to be wonderfully weird and terrible.

During our stay we met many tourists and visitors who had come for a course of mineral baths. The hot springs are fenced round and adapted to bathing. The curative effect of some of these springs is marvellous. For rheumatism, gout, dyspepsia, eczema, neuralgia, and liver troubles the waters of these hot springs seem to act as a charm. Some people have even been cured of paralysis. We were told that many apparently hopeless cases have been cured. The sensation of bathing is peculiar. The water feels like warm oil, and you leave your bath the colour of a boiled lobster. That, at least, was our own experience.

In little groups the Maori women were chatting over the boiling wells cooking the Kumara or Sweet Potato, while the air was heavy with the smell of roast pig; other Maories were squatting in the middle of the springs smoking their pipes, only their brown heads showing above the water. Some, indeed, indulge in the luxury of an umbrella to keep off the rain. From Pipiriki to Rotorua the country is of little agricultural value, but the scenery is beautiful beyond words.

CHAPTER XXXVII.

A FAMOUS FARMING DISTRICT.

Hamilton—Government Experimental Farm—The Waikato River—Dehorning Cattle—Land £15 per Acre—Seventy-five per cent. increase—A Large Mill—An Extensive Trade—Wairangi—Wine Cellars—Tobacco Growing—Auckland—70,000 People—Mount Eden—An Extinct Volcano—Best Horse Stud in the Colony—Farewell to New Zealand.

MARCH 14th.—This morning we started for Hamilton to visit the Government Experimental Farm at Ruakura, where we arrived about 2 p.m., and were joined by Mr. Ritchie, who had come from Wellington to meet us. We crossed the Waikato River to Hamilton West. At the farm we were met by Mr. Clifton, Mr. Ross, and several members of the Agricultural Department. Although the Government have had this farm for only two years several good substantial buildings have already been erected. In the stables were two thoroughbred stallions—"Single Stick," a five-year-old, which cost £250, and "Malachi," costing £200. Both were fine looking animals.

Some steers were being dehorned. From the kraal an ox was driven into a passage just large enough to allow one at a time to pass through. At the end of the enclosure there is a small opening for the head of the animal. A bar is then lowered to prevent the head from being withdrawn, whilst a lever placed behind the horns holds the head immoveable; a man then comes along with the clipping implement and with one clean cut severs the horn. The clipping of both horns does not occupy more than one minute. When the operation was over the ox was let out, bleeding profusely. This, undoubtedly, must be painful to the animal, and we thought it very cruel. Yet, we were assured that animals never die from the effects of this treatment. The object of dehorning is to prevent cattle that are being shipped in cars from hurting each other. Dairy farmers dehorn cows in order to make them quiet. We consider that this should be done, if at all, when the animals are quite young.

We next drove over the farm, where we saw a fine field of oats. Artificial manure had been applied at the rate of two cwts. to the acre. The poultry yard consisted of serviceable houses and extensive runs, with all the best breeds. On our homeward journey we passed some very good farms, one of which

had recently been sold for £15 per acre. Some of the local authorities informed us that since the farmers have gone in for dairying the price of land has increased seventy-five per cent. Not long ago farmers were content with any sort of cows; but now they have discovered that it is more profitable to improve the type, for the reason that a cow giving three gallons of milk daily costs almost as much to feed as one giving six gallons. Consequently, it pays to keep the best breeds of cattle.

March 15th.—This morning we visited a large mill for preparing New Zealand flax (if any reader has been to St. Helena he will doubtless remember flax growing there—this was the same kind). An extensive trade is carried on in this industry, and we think it would be well worth trying in the Transvaal. Even if our flax did not prove of so valuable as in New Zealand, where it sells at £30 per ton for export, it would prove very useful on a a farm where so many necessary articles could be made from it. It is quite as strong as any rope, and might easily be used instead of riems.

From here we started for Waerenga, the site of another Government Experimental Farm. It consists chiefly of vineyards and orchards: wine-making has already been started. Signor Bragato, the Viticulturist or Wine Expert to the New Zealand Government, is in charge of this establishment. We inspected the cellars and tasted several varieties of wines, among which was some excellent claret. Signor Bragato kindly explained the methods adopted in the manufacture and fermentation of wines. There should be a splendid future for wine-making, as the climate and soil are singularly suited to the growing of grapes. Here, also, we saw a field of tobacco, which looked healthy and had a fine leaf.

After lunch we walked over a portion of the farm. The surrounding country is very poor, and is not worth more than 10s. per acre, but the Government hope by establishing an Experimental Farm to induce farmers to follow the best methods and thereby raise the price of land to about £5 per acre. Here, again, we saw tests with different sorts of grasses. The vineyard is 35 acres in extent, and comprises many different kinds of grapes. The orchard is of considerable size, and has a good selection of apples. Here we also enjoyed some delicious strawberries. By means of a windmill water is pumped out of a creek, and distributed to the several fields through pipes.

It was close on six o'clock in the evening when we reached Auckland, the Ancient Capital, the most populous city of New Zealand, and the pioneer of its civilization. There is something of surpassing fairness in the sea-view of this town as it nestles far up the Gulf of Hauraki on the sunlit shores of a well-sheltered sound; its long line of wharves and the terraced red-brick houses, spires and steeples, churches and stately buildings, all flanked by the soft and verdant slopes of Mount Eden. The view from Mount Eden is one of the finest in the world. Many volcanic

hills are visible, in fact, eighty extinct craters can be counted from this spot. The city is built upon a narrow peninsula, and so may be said to have two harbours—one on each coast. Rich volcanic soil, abundant rain, warm sunshine, all unite to make a most luxuriant growth of trees and fruits and flowers. Suburban villas rise on every hill-side, half hidden amongst palms, and pines, and giant ferns. It was in this country that the Maories lived in the old wild days before the coming of civilization. Here was the site of many a bloody battle and many a cannibal feast. And away to the south are the battle-fields where the stern white settlers and the invincible aborigines are peacefully sleeping side by side. Ten hours from Auckland by rail is the Wonderland of the North. Auckland has a population of 70,000, and is the largest city in New Zealand.

In the afternoon we were taken for a drive to the highest hill in the district—Mount Eden—an extinct volcano, 644 feet above sea level. Here the cinder-strewn crater and the slopes of decomposed lava bear witness to the fierce volcanic action of former days. The crater is a great inverted cone, and forms a huge amphitheatre around which the Maories built their fortifications and in which they held their Councils of War. In the native tongue it is said that Mount Eden will sometime awake from its slumber and again vomit forth fire and death even as did Vesuvius; but in a country where the people bathe in hot springs and live amidst volcanic ruins such folklore falls on unheeding ears. From Mount Eden the view is glorious. Far out to sea stretches the Great Barrier Isle; while below us are the verdant tree-clad slopes, the trim suburban villas, two splendid harbours, and a score of craters beyond which the graceful outlines of Rangitoto tower supreme.

March 16th.—This morning we started in a carriage, accompanied by Messrs. Ritchie, Blundell, and Hull to see a famous stud of horses owned by Mr. Morrin at Wellington Park, about ten miles from the city. This gentleman has fifty brood mares and holds annual sales of young stock. The last, held in January, realised £58,000. Buyers come from all parts of the world. Mr. Morrin and his nephew took us over the farm, and we were shown three stallions, viz., "Manescotle," "Phœbus Apollo," and "Hotchkiss." The last named is eighteen years old, and is by "Musket." Only racehorses are bred on this farm. We would advise our friends at home who are interested in racehorses to pay this farm a visit as they may be certain of picking up a good colt. Besides horses, there are a fair number of cattle, and we saw a capital herd of cows and calves in a paddock near by—all pedigree stock. In another paddock we saw fifty one-year-old heifers. Mr. Morrin stated that he would sell a hundred 18-month-old heifers, free on board at Wellington, for £15 15s. each and bulls for £20. From what we heard at Mr. Stuckey's farm we believe that these cattle would answer well in the Transvaal and the Orange River Colony, and we would strongly recom-

mend the importation of some as soon as possible. With our return to Auckland our most valuable and interesting tour through New Zealand came to a close.

To the Premier of New Zealand — the Hon. Richard Seddon, P.C.—our thanks are due for his generous and practical interest in our visit to the Colony, and also to Mr. Ritchie, Secretary for Agriculture, for his untiring efforts on our behalf. Lastly, we can never forget the kind attention we received from the officers of the Agricultural Department; and we would gratefully acknowledge the courtesy of those gentlemen whose farms we inspected and who aided us in all our investigations.

It was with a feeling akin to sadness that we put out to sea leaving behind us this land of snow-capped mountains, far reaching fiords, fathomless lakes, gleaming glaciers, gloomy forests, and clear running rivers; of marvellous geysers, weird volcanoes, rich pastures, and fertile plains; of luscious fruits and fragrant flowers—the fairest of the Empire's Colonies, the Paradise of the South.

CHAPTER XXXVIII.

VICTORIA.

Melbourne—Government Buildings—Cold Storage Establishment—House of Parliament—Dookie Agricultural College—Forty-seven Students—Shepparton—Mooroopna—A Co-operative Company—Lucerne and Irrigation—Ngamie—Goulbourn Weir Irrigation Works—A Great Weir—Sluice Gates Worked by Electricity—Recovered Land—A Wine Farm.

MARCH 20th.—Towards evening, after a very pleasant voyage, we entered Sydney Harbour; and three days later left for Melbourne, the capital of Victoria.

March 24th.—Arrived at Melbourne and were met at the station by Mr. S. Williamson Wallace, Director of Agriculture, along with several other gentlemen.

Melbourne has a population of 439,000, and is remarkable for its rapid growth. Indeed it is only sixty years since the famous Tasmanian Bushman, John Phillip, bought—for a few blankets, knives, and looking-glasses—six hundred thousand acres as a site for a village. The village has grown into a town nearly as large as Birmingham. It stands on seven hills, which rise gradually from the Yarra-Yarra, or "Ever-flowing," as the name signifies in the language of the aborigines. Wide streets with high and beautiful buildings on each side, large parks and luxuriant gardens, magnificent public edifices, represent the trade and wealth, not of Melbourne alone, but of ninety thousand square miles of hinterland, out of which come the wool and the wine, the mutton and the gold.

March 25th.—This morning we were shown over the Government Buildings and many other places of interest, including a large cold storage establishment. Next we had an interview with the Hon. J. W. Taverner, M.L.A., Minister for Agriculture, who presented us with railway passes, and said that every facility would be given us to see the agricultural resources of Victoria. Mr. Campbell, an auctioneer, informed us that he had sent several large consignments of cattle to South Africa. He gave us much valuable information regarding the importation of cattle. In the evening we were taken to the House of Parliament and introduced to Sir Edmund Barton, P.C., Premier of the Commonwealth, and several other members of the Government of Australia.

March 26th.—Started this morning for Dookie College, accompanied by Mr. E. G. Duffus, Secretary for Agriculture, Mr. Yeo, member of the Agricultural Trust, and Mr. Knight, of the Agricultural Department. After a rather long and wearisome journey through bush and clearing we at length reached our destination. Mr. Hugh Pye, Principal of the College, met us at the station, and after a pleasant drive of four miles we arrived at the College. Even at the present time—notwithstanding the drought—some of the land we traversed was worth £30 per acre. On arriving at the farm we went first of all to the stables where there were some fine horses. The dairy is fitted up with all modern appliances, and every opportunity is afforded students of acquiring a thorough and practical knowledge of dairy farming. As is the case with all these Experimental farms, pig breeding is a prominent feature; Berkshires being the chief type kept. From pigs and poultry a considerable revenue is derived. Recently a large number of dams for storing water have been erected, which proved of great service during the trying drought. There are forty-seven students at this College, and, as this is the maximum number that can be provided for, many applications are refused. But Mr. Yeo, one of the Trustees, said that it was the intention of the authorities to provide more accommodation. The students study and work in the fields on alternate days. We left at 6 o'clock in the evening, and after a long ride in the dark reached Shepparton—a distance of nineteen miles. The Secretary and other representatives of the Agricultural Department were waiting to welcome us.

March 27th.—This morning we visited a Mr. Orr's farm, which is about ten miles out of town. On this farm they go in largely for lucerne. The land is worth £30 an acre. An extensive system of irrigation is carried on here, the water being brought from the Goulbourn Valley Weir; consequently, during the recent drought the farmers of this neighbourhood were able to dispose of a great deal of their produce.

In the afternoon we visited the farm of the Goulbourn Valley Wine and Distillery Company, which is situated at Mooroopna. This is a Co-operative Company, and produces excellent wines. The farmers around here are making much money by growing lucerne. There is a great demand for it; and owing to irrigation they are able to rely on a good crop, irrespective of the dry seasons. The owner of a farm that we visited was receiving 5s. monthly per head of cattle for his grazings. The prosperity of farmers in this neighbourhood is undoubtedly due to the benefits derived from irrigation. Leaving here we took train for Ngamie, and although it was late, we were cordially greeted by the principal residents of the town.

March 28th.—A very wet morning. But as it soon cleared up we decided to visit the Goulbourn Weir Irrigation Works, which are situated on the Goulbourn River, and proceeded up the river in a steam launch. Some ten miles up, the river is dammed by a weir, and spreading out in a great sheet of water forms a

large lake. The farms adjoining the river are untenanted; the farmers having been compensated for their loss. Here trees almost entirely covered with water are still growing, and, indeed, it was a wonderful and beautiful scene. In half an hour's time we reached the weir. At the weir a large wall has been built across the river, and about twenty sluice gates convey the water into the natural bed of the river. On both sides canals lead the water which is necessary for irrigation purposes, through large sluice gates. The sluice gates are worked by electricity, the power being obtained from water pressure. These canals meet the mains and convey the water to any place where it may be required. The river is affected by this weir for a distance of thirty-two miles. Land that has been recovered from under the water is worth from £30 to £40 per acre. Mr. Murray, a son of the engineer who planned this piece of work, kindly explained all the details. It is a most interesting weir and well worth a visit.

In the afternoon we visited the farm of the Chateau Thabik Wine Company, which is situated about fourteen miles along the river. In the busy time as many as seventy men are employed in these extensive vineyards. The annual output is 70,000 gallons.

CHAPTER XXXIX.

The Environs of Melbourne.

Bairnsdale—The Mitchell River—Mount Eagle—Starving Stock—Bairnsdale Valley—Linden Estate—Field after Field of Maize—A Black Loam—Ludlow—Melbourne Sewage Works—Glass Works—Agricultural Factories—Disc Ploughs for South Africa.

MARCH 30th.—This morning, at 7.30, accompanied by Messrs. Duffus, Knight, and Yeo, we left Melbourne for Bairnsdale, in Gippsland. After passing a place called Sale we came to a fertile, well cultivated region, where oats give good yields. It was surprising to note that the land in this vicinity was worth £30 to £40 per acre. At Bairnsdale we were met by Mr. L. Moody, the secretary, and other members of the Agricultural Society. The Mitchell River flows close to the town. This is a great advantage to farmers, enabling them to send their produce by steamer to the Melbourne markets. We obtained a grand view of the surrounding country from Mount Eagle. Prior to Federation the culture of hops was most profitable here, but the Island of Tasmania is now able to produce them at a lower price. Dairying is a thriving industry, and maize is extensively grown. This part of Gippsland has not suffered so much from drought as many other districts, and in consequence large numbers of all kinds of stock have been sent in from the more unfortunate parts. These are called "Starving Stock;" and many farmers make a lot of money by fattening up these lean animals. A cross between a Hereford and a Shorthorn is recommended for producing a large animal and a fair milker. Good grade heifers can be bought from £4 per head.

March 31st.—This morning we started in traps for a trip to the Bairnsdale Valley, accompanied by a fruit-grower who had just returned from South Africa, where he landed a consignment of fruit trees. He took us over some extensive nurseries, and said that he hoped to do a big trade with South Africa in this line. We then went to visit Mr. Hill, of Linden Estate, who milks as many as 150 cows. His churns and cream separators are all worked by steam-power. His milking shed is large and airy, and is dusted with dry lime once a day. Mr. Hill complains of the high wages that he has to pay. He has tried milking machines; but found they did not pay. The dairy stock were particularly fine, some of the cows being perfect beauties. His paddocks were laid down with lucerne, which he was busy reaping; this

being the second crop cut since January. His dairy and store cattle are fed on lucerne; much lucerne is also pressed into bales and sent to market; this being a profitable branch of farming. Large fields of maize were ready unto harvest. It is sown with a drill dropping three seeds at a time about three feet apart. It was here that we remarked the great benefit of planting maize in rows instead of broadcast. For by the practice of drilling a heavier crop is produced; as much as 80 bushels to the acre being obtained. We went well into the midst of the crop and found the cobs fully grained up. This maize was a yellow variety, and is called the "Big Yankee."

Proceeding further up the valley we passed field after field of maize. At harvest time labourers are paid 4d. a bag for pulling the cobs, which are then placed in a heap fenced with netted wire, and left until required. Onions are extensively grown; the Brown Spanish being mainly cultivated. The land here is worth about £30 per acre; the soil is black loam and requires no manure. This valley is about thirty miles long. From Ludlow we started for Melbourne, arriving about 8 o'clock.

April 1st.—This morning, accompanied by Messrs. Ramsay, Waller, and Duffries, their wives and families, we boarded a steam launch and went for a trip down the river. After passing through several of the docks we reached the Melbourne Sewage Works, where all the sewage of Melbourne is pumped to the Sewage Farm. The machinery is of the finest and latest design. Next we visited a glass factory, where all kinds of bottles are manufactured; and then to Messrs. Lennon & Co.'s Agricultural Implement Factory, where we were taken in hand by Mr. Lennon. Here all sorts of agricultural machines are manufactured. These machines are strongly built, and should have a ready sale in the Transvaal. Afterwards, we visited Robinson's Agricultural Factory. We were shown the disc plough manufactured by this firm, and we believe that it should do well in South Africa, and we would strongly advise our farmers to give it a trial. The representatives of Messrs. Lennon and Robinson took a great deal of trouble in showing us over their admirable establishments, and we hope that these enterprising firms may be persuaded to start agencies in South Africa. At 5 o'clock we met the Lord Mayor in the Town Hall, and enjoyed a most interesting conversation.

CHAPTER XL.

THE GARDEN OF VICTORIA.

Colac—The Butter Factory—Seven Tons per Week—Fern Tree Gully—The Creamery—Milking Sheds—A Model Piggery—A Famous Ayrshire Herd—Jamie of Oakbank—Champion of Australia—Lunch at Government House.

APRIL 3rd.—We started this morning by train for Colac, which we reached after a journey of five hours. Here we were met by the members of the Agricultural Society. After lunch we were taken out for a drive of about fifteen miles through a splendid agricultural country. The first place visited was the Colac Butter Factory. The machinery in this factory is undoubtedly the best we have seen, which is saying a good deal, considering the number of factories we have already visited. The output from this factory is seven tons per week. Continuing our journey, we passed through a most beautiful district, and, indeed, this part of the State is well-named the "Garden of Victoria." In the vegetable gardens the culture of the onions seems to be particularly profitable.

We visited Mr. James' farm. This gentleman is a large breeder of cattle and horses. Here there were splendid stables and some fine stallions, including "Patron," a Clydesdale, and "Royal Heart"; brood mares and foals. The shorthorn cattle here were first class; two heifers 17 months old taking the first prize at the Melbourne Show. Several young bulls, about 16 months old, showed good points; one red bull, about 13 months old, being particularly noteworthy. Mr. James is considered one of the best judges of horses and cattle in Australia, and is a most successful breeder. Another well-known breeder is Mr. Evered-Browne. He has a large dairy farm, with mainly Shorthorns and Jerseys. Mr. Browne is a rich man, and does what we should like to see more of our own wealthy men doing in South Africa, namely, takes a keen interest in all local agricultural matters. On our return to Colac we were entertained to dinner by the Agricultural Society, after which we started for Melbourne, arriving there at 12 o'clock.

April 5th.—Mr. W. S. Campbell entertained the whole party to dinner at his house.

April 6th.—This morning we took train at 8 o'clock for Fern Tree Gully, arriving at 9.30 a.m., and were met by Mr. Quinn (uncle of Captain Kirkpatrick, D.S.O.) and Mr. Sellman, and

drove to the former's residence. It is a handsome two-storied house tastefully fitted up. Mr. Quinn has a fine farm of about 800 acres of good agricultural and grazing land. From a fine collection of paintings (Mr. Quinn is a connoisseur in this line) we turned to the creamery. The floor of this creamery is made of concrete, with a gentle slope so as to permit the use of a plentiful supply of water for thoroughly flushing the whole place every day. This department is entirely conducted by Mrs. Quinn, and certainly reflects great credit upon her thrifty management.

The general arrangement of the piggery is the best we have seen on any private farm. It is a large square building of stone and brick. The walls are about four feet high, and the roof is raised about three feet higher in order to allow plenty of space for ventilation. The building is divided into five sties—a small passage running the full length being left on one side which enables a man to bring in the food and distribute it in each pen. Each pen is reached by a small door leading from this passage. The food is put in troughs built inside and running parallel to the passage; and so when feeding it is not necessary to go inside the pen, since the bucket containing the food is merely tipped into the trough. All around inside the pens a board about 6 inches wide is placed about 8 to 10 inches from the ground so that after a sow has farrowed the young pigs are protected from the mother in case she might smother them when rolling over against the sides of the pen.

A windmill supplies this farm with water; two iron tanks being placed on a rise of ground near by. A plentiful supply is distributed to all the fields by means of pipes. Here also was a fine herd of cattle, which is being gradually improved by the use of the finest sires. Mr. Quinn believes that the Ayrshire is the best dairy animal. Some 70 cows are milked every day. A great deal of hay is stored for winter use, and much maize is grown and fed in the green state to the cattle. Mr. Quinn informed us that he intended shortly to erect a silo. After lunch he accompanied us to an adjoining farm, that of Mr. Sellman, where we inspected a fine herd of Ayrshire cows. The best animals had just left to compete at the Sydney Show, and, as we noticed sometime later, gained five prizes, including two championships. This was an ideal herd for dairy purposes, and they were so quiet that when walking through the paddocks the owners could go up and catch any of them; most of them have been exhibited at shows throughout the Colony. The best bull here was a son of "Jamie of Oakbank," an unbeaten champion of Australia, and now owned by Dr. Hay of Coolangatta. Father and son met in the show ring in Sydney this year, and the judges experienced great difficulty in awarding the first prize. But eventually it fell to "Jamie of Oakbank." On this farm they have about 120 head pure bred Ayrshires; nearly all being registered in the Stud Book of Australia. The milk is put through

the separator and the cream sent to Melbourne every day. The herd has been built up by this family alone within the last twenty-five years.

After spending one of the most delightful and instructive days of our tour we returned to Melbourne. We would like to see some of Mr. Quinn's and Mr. Sellman's cattle wending their way to South Africa to improve our herds. To-day, we had the honour of lunching with His Excellency the Governor of Victoria—Colonel Sir George Sydenham Clarke, K.C.M.G., F.R.S. —at Government House, which is situated some fifteen miles out of town. The Governor was very kind indeed, and wished our mission every success, and hoped we had learned something from Victorian methods that might be of use to us in South Africa. In the evening we took train for Sydney to attend the Agricultural Show.

CHAPTER XLI.

A GREAT AGRICULTURAL SHOW

Sydney—Farewell to New South Wales—Melbourne—Sailing for South Africa—At Durban—After Nine Months—Advice to our Countrymen—Table of Mileage.

APRIL 7th.—Arrived at Sydney and spent the most of the day in getting our luggage on board the steamer which was to take us to South Africa; we proposed to join it at Melbourne on the 15th. In the afternoon we visited the Hon. John Kidd, who presented us with complimentary tickets for the show, while Mr. W. S. Campbell, Director of Agriculture, who, from his long connection with the Agricultural Department of New South Wales, is able to speak with authority, gave us many valuable suggestions as to Australian methods most likely to be of value in the Transvaal.

April 8th.—Accompanied by Mr. Campbell we visited the show, although it was not yet officially opened. The Royal Agricultural Society's Show of New South Wales is a splendid representation of everything grown and manufactured in the Commonwealth. It is one of the largest shows in the world. The grounds, covering an area of some thirty acres, were one mass of buildings, stables, machinery sheds, with a splendidly laid out ring for trotting, jumping, etc. There were fine large buildings for the display of produce; while a large section was set aside for machinery. Most of the competing firms have their own buildings erected. The managers of the different firms exhibiting machinery were present in order to explain everything connected with their exhibits. The Government have a special division for the stock and produce from the different Experimental Farms. These are merely exhibited and are not awarded prizes. The experts from the Experimental Farms were also on the spot to discuss any matters which might not be perfectly clear.

April 9th.—To-day we all attended the show, which was opened by the Governor of the State, Sir Harry H. Rawson, R.N.: the Premier, the Hon. Sir John See, K.C.M.G., and other members of the Ministry were also present. After lunch we inspected the stock. Many of the animals we had seen during our tour through the country, although some had come in from the neighbouring States. The different breeds were fully represented; and a finer collection of animals we have never seen. The various breeds of horses and ponies were well selected. Sheep were not much in evidence, as they are held back for the great yearly sales, which are really sheep shows. Pigs and poultry, and even dogs, were

all there; while the display of grain and roots was most interesting. The Government show of produce was most tastefully got up. The exhibit of fruit by private persons was excellent, especially the grapes grown at Parramatta, near Sydney. The exhibits of machinery of all sorts was most comprehensive. The Clyde Engineering Company, Lennon's, and Robinson's, Massey, Harris & Co., MacCormack, Deering, etc.; in fact all the leading makers were represented. The machinery, which was worked by steam, was set in motion to illustrate more clearly the actual mechanism. Messrs. Shirley & Co., manure manufacturers, had a very interesting exhibit of cereals, grown by means of artificial manure, alongside of grains that were not manured at all which showed the value of fertilizers. We were greatly interested in the three days' milking competition for the best milk yield. Every day there were jumping competitions, trotting matches, and motor races, which greatly added to the many other attractions. On Good Friday some 60,000 people were present. Altogether we spent five days at the show, and had a most instructive and enjoyable time.

April 13th.—To-day we left New South Wales; the Hon. John Kidd, Mr. W. S. Campbell, and many others were good enough to see us off. We shall long remember the kindness and courtesy we received from everyone during our most pleasant visit to this State.

In Melbourne we called on Mr. S. W. Wallace, Director of Agriculture, and Mr. E. G. Duffus, Secretary for Agriculture, and bade them good-bye. Our thanks are due to the Government and the people of Victoria for the great courtesy with which we were received, and we regret that time did not permit of our prolonging our stay in this splendid State.

One thing struck us most forcibly during our stay in Australia, viz., that farmers are always willing to assist each other in every possible way, there being an entire absence of jealousy. Every citizen seemed proud of the Government and of the Commonwealth, a state of affairs essential to happiness and true prosperity.

It was late in the afternoon when we said farewell to those friends who had welcomed us with such open-hearted hospitality. After a calm and pleasant voyage across the Indian Ocean we reached Durban on the 6th of May, right glad to set foot once more on South African soil. We stayed a couple of days in Natal, and then started out for our homes and our children, after an absence of fully nine months.

The attached sheet will be of interest in indicating the mileage covered by the party during the tour. The places visited and the distances noted may prove of use to future travellers to England and her Colonies. In conclusion, we would strongly advise all those South Africans who have the means at their disposal to make a similar tour, and we can assure Transvaalians and our countrymen from the Orange River Colony that they will receive a warm welcome wherever they travel throughout the British Dominions.

TABLE OF MILEAGE.

SHOWING DISTANCES TRAVELLED BY RAIL, SEA, AND COACH.

	Sea.	*Rail.*	*Coach.*
Klerksdorp—Capetown	—	1140	—
Capetown—Southampton	5987	—	—
Southampton—London	—	120	—
London—Stranraer	—	600	—
Stranraer—Larne	60	—	—
Larne—Limavady	—	200	—
Limavady—Belfast	—	120	—
Belfast—Liverpool	156	—	—
Liverpool—Montreal	2806	—	—
Montreal—Truro	—	775	—
Truro—Wolfville	—	80	—
Wolfville—Halifax	—	80	—
Halifax—Pictou	—	116	—
Pictou—Charlottetown	55	—	—
Charlottetown—Summerside	—	48	—
Summerside—Pt. du Chene	45	—	—
Pt. du Chene—St. John	—	108	—
St. John—Fredericton	84	—	—
Fredericton—Ottawa	—	580	—
Ottawa—Rockland and return	52	—	—
Ottawa—Toronto	—	356	—
Toronto—Guelph and return	—	100	—
Toronto—Oshawa and return	—	70	—
Toronto—*Niagara Falls via* Grimsby ..	—	100	—
Niagara—Toronto direct	—	82	—
Toronto—Owen Sound	—	122	—
Owen Sound—Sault Ste. Marie	250	—	—
Sault Ste. Marie—St. Paul, U.S.A. ..	—	550	—
St. Paul—Winnipeg	—	482	—
Winnipeg—Vancouver	—	1482	—
Vancouver—Victoria, B.C.	—	84	—
Victoria—Sydney	6753	—	—
Sydney—Hawkesbury and return ..	—	80	—
Sydney—South Coast and back ..	—	170	—
Sydney—Braemar (5 return trips) ..	—	750	—
Sydney—Bourke and return	—	1006	—
Bourke—Pera Bore	—	—	20
Orange and Bathurst Districts	—	—	50
Jenolan Caves	—	—	72
Sydney—Wagga Wagga	—	618	—
Murrimbidgee River, etc.	—	—	66
Sydney to Grafton	340	—	—
Grafton—Woodburn—Lismore	150	—	—
Murwillumbah, etc.	—	37	—
Murwillumbah—Tweed Heads	32	—	—
Tweed Heads—Brisbane	—	—	75
Brisbane—Sydney	—	723	—
Glen Innes—Maitland Districts	—	—	50
Sydney—Clyde	—	26	—
Sydney—Wellington N.Z.	1200	—	—
Wellington—Ngahaurango and return ..	—	6	—

	Sea.	*Rail.*	*Coach.*
Wellington—Waipawa	—	172	—
Waipawa—Te Aute	—	—	12
Te Aute—Napier	—	26	—
Napier—Taradale and return	—	—	12
Napier—Hastings—Marekakaho	—	—	30
Hastings—Eketahuna	—	110	—
Eketahuna—Masterton	—	22	—
Masterton—Te Rongituma and return ..	—	25	—
Masterton—Wellington	—	66	—
Wellington—Lyttelton	175	—	—
Lyttelton—Christchurch	—	7	—
About Christchurch	—	—	12
Christchurch—Little River	—	36	—
Little River—Christchurch	—	36	—
Christchurch—Glen Tunnel	—	76	—
Christchurch—Overton's place	—	5	—
Christchurch—Waimate—Waihao Downs .	—	129	9
Waihao Downs—Glenavy	—	37	—
Glenavy—Dunedin	—	96	—
Dunedin—Poultry Farm—Woollen Mills	—	72	—
Round Dunedin—Water Supply—Dairy, etc.	—	—	3
Dunedin—Lyttelton	—	237	—
Lyttelton—Wellington	175	—	—
Wellington—Weraroa Experimental Farm	—	59	—
Levin—Awapuni	—	27	—
Awapuni—Palmerston	—	—	3
Palmerston—Nathan's Stud Farm ..	—	—	25
Feilding—Hawera	—	104	—
Around Hawera	—	—	18
Hawera—Waverley	—	27	—
Waverley—Momohaki and back to Momohaki Railway Station	—	—	7
Momohaki—Wanganui	—	27	—
Pipiriki up River	56	—	—
Pipiriki—Waioura	—	—	42
Waioura—Tokaanu	—	—	44
Lake Taupo Steamer	24	—	—
Spa—Wairakei	—	—	6
Wairakei—Rotorua	—	—	51
Crossed Lake and visited Hot Springs ..	16	—	—
Rotorua—Kirirkirewa	—	85	—
Auckland	—	86	—
Auckland—Mount Eden	—	—	12
Wellington Park	—	18	—
Auckland—Sydney	1200	—	—
Sydney—Braemar and back	—	75	—
Sydney—Melbourne	—	577	—
Melbourne—Dookie	—	130	—
Dookie—Shepparton	—	—	18
Shepparton—Mr. Orr's farm and return..	—	—	8
Shepparton—Mooroopna Wine Cellars ..	—	—	3
Mooroopna—Ardrossan	—	—	8
Mooroopna—Ngamie	—	32	—
Ngamie—Goulburn	20	—	—
Ngamie—Chateau Vineyards	14	—	—
Ngamie—Melbourne	—	78	—
Melbourne—Bairnsdale	—	171	—

	Sea.	*Rail.*	*Coach.*
Drive through Bairnsdale District ..	—	—	20
Bairnsdale—Melbourne	—	171	—
Melbourne—Implement Works	—	12	—
Melbourne—Colac	—	96	—
Drive through Colac District	—	—	10
Colac—Melbourne	—	96	—
Melbourne—Sydney	—	577	—
Sydney—Braemar (2 return trips) ..	—	150	—
Sydney—Melbourne	—	577	—
Melbourne—Durban	6380	—	—
Durban—Klerksdorp	—	600	—
Total	26,030	15,738	686

Travelled by Sea	26,030	miles
,, ,, Rail	15,738	,,
,, ,, Road	686	,,
Total	42,454	miles

PART II.

CHAPTER XLII.

SOME IMPRESSIONS AND SUGGESTIONS.

Irrigation—Ensilage—Lucerne—Grasses and Forage Plants—Forestry—Fruit Culture—Spraying, Thinning, Pruning—Fertilizers—Culture of Maize—Rust—Rotation of Crops—Wheat—Locusts—Cattle Breeding—Dehorning—Shearing and Wool Sales—Pigs—Poultry—Marketing of Farm Produce—Stock Boards—Stock Inspectors—Stud Farms—Importation of Stock—Fencing—Experimental Farms—Agricultural Exhibitions—Agricultural Societies—Railway Rates and Import Duties—Summary.

Irrigation.—Although in South Africa the art of conserving water is as yet in its infancy; in other British Colonies much has already been accomplished, not only by the construction of extensive irrigation works, but also, on a smaller scale, by the erection of simple dams and the sinking of artesian bores.

Over a vast portion of Australia there are limitless tracts of land—devoted almost entirely to stock raising—which are periodically visited by severe droughts; and the necessity of providing a permanent water supply in these arid regions induced the Governments of the several States to set aside certain funds for the purpose of tapping underground streams. Since 1884 the sinking of artesian wells has proceeded in a systematic manner under the supervision of specially trained officers. Private enterprise has also done much in the same direction.

Up to 1901 the Government of New South Wales had undertaken the sinking of 103 wells; of these, 88 have been completed, and 15 are in progress. Of the completed wells, 58 are flowing, 19 are sub-artesian, yielding pumping supplies, and 11 have been failures; these wells represent 143,391 feet of boring, while with the uncompleted wells the total depth bored has been 170,507 feet. From the completed wells about 33,000,000 gallons of water flow every day to the surface. The deepest bore is that at the Dolgelly, on the road from Moree to Boggabilla, where boring has been carried to a depth of 4,086 feet; this well yields about 745,200 gallons per diem. The largest flow in the State is obtained from the Kenmare Bore, on the road from Bourke to Hungerford; the depth of this well is 1,539 feet, and the estimated flow 2,050,000 gallons per diem. Another important bore is that at Pera, already mentioned, eight miles from Bourke on the

Wanaaring road, where at a depth of 1,154 feet a flow of 350,000 gallons per diem is obtained. A remarkable flow has also been obtained at the Moree bore, amounting to 1,108,000 gallons daily. This bore has been carried to a depth of 2,792 feet. Here, as at Pera, an Experimental Farm has been established, where sub-tropical fruits and plants are grown.

Some idea of the magnitude and value of these artesian wells may be got when it is stated that the aggregate daily flow of underground water in New South Wales is now more than 78,000,000 gallons. The average depth of the 88 wells completed by the Government is 1,628 feet, ranging from 165 to 4,086 feet. The total cost of the wells (including actual boring, casing, carriage, and incidental expenses) was £252,759, or an average of £2,872 5s. 3d. per bore, or £1 15s. 3d. per foot.

In Queensland, up to the 31st December, 1901, there were 907 bores, of which 65 were Government, 30 Local Government, and 812 private.

Of the Government bores, 24 were artesian, 14 sub-artesian, and 27 were abandoned as failures. The daily flow of water from the successful bores amounted to 10,365,600 gallons. The Local Government bores included 10 artesian and 18 sub-artesian, while 2 were abandoned. From the successful bores a daily flow of 6,007,100 gallons was obtained. Of the private bores, 499 were artesian, 174 were sub-artesian, and 107 were failures. It is estimated that the daily flow of water from private bores amounts to no less than 344,701,800 gallons. The large proportion of abandoned Government bores is mainly due to the fact that many were sunk for experimental purposes in order to ascertain the prospects of obtaining artesian water; while others were put down by the old methods of boring, by which depths over 1,000 feet could not be penetrated. The total expenditure by the Government up to the 31st December, 1901, amounted to £345,943 on water conservation, and £138,060 on artesian bores. The total depth bored in search of artesian water up to 30th June, 1901, was 1,066,605 feet, the average depth per bore being 1,176 feet. Naturally, at the greater depths boring becomes a costly operation, but the immense advantage of having a continuous stream of water requiring little or no attention calls for some sacrifice. In South Africa we believe that only in rare cases would it be necessary to sink deeply before striking a vein of water. Moreover, it may be of interest to know that in Australia it has been found to be a mistake to shut down the bores, because the water nearly always finds an outlet along some permeable strata, and the supply tends to diminish.

We are informed on good authority that our own Government have a comprehensive scheme of irrigation under consideration, and it is to be hoped that no time will be lost in carrying it out. For this country has unparalleled possibilities, in that thousands of acres of rich soil are lying idle, only awaiting water in order to produce nearly every conceivable crop. After witnessing the marvellous transformation of dry and arid spots into veritable

gardens by means of artesian wells we are looking forward with great expectation to the results of the first deep boring experiments by the Governments of the Transvaal and the Orange River Colony.

With reference to the ordinary furrow irrigation as carried out on many farms at the present moment we would urge that it should be developed to the fullest extent. It need hardly be emphasized that with water we can depend upon an almost certain crop, and a much heavier yield than is possible on the dry veld. A number of farms could be greatly improved, and the land available for irrigation doubled or trebled by the making of dams so as to retain a plentiful supply to tide over the dry season. Nature has supplied us with a congenial climate and a fertile soil, and it is surely our duty to devise some means of enriching the many barren and uncultivated wastes of this country, so that it may become, even in our own lifetime, one of the fairest in all the world.

As a great many of our farmers are at present in financial difficulties we would suggest that the Government might render assistance in the following manner :—

(*a*) That any farmer who desires to start irrigation should submit his scheme to the Government official in charge of his district.

(*b*) That a Government expert be sent to report upon and advise the Government as to the cost and feasibility of the scheme.

(*c*) That if the plan be found practicable that the Government should advance half the necessary funds.

The advance to be held as a first mortgage on the farm bearing a low rate of interest, and to be repaid within a certain number of years. We are convinced that without some such financial aid the average farmer cannot improve his land sufficiently so as to enable him to compete with monied men, however anxious he may be to do so.

It may be well to again emphasize the advantages to be gained by "intensive farming" (small holdings) on small irrigated areas. By paying proper attention to a few areas you gain in several respects : (*a*) In the concentration of buildings ; (*b*) In the direct supervision of the farm lands ; (*c*) In having an almost certain crop with barns full of fodder for wintering stock. The peace of mind arising from this fact is worth something.

The disadvantages of "extensive farming" (large holdings) are many :—

(*a*) Waste of time and labour in travelling over the lands.

(*b*) Insufficient cultivation and consequent invasion of weeds and injurious insects.

(*c*) A much greater initial outlay.

(*d*) Uncertainty as to crop.

(*e*) Lack of food for tiding cattle over a bad winter.

2. *Ensilage.*—There is no subject that we would advocate more strongly than the preservation of winter forage by means of the silo. Indeed, we have no hesitation in saying that we do not believe that farming can be successfully carried on in this country without a supply of winter forage being laid by every year. In Canada, where stock are fed inside for five months of the year, and where dairying is conducted on a large and profitable scale, the system of ensilage is universally adopted.

In Canada, Australia, and New Zealand, maize (mealies) is most generally employed for ensilage, and it has proved the most valuable of all forage crops. Yet excellent ensilage may also be made from wheat, oats, barley, rye, lucerne, Kaffir corn, vetches, and even cabbage. In fact, most cultivated crops have from time to time been converted into ensilage with satisfactory results. In South Africa, on account of their luxuriant growth, enormous yield, and comparative cheapness of production, maize and Kaffir corn are the most useful crops for ensiling. Besides which, in many portions of the Transvaal, there are vast tracts of land covered in mild seasons with hundreds of tons of grass of a high nutritive value. The ordinary "Zoet Riet" (sweet reed) of this country would make capital ensilage, and could be mixed with the maize in the silo.

3. *Lucerne.*—In all the Colonies we visited the cultivation of lucerne is extending in every direction, and its immense value is universally acknowledged. This fodder is relished by all sorts of animals—cows, horses, mules, sheep, and goats. The crop, when cut for hay, is removed before the plant has reached its full bloom. In Victoria a good yield will weigh from 1½ to 2 tons, and with six cuttings a total of about 10 tons for the year is commonly harvested.

Lucerne may be sown either broadcast or in drills. If sowing broadcast, you may use from 20 to 25 lbs.; and in drills, from 15 to 20 lbs. To sow in drills is more economical, and you can obtain a more even growth. The seed should be covered but slightly—not more than an inch in depth—with a light harrow. Sometimes a light roller is preferred to a harrow, and the seed is simply pressed gently into the soil. In the Oudtshoorn District, the greatest centre of lucerne culture in South Africa, farmers do not usually manure their land. Indeed, some of the finest crops of lucerne have been grown on unmanured land.

As far as we know lucerne is almost always grown on irrigated land in Cape Colony, yet we strongly advise our farmers to experiment on dry lands, because the plant has such a long tap root that it is able to draw up nourishment from far below the surface of the soil. To show the value of lucerne lands, it may be stated that fields under lucerne in the Oudtshoorn District with good drainage are worth £50 per acre.

To make the finest hay the crop should be cut just when the first flowers begin to appear, for the stalks soon become hard and woody, and unfit to be eaten by stock. Leave it in the swath until the leaves are well wilted, then rake into windrows, and

after a while convey to the stack. Handle the hay as seldom as possible, since every time it is shifted some leaves are lost. Do not stack until the stems are properly cured, as it may heat and mould. The art of making good lucerne hay is to place it in the stack sufficiently cured, so that it will keep without heating, yet green enough so that the leaves do not drop off. It is also well to bear in mind that a stack of lucerne does not readily shed a shower, so steps should be taken to protect it from rain.

4. *Grasses and Forage Plants.*—The introduction of new grasses and forage plants is one of the most important points in connection with stock farming in the Transvaal. There is no doubt that by sowing drought resisting grasses, and, after a series of experiments, selecting the sorts most suitable to the climate, the carrying capacity of the grazing land could be greatly increased. The veldt, though it carries a great body of grass in a favourable spring, and stock fatten on it readily while it is soft and green, cannot be called a good stock grass. It is too sour, and, as is well known, directly it starts to become dry, stock fall off in condition, while in the colder districts, although the dry grass may be there in abundance, stock sometimes die from sheer starvation—a state of things that should not be tolerated. Besides, it takes the best part of the spring in the following year for an animal to recover to a state fit for slaughter. A mixture of rye grass and clover on any good soil that can be irrigated, or is more or less moist, will give a capital yield, and as many as three crops, giving two tons per acre at each cutting, may be obtained during the year. Further, this forage is very fattening, and makes good ensilage if merely put in an ordinary round stack and some weights placed on the top. Such grasses as Cocksfoot (*Dactylis glomerata*); Crested Dog's Tail (*Cynosurus cristatus*); Tall or Meadow Fescue (*Festuca elatior*); Smooth Brome Grass (*Bromus inermis*); all make splendid hay and are certainly worthy of a trial. We would advise farmers to introduce these grasses after the following manner:—

Select a piece of moist sandy ground for preference, and at the beginning of the season scarify it well, and sow the following mixture of seed with the oats or wheat:—

20 lbs. Cocksfoot	3 lbs. Meadow Fescue
7 lbs. Italian Rye Grass	1 lb. Crested Dog's Tail
1 lb. White Clover	2 lbs. Mammoth Red Clover
3 lbs. Timothy (*Phleum pratense*)	

A good plot of ground should be selected, and if it is very rich the proportion of Rye Grass and Timothy Grass may be increased and the Cocksfoot reduced. When the crop is cut, and if the ground has had sufficient moisture, naturally or artificially, the grasses will be found to have come up about six or eight inches, and, of course, after the first cutting will make rapid progress, when the farmer will possess one of the sweetest pastures it is possible to imagine. In this way there is always something growing on the land which is not lying idle between the crops. In

Australia we saw many varieties of "Salt Bush." This is one of the most valuable drought-resisting fodders, and grows in the driest and most barren parts of the Commonwealth. We are sure that it would be of the greatest value in this country. It is to be hoped that the Government will make arrangements to obtain a supply of seed and distribute it liberally to farmers.

5. *Forestry.*—The planting of trees for shelter for stock and for future farm requirements should not by any means be overlooked. In fact this is a very important factor in successful farming. We recommend Cypresses, Pines and Wattles, and any of the many varieties of Australian Eucalypts or Gum trees, all of which grow rapidly. Gum trees are especially desirable for fence posts, farm buildings, sheep and cattle pens, etc. It is a good plan to plant small groves of trees here and there about the farm, because a sheltering clump of trees will break the cold winds of winter and afford shade during the hot summer months, besides adding greatly to the beauty of the Homestead. We noticed everywhere on our travels that progressive farmers always laid out small plantations, and the results were invariably found to fully repay the trifling initial cost and trouble. For garden hedges the cypress pine will be found to answer as well as any, being very dense and hardy and standing both extremes of heat and cold.

6. *Fruit Culture.*—It was with a feeling of pride that we found at least one product that could bear favourable comparison with anything in our Sister Colonies. That was fruit. Moreover, we never tasted an orange, or a peach, equal to those either of the Transvaal or of the Orange River Colony, and, further, we have not seen trees grow as they grow in South Africa. Of course, the oversea Colonies have more varieties than we possess. For instance, on one Experimental Farm that we visited in New South Wales we found the following varieties listed :—

30	varieties of	Figs.	2	varieties of	Chestnuts
130	,,	Grapes.	8	,,	Mulberries.
95	,,	Cherries.	13	,,	Persimmons.
200	,,	Pears.	5	,,	Walnuts.
50	,,	Apricots.	20	,,	Japanese Plums.
150	,,	Plums.	95	,,	Peaches.
9	,,	Quinces.	400	,,	Apples.
10	,,	Almonds	10	,,	Prunes.

If we take into consideration how easily citrus fruits can be transported, it is apparent that apart from our own local markets we could easily supply the English demand, seeing that we are so much nearer to the London market than Australia. There is one point above all others that should not be neglected with fruit, and, in fact, with all farm produce. As soon as we are able to export, all our shipping should be carried out under Government inspectors, who would carefully supervise and inspect all produce before it leaves our borders to make sure that it is perfectly sound. This

is only fair to farmers who grow good produce, and would effectively prevent our reputation in the English and European markets from being injured by those who are careless or unscrupulous. All kinds of fruits and produce should be graded, and our orchards should certainly be better looked after and more carefully cultivated than has been the case in the past. Blight and other fungoid diseases in fruit trees should be checked by the use of sprays, such as the Bordeaux Mixture, Paraffin Emulsion, Paris Green, etc. It is still better to fumigate by means of canvas covers and hydrocyanic acid gas—a method which is now much in vogue for eradicating the red scale of citrus trees. A very important thing in fruit growing is to cultivate the soil properly. We have seen many orchards where there was not a single blade of grass or a solitary weed; the soil is cultivated so frequently. This is easy enough to do when the trees are planted in regular rows. A much better yield of fruit will be got if the soil is thoroughly tilled and kept loose; thus allowing the air and the rain to go down to the roots of the trees, while the moisture is retained in the ground by a dust blanket or "soil mulch."

7. *Spraying, Thinning, and Pruning.*—It may be said without fear of contradiction that to try to raise fruits and vegetables on a commercial scale, without the aid of spraying; in the face of the present merciless competition is merely to court disaster. For sooner or later disease will strike your orchard, and without some means of combatting it your crop will gradually deteriorate. We are convinced that proper spraying is one of the most essential factors in modern agriculture; and we firmly believe that the money and labour expended in purchasing spraying materials will be repaid fully a hundredfold. In recent years this fact has been clearly demonstrated by the farmers, gardeners, and fruit growers of Canada, Australia, and New Zealand. Now spraying is an insurance. In the growing of fruit there are always some risks. Probably, the most important are frosts and hailstorms, which can never be completely controlled. But the danger from the invasion of injurious insects and fungous diseases can often be avoided. You do not know when your house may be burned; yet you wisely insure it. So in fruit growing; and every year you should be ready to deal with noxious pests.

To exterminate all injurious insects and fungi is plainly impossible, but most may be held in check and many eradicated. Thus it becomes necessary to spray every year. Moreover, fruit growers who spray with the greatest thoroughness will realise the largest profits. *Squirting a few quarts of water on a tree is* not spraying. Indeed, it is a mere waste of time. A tree is thoroughly sprayed when it is wet all over the branches and on both sides of the leaves.

In Canada the average cost per tree for each spraying, exclusive of the price of pump, tank, and hose, is reckoned at about 3 cents (1½d.) per tree for those of bearing age, using Paris Green and the Bordeaux Mixture.

Another factor in successful fruit growing that is sadly neglected in our own country is thinning. Yet we found that where thinning is systematically done it is regarded as indispensable. As is well known, the main purpose of thinning is to allow each fruit or bunch of fruits sufficient space in order to attain the fullest development.

Moreover, thinning not only results in a marked improvement in the quality of the fruit, but it is also of value in checking disease. Although thinning is a somewhat expensive and laborious operation it usually proves most profitable. There is no reason why fruit trees should not bear every year if properly thinned. But a tree overloaded and exhausted one season will often fail to produce a moderate crop in the next. There is no doubt that systematic annual thinning tends to induce a more regular yield. It is impossible to give any definite rule for the distance to be left between fruits. But for all practical purposes we were informed that from 4 to 8 inches is a common distance according to the size of the fruit and the strength of the tree. When thinning, all wormy, shrivelled or blemished fruit should be removed. Judicious thinning not only increases the size and quality of the fruit, but also greatly lessens the danger of disease.

In the pruning of trees there are many problems, since no two trees are alike. But the most successful methods are founded on one or two fundamental principles. The common custom of pruning an orchard heavily every two or three years is bad, for it disturbs the balance of the tree. As with thinning a moderate annual pruning maintains the equilibrium of the plant, checks overbearing, and helps to make it fruitful. Prune your trees to let in the sunlight and allow a free circulation of the air.

8. *Fertilizers.*—A succession of crops taken off the land for a number of years tends to lessen the producing power of the soil. This loss can be avoided by a judicious use of manure, which contains the necessary chemical elements. This point is commonly ascertained by forwarding a small sample of the soil to the Government Analyst for report. Here we would add a word of caution. Many farmers expect an agricultural chemist to be able to tell them just what sort of manure they should apply. Now a soil may contain all the elements necessary for the growth of a certain crop—let us say tobacco—yet not in a form available for the plant to use, and that is just the great difficulty which confronts both the farmer and the chemist. Every farmer is well aware that manuring makes a great difference in the producing power of the soil; and in Australia, Canada, and New Zealand where manuring is rapidly coming into favour, the average cost of manure does not, as a rule, exceed six or eight shillings per acre, but the gain to the crop is marvellous. We do not know of any manufacturer of fertilizers in this country, but there is a good future for the man who is first in the field. In most cases the fertilizer is spread on the land at the same time as the seed; although, if desired, half can be put on at the sowing and the other half used as a top dressing when the crop is well up.

About 100 lbs. of artificial manure is the usual amount per acre, although it depends upon the state of the soil. If manuring is begun before the soil has become impoverished, the object being merely to keep up the standard of fertility, then less may be used. Too much stress cannot be laid on the importance of farmyard manure as a fertiliser, by which is meant the solid and liquid excreta of all farm animals. In this natural product of every farm the farmer has a perfect supply of plant food, and thereby a means of increasing the fertility and producing power of his soil. That this is not fully realised is only too evident from the neglect so frequently seen in the care of manure on farms throughout South Africa.

9. *Culture of Maize.*—Throughout the Colonies we found the culture of maize carried out in a thoroughly practical and scientific manner.

In preparing the land it is usually ploughed from six to eight inches deep. Some farmers, however, go as shallow as five; others as deep as nine inches. After the land has been properly ploughed it is reduced to a fine tilth by the harrow. Where there is turf or hard lumps a disc or cut-away harrow is commonly employed. Then a mellow seed-bed is made by means of a smoothing harrow, and any clods that escape are broken by a roller. But it is the constant cultivation of the fields after the maize is up that produces the most striking results. Time and again we heard the same statement that in the growing of maize clean and thorough cultivation is essential. You cannot afford to grow a crop of weeds on your maize land, for not only do the weeds absorb the plant food required by the maize, but they likewise use up a great deal of soil moisture so necessary in time of drought. As a general rule from three to five cultivations are given, depending upon the weather and the weed growth. If weeds appear they are at once eradicated; if a severe drought prevails the soil is stirred to conserve the moisture. Regarding the distance between the rows we heard various opinions. Yet in general it was said that since maize is a sun-loving plant where it is grown for grain, ample space should be allowed for the full development of both stalk and kernels.

From various experiments it would appear that there is but little difference between the drill and the hill system. With the hill system, however, cleaner cultivation can be maintained as the soil may be stirred on all sides of each clump of plants. For this work a check-row maize planter is an excellent machine, and may be set to plant in squares, 3 feet 6 inches apart, dropping 2, 3, or 4 kernels in a hill. Where the land is level, rich, and well prepared, the drilling system is generally found to be the most rapid and economical, both in planting and cultivating. For a small acreage there is perhaps no better machine than a one-horse drill, making a single row at a time, and carrying a marker for the next.

The horse cultivator should be run through the rows as soon as the maize is clearly visible. And the process should be repeated once a week until the plants are about three feet high. Maize land can hardly be cultivated too often. One of the best cultivators is one on which the driver can sit and so give his whole attention to his work, instead of having to watch where he is walking. This riding two-wheeled machine is drawn by two horses or mules, and the cultivators work on each side of the row. Crooked rows are easily cleaned with this implement. Cultivation should continue, even if the land is not weedy, until the flowers appear in order to preserve the moisture of the soil.

In Canada and Australia it is customary to husk the maize in the field, and then convey the ears direct to the barn where they are afterwards shelled. But when forage is required it is usual to turn the stalks into shredded fodder. A small oil engine is often employed to drive these machines. For this purpose the maize is left until the kernel is well set. Then the stalks are cut off close to the ground, and allowed to get quite dry, when they are run through the shredder which delivers the husked ears and tears the stalk and leaf into fine shreds, forming excellent food. Every farmer should breed his own maize, and so avoid the unnecessary expense of purchasing new strains. Cereals readily respond to careful crossing and selection.

10. *Rust.*—The annual damage to the grain crops of Canada by rust is estimated at several hundred thousands of dollars. During a damp warm season the destruction is often so great that only a fraction of the crop is harvested. Rainy seasons, with intervals of intense heat, with thunderstorms and strong winds, are ideal for the spread of rusts. Rusts are propagated by means of spores, which are minute dust-like organisms, produced in enormous quantities and carried by the wind from plant to plant. At present there is no satisfactory method for the prevention of rust. Spraying the crop, although theoretically good, is practically impossible; while pickling the seed grain is of little use. In Australia much has been done in the way of developing rust-resisting varieties, and results have been secured of great practical value. That country has now varieties of wheat that are vigorous, true to type, and of exceptional quality. Indeed, it would seem that the only satisfactory method of dealing with this trouble lies in the direction of producing rust-resistant types. The characteristics of a plant that are most likely to prove rust-resistant are as follows:—Narrow erect leaves, and a tough, stiff skin with a distinct waxy bloom. Such varieties are, as a rule, less easily infected with the rust spores than those with broad, soft and green leaves.

In Europe it has been found that early sown and early ripening varieties are less liable to rust. Another point of interest is that top dressings of nitrogenous manure, such as Nitrate of Soda (Chili Saltpetre) tend to make the foliage soft and broad, and, consequently, these strong soft stems are more readily affected by the rust germs. Such manures should, therefore, be avoided.

Again, good drainage is decidedly beneficial, for the excessive dampness of the soil is thereby removed. But every farmer should try to secure rust-resistant varieties for himself. If your crop is badly attacked go over your fields and carefully pick out any plants which may have escaped; and from them choose those with the narrowest and most rigid leaves. Save for seed, and select in a similar manner year by year.

11. *Rotation of Crops.*—One of the most important factors in successful agriculture is the nursing and husbanding of the resources of the soil. In all the countries we visited we were greatly struck with the amount of attention paid to the preparation of the soil. Comparatively little land is capable of producing the same crop year after year without rapid deterioration in both the quality and quantity of the yield. It must also be borne in mind that by continuous cropping year after year the insect and fungous diseases of a particular crop are encouraged. To prevent this it has been found necessary to practise a rotation of crops, some of the principal advantages of which are as follows:—

1. It improves the texture of the soil.
2. It prevents the depletion of any particular plant food, and so tends to save manure.
3. It permits of a proper cleaning of the land.
4. It checks the ravages of both insect and fungoid foes by changing the crops they affect.
5. It varies the pasturage of live stock.
6. Many crops are needed for market and live stock requirements, and "mixed farming" is usually the best; besides, some crops form a good preparation for others, as, for instance, clover before wheat.

The kind of rotation must be determined by the soil, situation, and many other factors. In the case of leguminous crops, such as peas, beans, clovers, lucerne, etc., a rotation supplies nitrogen to the land.

12. *Wheat.*—In Canada the main principle observed in procuring seed wheat is to select the seed from some good variety. A common plan is to cut off the very best heads from the finest sheaves. It is thus easy to procure a peck or a bushel of first-class grain. A variety of wheat called barrel wheat got its name because the sheaves were shaken over a barrel. The largest and ripest grains fell out first, and so by this simple scheme an excellent variety of seed wheat was secured. The usual amount of seed sown is 1½ bushels per acre or a little more. This gives twice as many plants as are needed. If everything turns out well, there is likely to be a large yield of wheat with short stalks. Should the season be unfavourable, there is at least a chance that some will grow. However, some of the largest yields have been obtained

with only a peck of seed to the acre. The depth of seeding varies from 1 to 1½ inches. In dry weather, however, wheat may be sown a little deeper.

With reference to the manner of sowing, whenever possible the grain drill should be used. The Canadian Agricultural Department has found that the average yield of wheat is from 2 to 5 bushels more per acre when sown with the drill. In broadcasting it is hard to get the seed sown evenly, and the subsequent growth is apt to be irregular.

Land is usually prepared for wheat (1) by early ploughing, or (2) by delaying the ploughing until the time of seeding. If land is ploughed early, there is time for a short fallow. This allows time for the breaking up or pulverising of the soil, setting free plant food, and for nitrification.

After ploughing, the ground is harrowed. It is here that the breaking up of clods by the harrows and the horses or oxen proves very beneficial. Farm manures are then spread upon the field, and the land is again harrowed and rolled. Whilst the harrow helps in spreading the manure in a uniform manner, it also tends to keep it near the surface, thereby forming a mulch which prevents the escape of soil moisture. Such a short fallow is also useful for letting the weeds start up, when they are easily destroyed. It also ærates the soil. For Canadian winter wheat a rotation with clover is considered excellent. The clover is mown in June or July. It is then ploughed under, and the soil is surface tilled. Frequently, the clover is not ploughed until just before the time of sowing. Heavy crops of wheat are often raised on land upon which peas have been grown. Formerly, it was a common custom to fallow land. The ground was ploughed in June, harrowed, and rolled. It was then cross-ploughed. Indeed, during a single summer farmers often ploughed five times. This method is now almost entirely abandoned in favour of cover cropping.

13. *Locusts.*—Throughout Canada locusts cause considerable loss, more especially in Central Manitoba; and although the loss from these insects did not materially affect the enormous grain yield of the province, namely, 85 million bushels, still it was a serious matter for the farmers in the localities visited.

All known methods of fighting locusts have been tried by the Dominion Department of Agriculture, and, as a result of various experiments, it has been found that a cheap, easy, and effective remedy is by poisoning with Paris green.

This poison mixture is made as follows:—One part of Paris green, 2 of salt, and 35 to 40 of horse dung (by measure). Mix thoroughly, adding enough water to make a soft mess without being soppy; scatter well. Formerly, bran was used instead of horse dung but recently the latter has been substituted as being cheaper, more easily obtained, and better liked by the locusts. The horse dung is preferable when fresh, as the locusts are attracted by the smell, but it will act well enough even after several weeks.

This simple bait can be readily distributed with a trowel or wooden paddle from a barrel placed in a wagon, which is driven round the edge of the field. Further, it can be easily scattered out into the crop for a distance of 20 or 30 feet by a person standing on the wagon. As the Paris green is insoluble, the mixture remains in an effective state as long as the adhesive properties of the horse droppings last.

In a recent report of the Experimental Farms issued by the Canadian Government Mr. Norman Criddle, a Manitoban farmer, writes as follows :—"In this section all used poison, and only a few acres of crops were destroyed. I am convinced that had we begun the fight earlier hardly a bushel of grain would have been lost. It is no exaggeration to say that dead locusts could be gathered up in wagon-loads, and. at times. smelt for half a mile." Such a simple remedy surely merits a thorough trial in our own Colonies.

14. *Cattle Breeding.*—The essential factors in successful cattle breeding for dairy or stud purposes are :—(1) Proper farm buildings; (2) Plenty of winter forage; and (3) Pure strains. Now, whatever breed you finally decide to adopt, hold to it alone; for improving any particular type is the work of a lifetime, and trying experiments with several sorts—which seldom prove profitable—can only be attempted by the rich. Moreover, during the winter months do not fail to feed generously and keep your cattle warm at night. A comfortable shed means a big difference in the milk yield at the end of the year. Take careful daily note of the quantity of milk given by each cow, and at the close of the season you can readily determine the most profitable milkers. Sell all animals that do not come up to a certain standard. Try to keep all farm buildings clean and disinfect them regularly. Such are a few of the lessons we have learned from the best of breeders.

At first sight the daily record may seem a tedious task, but, as a matter of fact, it is quite simple. Give each cow a number or name, and place a list of the herd in the shed. Next, obtain a small spring scale with hook attachment. Hang the bucket of milk on the scale and you have the weight, which is at once put opposite the name or number on the card of the cow just milked—of course, allowing for the weight of the bucket. By this method it can be readily seen which cows are really paying. A dairy cow is not worth keeping which does not average two gallons (20 lbs.) per day during the whole period of milking, which should last until within two months of calving. Another maxim is never to allow a calf to suck after the first day.

Again, always put your manure from your cattle kraal in one place, and cover it whenever possible. It is thus easier to handle and less liable to be wasted. Leaving manure scattered about a farmyard means a great waste of time and of valuable fertilising elements, which are washed away by the rains. If these suggestions are carried out, notwithstanding all the diseases

that prevail in these afflicted Colonies, dairying ought to pay; not, indeed, as some people are inclined to think—a fortune made right away—but a comfortable livelihood should be possible, for with a dairy, a piggery and poultry yard are naturally allied. We would recommend Ayrshires as being the best dairy cow for South Africa. They are hardier and give a greater yield of milk under adverse circumstances than any of the other breeds. For beef purposes we think Herefords and Shorthorns are likely to give the best results. As mentioned previously, too much stress cannot be laid on the importance of ensilage or the preservation of food for winter feeding. Our country is specially fortunate in this respect. Here we have a vast amount of virgin soil awaiting the plough, requiring no clearing as the forest regions in Canada and New Zealand, and almost every year a good crop of maize can be relied upon. Maize is the winter food for cattle that has been universally adopted in Canada. Canada has the severest Winter of all British Colonies, and can never compete with South Africa as a maize-growing country. Yet, in spite of many difficulties, she has built up a vast export trade in cattle, butter, and cheese, which is mainly due to a plentiful supply of winter fodder.

Here we may state that in New Zealand and Australia dairying is profitably carried out, even on land costing from £20 to £50 per acre (£40 to £100 per morgen), and a tremendous amount of labour is often required to clear the land of timber before it is fit to receive the plough. Looking at these figures, dairying should surely prove profitable in this country. On the other hand, the Government must render assistance to the farmer by erecting butter factories and creameries at various centres throughout the several districts.

15. *Dehorning.*—At various places during our tour we witnessed the operation of dehorning, and although it seemed cruel, yet its advantages were so clear that we were greatly impressed. Three arguments are commonly advanced against the dehorning of mature animals:—(1) That dehorning a full-grown animal causes intense pain; (2) That the removal of horns may permanently injure the dairying qualities of cows possessing a highly nervous system; (3) That it spoils the beauty of the animals.

At the outset it must be admitted by all that a mature animal suffers great pain during this operation, but it still remains an open question whether the momentary intense pain of dehorning is not far preferable to the constant suffering amongst a herd of cattle caused by the ripping and hooking of their horns. Regarding the second point—viz., Does dehorning permanently injure the milking qualities of a cow?—it may be stated that experiments have proved that, under ordinary circumstances, a dairy cow will resume her normal flow of milk a day or two after the operation. Thus, practical tests fail to sustain this argument. The third point—beauty—may concern farmers who are raising pedigree stock for the show ring, but most farmers place milking capacity before beauty. The arguments in favour of dehorning are many. A Canadian Commission which thoroughly investigated the matter

reported that it must be considered justifiable; whilst amongst Australian farmers the practice is becoming more and more common especially when they have to truck their stock any considerable distance to market. Cattle often reach the stock-pens cruelly ripped by their more vicious comrades. Naturally, buyers prefer a clean-skinned animal to one which has been scored and marked all over, as is so often the case with horned animals; so that dehorning is really becoming a matter of pounds, shillings, and pence. Our own farmers know well enough that in a kraal where all the cattle are horned several may often be seen bleeding by *being gored or hooked. Probably, only a slight gash, but it pains* the animal, and in a hot climate, like that of South Africa, foreign matter and flies soon cause the wound to suppurate with serious consequences. The advantages of dehorning dairy cattle are also manifest. Many a good milker is ruined by being horned in the udder, and a few ill-tempered cows will keep a herd when kraaled in a constant state of nervousness, resulting in the loss both of milk and butter fat. Cows, when dehorned, become more docile in the yards and at the watering-troughs, and they feed quietly together in the paddocks. Dehorning bulls is certainly desirable; we ourselves have seen more than one valuable horse ripped by a vicious bull. Again, in Canada and Australia, where dairy cows are fed in stalls, the attendant is very apt to get struck in the face by the uplifting of the horns. Such accidents occur when the cows are frightened or irritated by flies.

For dehorning mature animals a special clipping instrument has been invented. The ox is fastened to a solid fence post by *a stout rope and halter. The clippers are slipped over the horns,* and with a single motion the horn is removed. Both horns can be taken off in less than thirty seconds. To check any future growth it is necessary to cut slightly below the spot where the *skin and horn meet. When the horns are removed, dress the* hair round the butts with a mixture of equal parts of Stockholm tar and paraffin, or tar and boiled linseed oil. Dehorning should be done in cool weather, and flies and maggots kept from the wound.

For our own part we have no hesitation in recommending dehorning calves by the use of chemicals. This simple method of preventing the growth of horns is quickly and easily done and comparatively painless. This operation is best performed when the calf is under five days, and should not be attempted after the ninth day.

Clip the hair from the top of the horn. Slightly moisten the end of a stick of caustic potash with water, or moisten the top of the horn bud. Rub the tip of each horn firmly with the potash for about fifteen seconds, or until a slight impression has been made on the centre of the horn. The horns should be treated in this way from two to four times at intervals of five minutes. If, during the interval of five minutes, after one or more applications, a little blood appears in the centre of the horn, another slight rubbing with the potash is all that is needed.

Caustic potash, in the form of a white stick, can be obtained from any chemist. When not in use, it should be kept in a stoppered bottle in a dry place, as it rapidly deteriorates when exposed to the air. Roll a piece of tinfoil or brown paper round the end of the stick of caustic potash, so as not to injure your fingers. Do not moisten the stick too much, or the caustic may spread to the skin round the horn and destroy the flesh. For the same reason, keep the calf from getting wet for some days after the operation. Be careful to rub on the centre of the horn, and not round the side of it. Caustic potash is poisonous, and must, therefore, be kept in a safe place. In using caustic potash, great care must be used to avoid the danger of injuring the animal's eyes.

16. *Shearing and Wool Sales.*—In a sheep-raising country, shearing time is the busiest and the most important of the year. In Australia and New Zealand we had an opportunity of witnessing shearing in full swing, and very interesting it was. Each "Station" has its own shearing shed, and this building is used for shearing alone. Of course, the cost of these buildings varies according to the average number of sheep shorn on each "Station;" but in many cases we saw sheds that cost £5,000 to erect, and we did not see the largest. They are elaborately fitted up; in many cases with machine-shearing gear driven by steam or oil engines. These machines are gradually superseding the old hand-shearing system, as it is found that the sheep are shorn quicker and without so much injury to the wool. As many as 300 sheep have been shorn in one day by one man; this may sound incredible to South Africans. From 200 to 300 persons are employed at shearing time, consisting of shearers, roundabouts, pickers-up, wool-sorters, etc. Each has his own particular work to do, and all are under the supervision of the "Boss of the Board," who can discharge any man at a moment's notice who does not do his work according to the terms of contract. The greatest care is taken of the wool. Immediately it leaves the backs of the sheep it is thrown on the skirting tables, where all the stained, seedy, and dirty parts are detached from the fleece. The remainder is then loosely rolled into a ball and handed to the wool classer, who examines it, tests its strength, and puts it in one of the many bins, according to its quality, such as 1st and 2nd combing, 1st and 2nd clothing, etc. Each quality is kept entirely separate. From these bins it is pressed into bales, and each bale is legibly branded with the owner's name and with the nature of its contents.

The pieces which have been taken from the fleece are put through the hands of expert piece-pickers, who sort it into various grades, and these are pressed and branded in the same way as the fleece wool. The bales are then transported to the nearest railway, and from thence to the various market ports, or perhaps to England, many growers preferring the latter market.

At the wool sales held by the various brokers, buyers attend from all parts of the world, and competition at times becomes very keen. It is quite a sight to see the various clips displayed for sale. As a rule, the top floor is selected for the show-room, and the roof is specially built to provide plenty of light, which is essential for the correct judging of "quality."

Some of these show-rooms are large enough to accommodate several thousand bales, placed end up. Several bales of each grade from each clip are displayed, the ends being cut open to enable the buyers to judge of the quality. The whole presents a splendid spectacle. We saw some superb wool displayed in one of these show-rooms, and earnestly hope to see a similar exhibition in South Africa in the near future.

17. *Pigs.*—"Pigs and Poultry" said a successful farmer to us "pay my rent and taxes," and he was not the only one we met who was doing the same thing. Pigs require as much attention as any other animal, and care should be taken that they are housed properly; especially the sows at farrowing time, when they should be isolated until the young ones are able to take care of themselves. In all cases where dairying was systematically conducted, we noted that a piggery was run in connection with the farm, and the pigs received almost as much attention as the cows, and were housed quite as well. Skim milk, turnips, carrots, mangels, etc., formed the main foods, and when pigs were to be fattened for bacon a little maize was added to this ration. This tends to harden the flesh. A good fattening diet is: 2 lbs. maize meal, 1 lb. crushed oats, 6 lbs. skim milk.

From experiments that have been made it seems evident that ground grain gives better results than whole grain, taking equal weights. Barley and skim milk also make a good fattening diet. Peas ground or mixed whole with skim milk can likewise be recommended. But it does not pay to cook food for swine where time and labour have to be considered. Skim milk added to any other food is most valuable when hard flesh is required. Further, we were informed that the greatest gain in weight is usually produced when the grain has been ground and soaked for about twenty-four hours. Mixed grains are more economical than any grain fed alone. As a rule pigs whose rations are regular and limited thrive better than pigs fed indiscriminately.

In our opinion the best pig for this country is the Berkshire: he is hardier than either the Yorkshire or the Tamworth. Bacon is always marketable, and if our farmers will only take to breeding the right sort of pig the more primitive methods of treating bacon will soon give way to modern bacon factories which will do much to improve the general condition of the South African farmer.

18. *Poultry.*—Naturally, every farmer keeps his pen of fowls, but the question is "Does he pay attention to proper breeding? Are the best laying sorts kept separate from the most suitable market birds?" We fear not. Now a simple run can be easily made with a few coils of wire netting and a long narrow

building constructed and divided off into compartments to isolate the different breeds. The space must be ample as fowls require plenty of exercise. Again, food need not be invariably placed in dishes, but may be thrown on the ground so that in scratching for it the fowls get a good deal of exercise. It is not generally known that one of the best foods for laying fowls is crushed green bones. By green bones is meant bones that are fresh and not hard and dry. A small machine costing about £2 grinds these bones easily, and should be purchased by every farmer. For laying purposes the finest kinds we saw on our travels were :— White Leghorns, Black Minorcas, White Wyandottes and Houdans. The first three, if pure bred, lay pretty well all the year round. For table use Indian Game, Plymouth Rocks, Buff Orpingtons, and Brahmas are the best. A good winter food is warm maize (mealies) meal and a mash of ground oats in the morning and some grain in the afternoon.

For lice in fowls a good remedy is to dust the fowls over with Carbolic Powder. Another cure is to disinfect the hen house with a solution of—

Corrosive Sublimate	..	..	4 ozs.
Common Salt	..	..	4 ozs.

Dissolve in three or four quarts of water, and when completely dissolved, dilute with 25 gallons. With this carefully spray every nook and corner. But be careful as it is very poisonous. Follow this by thoroughly whitewashing the premises. To keep lice from the roosting perches damp them occasionally with Coal Oil. This also prevents scaly leg, which is troublesome in the Transvaal.

A good method of preserving eggs is to keep them in saturated lime water, containing one per cent. common salt (not more). Lime water is prepared by slaking one pound of freshly burnt lime (quick) with a small quantity of water. The milk so formed is stirred into 5 gallons of water. After the mixture has been well stirred it is allowed to settle till quite clear ; the excess of lime sinks to the bottom, and the clear liquid must be drawn off and poured over the eggs which have been put in a vat or water-tight barrel. The vessel containing the eggs should be well covered and the air excluded by a covering of sweet oil which will float on the water. The eggs should be examined now and again. If there has been any precipitation (*i.e.*, any settlement of solid matter to the bottom of the barrel) the sediment should be carefully removed and a fresh quantity of lime water added. The eggs must be completely immersed throughout the whole period of preservation.

In fattening chickens for market, they are usually kept in crates of the following dimensions :—7 feet long and 16 feet square inside, each crate divided equally into three compartments with 5 chickens in each, making 15 in the crate. They are fed on ground oats mixed with some skim milk to the proportion of 2 lb. of milk to 1 lb. of oats ; next a little salt is added, and the whole brought to the consistency of thin porridge and put into the trough which

runs the full length of the crate outside. The chickens are fed twice a day, morning and evening. Some grit is mixed with the food twice a week. For the last ten days a pound of tallow is added to the food of every seventy fowls. This can be easily done by melting the tallow and mixing it with some meal and afterwards mixing the whole together. Only one day's ration is made at a time. About four days before killing some sulphur is rubbed under the wings and tail of each fowl. This kills any lice and gives a good colour. Farmers who propose sending poultry to market should test this plan, even if they only have a single crate. Then take the same number of fowls fed in the ordinary way and compare the results. Such an experiment would be simple and striking.

19. *Marketing of Farm Produce.*—To anyone who has taken the trouble to attend the markets of South Africa it is plain that there is plenty of room for improvement in the manner of marketing farm produce. It was a revelation to us to contrast our careless and often slovenly method of conveying produce to market with the care we saw taken of Canadian, Australian, and New Zealand produce. Many of our farmers seem to fail to realize the condition in which their produce is likely to reach the market, and take no pride or thought as to how it will attract the consumer. And although we propose to speak mainly of fruit, the same principles of cleanliness, neatness, and uniformity apply to all farm produce.

Now in the growing of fruit this problem is of supreme importance, and the day is not far distant when the fruit farmer who does not give proper attention to the shipping of his crop will find himself unable to dispose of his produce. For although you may raise the finest of fruits, if you send them to market in unsightly worn-out boxes you can hardly expect the highest price for your produce. Just when fruit must be picked will largely depend upon the fruit in question and the distance from the market. As a general rule the closer to the market the riper may be the fruit. If apples are to be stored or exported it is usually best to pick them just when they have reached the full size and are partially coloured; pears before they have begun to colour. Take a pear in the hollow of your hand and turn it up, if the stem snaps off from the spur at its point of articulation the fruit is ripe enough to pick. The pears are then ripened in a dry, cool chamber.

When a peach is full grown and begins to show its characteristic colour it is fit to pick. Press the thumb very lightly upon the side, and if the fruit has a slightly elastic feeling it may be removed. But pinching a peach is very apt to spoil it. When a peach is too green it is hard and stony; when too soft it lacks elasticity.

Apricots do not, as a rule, colour up well after being picked, but Japanese plums, although picked green, will take on a high colour.

In picking soft fruits, such as plums and cherries, grasp the stem but not the fruit. Thus you neither hurt the fruit nor destroy the delicate bloom. Take care also in touching peaches and apricots lest you leave a bruise. In the case of grapes the cluster should be taken off by the stem and snipped off with the shears. Further, *the stems of fruits, such as plums and cherries, should* always be left on, as when the stem is broken or pulled out they are very apt to rot. Moreover, stems tend to keep the fruit steady in the box or basket, besides giving the fruit a more attractive appearance.

To pack properly requires experience, but a few suggestions may be of value: On every farm where there is considerable shipping a packing shed is essential. Now, decay is the fruit-grower's great enemy, and it is promoted chiefly by heat and moisture. Therefore, whenever possible, try to get your fruit or vegetables cool from the heat of the day before packing. Pack tightly and take care not to bruise. Too tight or too loose packing results in bruising. All fruits should be of uniform ripeness, otherwise a hard unripe one coming in contact with another, perhaps fully ripe, will tend to make the latter decay. Before starting to pack it is essential to have some system of sorting or grading, and it is usual to consider three or four grades; of which the first may be designated by some term, such as "selected." Look into many a so-called first-class barrel, and how many are perfect? Here is one that is shrivelled, another scabbed, a third worm-pierced, and a fourth bruised by falling. Further, uniformity of size must not be forgotten in grading. Two apples may be without a blemish, yet unequal in size. All these things are noted in the fruit industry of to-day. It is a well-known fact that local produce is often driven from the market by foreign fruit conveyed over thousands of miles of land and sea. How is that? It simply means that the fruit transported over great distances must be carefully graded and securely packed. And again the far distant fruit grower knows well enough that on account of the high rates of transportation his only chance is in shipping the finest and the soundest produce. All fruit to be forwarded over great distances must be snugly packed; and it is a good plan to wrap up each fruit in tissue or tea paper; these wrapped samples usually reach the consumer in perfect condition, and give off a most alluring aroma when the barrel or box is opened. But there is something more than neatness required in packing, and that is a tender touch and infinite care. That was the lesson we learned in seeing women employed in packing the delicate fruits, such as peaches and grapes. One by one each fruit and cluster was lifted and laid in the box or basket, and other circling tiers filled up the space. But the last layer was laid with special care; all stems placed in one direction, and the same side of the fruit shown above. This gives an attractive or finished appearance to the top, and in the fierce competition of the great fruit industry, it is just the last touch that tells.

20. *Stock Boards.*—A stock board should be formed in each district, consisting of representative farmers, and should meet at least twice a year to discuss the various matters concerning the welfare of the districts, such as Stock Laws, Government Regulations, etc. It is quite plain that in every district throughout the Transvaal stock boards would render great service in promoting harmonious co-operation between the Government, through the Stock Inspectors, and the people as represented by the boards. This board could appoint several persons as pest eradicators who would forward a declaration of the injurious animals and birds destroyed to the Stock Inspector, who, after proper verification, would pay the assigned bounty

21. *Stock Inspectors.*—Four Stock Inspectors should be appointed for the northern, southern, eastern, and western districts of the Transvaal, and they should visit every holding in their respective districts at least once a year.

The duties of a Stock Inspector are many. He is appointed as the Government representative to enforce all laws and regulations regarding stock in his district, and the following might be regarded as coming within his special sphere :—

(1) A concise return to be rendered by him each year from every holding in his districts; printed forms being supplied by the Department for the purpose, and sent out some time before so as to enable the owners to complete and return before a fixed date.

(2) Every owner to register with the Inspector his horse and cattle brands, also his sheep ear marks; one ear of each sheep being set aside as the property of Government, and must bear the registered, but no other mark of the owner. Suppose the near ear for rams and wethers, and the off ear for ewes. The benefit of registered brands is obvious. It prevents stealing, and is a good means of identification in case of dispute.

(3) No two similar brands to be registered in the same district. The Inspector should have the power to destroy any diseased stock in his district that he may think dangerous to the well-being of the rest. Amount of compensation to be paid to owners of cattle so destroyed should be fixed under the Stock Act.

(4) All farmers and dealers travelling stock must obtain a permit before being allowed to travel more than a short distance (say 40 miles). All herds of more than a hundred cattle, and flocks of three hundred sheep or goats, to be considered travelling stock. The advantage of a system of permits is, that it prevents stock that are not *bona fide* travelling stock from being moved indiscriminately about the country and grazing on a neighbouring farm. It also prevents diseased cattle from being moved.

(5) The Stock Inspector would collect all rents due to the Government, which include the assessment rates fixed by the stock board. Any outbreak of disease must be reported to him at once, and he should proceed immediately to the spot.

(6) No stock can be brought into the district without being examined and passed by the Stock Inspector.

(7) He must inspect all farm boundaries.

(8) All cattle belonging to natives to come under the supervision of the Stock Inspector, and to be subject to the same laws and regulations as other cattle.

(9) Stock Inspectors must not be interested as dealers in stock.

(10) Inspectors to have full power to declare infected areas where they find contagious diseases.

Such are a few of the more important laws and regulations, and are merely given to illustrate the benefit that would arise from a proper system of stock inspectorship.

22. *Stud Farms.*—After having witnessed the splendid incentive Government Stud Farms have been to the farmers of Canada, Australia, and New Zealand in stimulating them to raise live stock of every description to a high and profitable standard, we maintain that it is the duty of the Transvaal and Orange River Colony Governments to start similar Stud Farms throughout the Colonies. They are not expensive to keep up, and, except for the initial expense, can be rendered largely self-supporting if properly managed. We would suggest that the Government should start such farms at, say, four centres; one in the north, one in the south, one in the east, and one in the west.

After the buildings have been erected and a proper supply of winter forage laid by, pedigree stud stock should be imported, and the sires leased at a nominal rate per season; or if it is thought unsafe to allow valuable animals to run the risk of not being properly cared for, then the farmers should be allowed to bring their stock to the Stud Farm. Small paddocks might be kept for this purpose, and special railway facilities granted for stock coming long distances. The stock bred at the Government farm ought to be valued and then balloted; thus ensuring an equal distribution of pedigree animals, as would not be the case if a few wealthy men living in the district were allowed to buy any animal they might fancy.

A good class of farm horse is eminently desirable for the Transvaal. The work we have seen done by farm horses during our tour has astonished us considerably; for instance, three horses draw with ease a double-furrow plough and do three acres per day. Here we may remark that veterinary officers should have the right to refuse any mares they may not think fit to breed from.

We should suggest that the Government import for each stud farm, say, two pure bred Aryshire bulls and two Shorthorn bulls and six heifers in calf to pedigree sires with a view to acclimatising the young stock from birth. Such stock might be procured in Australia, New Zealand, or Canada; at present preferably Australia, on account of its climate being more or less similar to that of the Transvaal. It was at the Sydney Show that we saw the finest collection of animals during our whole tour, and a great many stud breeders are anxious to open up a trade with South Africa.

That stud sheep should be imported is also manifest. After having seen the immense pastoral industry of Australia and New Zealand we are convinced that the Transvaal is entirely out-classed in the matter of sheep. Merinos are by far the most common in Australia. In the dry interior of Australia vast flocks are pastured, and they have proved unquestionably hardier animals than the cross-breds; besides their wool is finer. Good flock rams bred from stud stock are procurable at from three to five guineas. These cut about 15 lbs. of wool each; valued at 8d. per lb. On one Station that we visited the owner kept 30,000 sheep, the whole clip averaging 8½ lbs. wool per sheep; lambs at 4¾ lbs. The value of wool per sheep was about five shillings.

The Government should certainly import some ewes and rams from Australia of the Merino breed, and lease stud sires to serve a few selected sheep. From New Zealand cross-bred sheep should be imported, including Southdowns, Shropshires, Border Leicesters and English Leicesters, Lincoln and Romney Marsh—all of which are much larger than the Merino and very much coarser in the wool. The average carcass of these full grown sheep weighs 80 lbs.; and of lambs—six months old—from 56 to 60 lbs. An ever increasing export trade is being developed in this line in New Zealand. The price of mutton in New Zealand is from 4½d. to 5½d. per lb. retail; wholesale, of course, being much cheaper. The principal trade is with lambs, which are quickly fattened on turnips, clover, and rape, and sold to the meat exporting companies at prices ranging from 12 to 15 shillings each. *Naturally, New Zealand is a wonderfully endowed country* as regards the raising of sheep, more especially of this description. The climate and rainfall are good and the pasture excellent. To compare it with the Transvaal is plainly impossible; but at the same time we think these sheep could also be profitably bred here.

23. *Importation of Stock.*—A question one hears all over the country is: "Do the Government intend going in for the importation of stock?" The majority of farmers cannot afford to do so on their own account, but at the same time are desirous of securing good stock at a moderate price. Besides, many private speculators seem anxious to import, but first of all want an assurance of help from the Government. Young heifers of good milking strains can be procured in New Zealand and Australia and sold in the Transvaal and the Orange River Colony at from £10 to

£12 per head. To prevent the introduction of disease the Government must, of course, exercise strict supervision over all imported stock.

24. *Fencing.*—We consider that the fencing in of every farm must be made compulsory. This prevents trespass, since if a standard fence is fixed it enables prosecution by the Inspector of the District. The advantages of sub-dividing holdings by fencing into small paddocks are many:—(*a*) Fencing enables farmers to keep small paddocks in reserve for feeding; (*b*) fencing prevents stock from wandering, consequently, less grass is trampled down; (*c*) fencing enables farmers to separate the different breeds of stock, and allows a proper and scientific system of breeding to be carried on; (*d*) fencing dispenses with boys to look after the cattle, sheep, or goats; and (*e*) fencing gives farmers the opportunity of experimenting with different kinds of grasses, because when stock are kept off the land the grass is able to get a good hold before being eaten off.

In the event of the fencing of farm boundaries being made compulsory the Government should assist the farmers by reduction in freight rates; and by paying half or one-third the cost which would be considered as a loan and be repayable within a fixed period—say, ten years. The initial outlay would not be excessively great, as most farms are surrounded on all sides by neighbours on whom naturally some of the expense would fall. Compulsory fencing is the only means of successfully coping with the deadly diseases so prevalent in this country; and (coupled with strict stock supervision) it has done a great deal of good in Australia.

25. *Experimental Farms.*—It is the bounden duty of the Government to start at once and liberally support Experimental Farms in suitable districts of the Transvaal and the Orange River Colony. The farmers must be educated and encouraged by practical experiments, the cost of which are beyond the reach of any single person. And the farmers should not forget that such farms are established entirely for their benefit, and they should avail themselves fully of the knowledge gained by experiments in their own and other lands. In the Sister Colonies Stock Farms are generally carried on in connection with the Experimental Farms—a most practical plan, since it allows the animals to be used as much as possible in the daily working of the farm; besides enabling experiments to be conducted relative to the value of the several grains and fodder plants, etc., in feeding and fattening. The farmer can go to the Experimental Farm of his particular State or Province at any time and learn the proper culture of wheat, maize, tobacco, etc., the most suitable forage plants and the best drought-resisting grasses, the hardiest cattle, the finest sheep, the best export bacon, and the most adaptable fruits; in fact anything connected with Agriculture or Horticulture that he may wish to know—and all for the trouble of asking. As already mentioned, carefully compiled bulletins, leaflets, and reports are

printed in attractive covers and circulated in thousands—free of charge—and are eagerly read by the farmer toiling close to the crowded centre, as well as by the stockman who welcomes the weekly mail on the distant lonely ranch.

26. *Agricultural Exhibitions.*—In all the British Colonies Agricultural Exhibitions are held periodically throughout the various Provinces, with perhaps one big annual show at the Capital, or in some populous centre. In most cases these shows are financed by public and private subscriptions, and are supported by the Government to the amount of half the total sum of money subscribed. That is if £300 were raised privately, then the Government would guarantee £150 more, making a total of £450. This amount, or a portion thereof, is apportioned in prizes by a committee formed for the purpose. Judges, as a rule, are asked to come from other Provinces, and care is taken to secure competent as well as disinterested men. These shows promote competition, and serve to illustrate what can be done by modern methods of farming. They bring about an interchange of ideas, and tend to the distribution of good stock, for, as a rule, the farmer will sell a fair portion of his exhibits; besides they give both breeders and growers a good advertisement and stimulate enterprise, since the unsuccessful man will see what can be done, and go away determined to be on the prize list next year. That his part of the world is not the only one which can produce fine stock is a potent incentive to a still greater exertion on the part of many a farmer, and encourages a healthy and generous rivalry. At the annual show farmers from all parts of the country compete, thus bringing together members of the rural community who probably would never meet otherwise. This broadening of ideas and the breaking up of an unprofitable conservatism is of immeasurable value in the rapid upbuilding of great progressive States. For after all the old adage "Seeing is believing" is still true. We earnestly hope that the townsfolk and the rural population will unite to make agricultural shows a recognised feature in the development of our South African Colonies.

27. *Agricultural Societies.*—After having observed the benefits arising from such organisations we hold that Agricultural Societies should be formed in each district, and that a certain number of representatives should meet twice or thrice a year at the Government Experimental Farms to discuss the various matters pertaining to their districts; further, that one or two members from each district should be annually appointed to confer with the Director of Agriculture at his Office in Pretoria. For the general welfare of the country the Head of this Department should be brought into intimate contact with, and secure the sympathy and goodwill of, the rural population. Owing to his many duties the Director of Agriculture will probably find but little time to visit the various districts, therefore the needs of the districts must be brought to him through representatives. This

Board should be entirely unofficial, and merely called for the purpose of bringing the Head of the Department and the farming community together. The advantage of two or three days' discussion with practical men from the different districts of the country must be obvious, and we feel sure that this scheme will receive the hearty support of the Department of Agriculture, which in turn must be backed by the people in order to bring about the desired reforms in agricultural methods. Co-operation is one of the chief factors in the success of any enterprise, and this fact must not be lost sight of either by the farmers or the officials of the Department.

28. *Railway Rates and Import Duties.*—If the agricultural and stock raising industries of the Transvaal are to be successful then the men on the land should receive liberal support from the Government in the matter of railway fares and import duties. Consider the farming community as a whole. The majority are practically ruined men, who since the Declaration of Peace have had hardships that must carry their thoughts back to the early days of the "Voortrekkers." That they are anxious to begin and build up their homes again can be seen by anyone visiting the remoter districts of the Transvaal, where many families are living in almost abject misery, but are still striving to do their best. Now we think it only fair that such men should be met half way by the Government for whom they are creating a source of future revenue.

We would therefore suggest that all farm implements, agricultural machinery, windmills, pumps, etc., be admitted free of duty, and, moreover, that a special railway rate be placed on all such goods imported. That in the event of private parties engaging to import stock the Government make arrangements with the harbour authorities in order that the cattle are landed without delay; trucks being ready for the immediate transmission of the stock to their destination. Further, we would advise:

a) That reduced railroad rates be allowed on all imported stock, as well as on all stock conveyed from any point within the two Colonies.

(b) That free passes be provided for *bona fide* farmers attending agricultural meetings and going to and from the Government Experimental Farms.

29. *Summary.*—In South Africa we have a vast country awaiting development, rich beyond the dreams of avarice, sunlit and fertile. The market is here, the soil is here; the only thing needed is energy—patient and persistent. True, we have had many difficulties to contend with, and at first it seemed hard to start anew after the ruin and desolation of the war, while our land was swept with disease; but in time all these will pass away, and why should we despair. The other Colonies have been visited by droughts and famine, frosts and hailstorms, locusts and devastating murrains; but they have been, in large measure,

conquered or controlled by the resolute will of the people encouraged by a wise, far-seeing Government. For our own part, we see no reason why the farmers of the Transvaal and the Orange River Colony should not take a prominent place amongst the stock breeders and the fruit growers of the British Empire. And we look forward with confidence to the day when these two Colonies will not only produce sufficient to support the whole of South Africa, but also take a proud position in the markets of the world, which should be the aim and the ideal of every farmer.

To the stranger who comes to our land full of the latest farming methods we would offer a word of counsel: Do not neglect to learn from the men of the veldt, who have a special knowledge of the climate, the diseases, and the soils of this country. And, in like manner, the native born should not forget that he, too, has something to learn about modern agriculture.

It is the progressive man—the man with the open mind—ever ready to learn a new fact, to understand the mechanism of a new machine, and to introduce a new plant, who is destined to succeed. And we would be wanting in our duty were we not to urge in the strongest terms that our countrymen should not fall into the common error of saying: "Oh! the olden times were good enough for us." For in the strenuous life of to-day those who are content to live in the thought and atmosphere of half a century ago shall surely fail.

For the future benefit of the farming population we would ask the Government to offer bounties for the encouragement of butter factories, cheese factories, creameries, and similar industries; and to offer prizes for the planting of trees and the best kept farms. Further, as already remarked, the importation of sound stud stock should be encouraged by rigorous veterinary supervision, together with cheap and rapid transportation. But although the Government can do much to stimulate the initial stages of any industry its ultimate success rests mainly with the people themselves. To this end we earnestly appeal to the men of wealth and influence. If our monied men would only invest some of their surplus riches in dairying, canning; sugar, beet and tobacco factories, cotton gins, etc., in fact in anything connected with modern farming we are certain they would be able, not merely, to place these industries upon a flourishing basis, but, in addition, obtain a good return for their outlay. And beyond the question of material prosperity there is always that of patriotism.

In conclusion: Take a pride in your farm; adopt the latest methods; pay attention to the results gained on Experimental Farms; keep the finest stock; preserve fodder against the seasons of drought; save and select your own seed; never cease to cultivate your lands; purchase labour saving machines; read agricultural books; be progressive; maintain an open mind; live to learn.

We sincerely trust that this account of our tour will be of some interest and benefit to our fellow-farmers; for we left our homes and travelled thousands of miles by land and sea solely to learn something that might perhaps help the farmers of the Transvaal and the Orange River Colony to become more prosperous, happy, and contented.

In the hope that we have not altogether failed,

We are, etc.,

W. L. JOOSTE.
J. M. LANE.
H. T. ROOD.

APPENDIX A.

REGULATIONS RELATING TO THE LAND OF CANADA.*

The land of Canada consists of granted and ungranted land. The ungranted land in the older provinces is the property of the provinces, and is disposed of by officials appointed for the purpose, in accordance with the provisions of Statutes passed by the several Provincial Legislatures.

The ungranted land in Manitoba and the Northwest Territories belongs to the whole people of Canada, and is administered by the Federal Government.

The following is a concise statement of the essential features of the law governing the disposal of Dominion lands in Manitoba and the Northwest Territories :—

System of Survey.

The Dominion lands are laid out in quadrilateral townships, each containing 36 sections of as nearly one mile square, or 640 acres, as the convergence of meridians permits; the sections are situated and numbered in the following diagram :—

N.

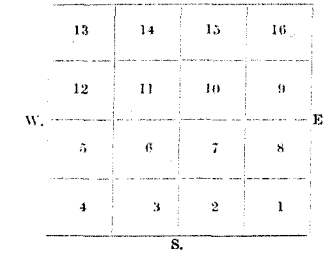
31	32	33	34	35	36
30	29	28	27	26	25
19	20	21	22	23	24
18	17	16	15	14	13
7	8	9	10	11	12
6	5	4	3	2	1

W. E.

S.

*Extract from the Government Handbook of 1901.

Each section of a township, or 640 acres, is divided into quarter sections of 160 acres each, styled, according to position, *the North-west, North-east, South-west, or South-east quarter* section, and to facilitate the descriptions of letters patent of less than a quarter section, every section is supposed to be further divided into quarter-quarter sections, or 40 acres, numbered as shown in the following diagram, and called legal sub-divisions :—



Disposal of Dominion Lands.

In regard to their disposal, the Dominion lands in Manitoba and the Northwest Territories may be considered as divided into two classes, viz., even-numbered and odd-numbered sections.

Within a certain area the even-numbered sections excepting those numbered 8 and 26, which are allotted to the Hudson's Bay Company, are open for homestead entry, and the odd-numbered ones (excepting 11 and 29, which are School Sections), are held for sale, and also as land grants in aid of the construction of colonization railways.

The area in Manitoba and the Northwest Territories which has been alienated for actual settlement, including both homestead and sales, amounts to nearly 13 million acres. The area set out for settlement by the surveyors is 80,040,000 acres.

Homesteads.

Any person, male or female, who is the sole head of a family, or any male who has obtained the age of eighteen years, is entitled, on making application before the Local Agent of the District in which the land he desires to be entered for is situated, and paying an office fee of ten dollars, to obtain homestead entry for any quantity of land not exceeding one quarter section, or 160 acres, of the class of land open to such entry. This entry entitles the holder to occupy and cultivate the land, to the exclusion of any other person, the title remaining in the Crown until the issue of patent for the land.

The settler is allowed six months from the date of obtaining homestead entry within which to complete or perfect such entry, by taking, in his own person, possession of the land and beginning residence and cultivation, and if the entry be not perfected within such time, it becomes void; except where entry is obtained on or after the 1st of September in any year, and the six months would expire before the 1st of June following, in which case an extension of time to the latter date is granted.

In the case of immigrants, or other persons, intending to settle on public lands, the Minister of the Interior, on requisition signed by them, may authorise any person they may name to obtain homestead entries for them before their arrival in the territory in which the land they desire to occupy is situated, and in such case the time for perfecting entry may be extended to twelve months.

The settler, on proving that he has resided on and cultivated the land for which he has homestead entry during three years from the date of perfecting his entry, is entitled to a patent from the Crown for the same, provided that he is a British subject by birth or naturalisation; in case of his death, his legal representatives succeed to the homestead right, but they or some of them must complete the necessary duties.

A homesteader has also the privilege of obtaining a patent for his homestead before the end of three years, by paying the Government price at the time for the land, and proving that he has resided thereon for twelve months from the date of perfecting entry and that he has brought thirty acres thereof under cultivation.

In case a certain number of homestead settlers, embracing not less than twenty families, with a view to greater convenience in the establishment of schools and churches and for advantages of a similar nature, ask to be allowed to settle together in a hamlet or village, the Minister of the Interior may dispense with the condition of residence on the homestead, but the condition of cultivation must be carried out on each one. There are also provisions in the land laws for co-operative farming, if undertaken by not less than ten persons.

A homestead entry is liable to be cancelled at any time that it is proved that the settler has not resided upon and cultivated his homestead for at least six months in any one year from the date of perfecting entry; but in case of illness, properly vouched for, or in case of immigrants returning to their native land to bring out their families to their homesteads, or in other special cases, the Minister of the Interior may grant an extension of time during which the settler may be absent from his homestead, but such leave of absence will not count in in the term of residence

The privilege of homestead entry only applies to agricultural lands.

APPENDIX B.

AGRICULTURAL STATISTICS OF THE DOMINION OF CANADA.*

AGRICULTURE.

Of the total area of Canada in 1891, there were 28,537,242 acres of improved land out of 60,287,730 acres of occupied land. Of the improved lands, 19,904,826 acres were under crop, being 4,792,542 acres more than were under crop in 1881. The acreage under pasture in 1891 was 15,284,788 acres, an increase of 8,899,226 acres since 1881. The acreage under wheat in 1891 was 2,723,861 acres, an increase of 381,506 acres in ten years. The cereals most widely cultivated are wheat and oats. The following statement from provincial statistics shows, for 1901, the area under these crops, the total yield, and the yield per acre in Ontario, Manitoba, New Brunswick, and the Territories :—

WHEAT

1901.	ACRES.	BUSHELS.	BUSHELS PER ACRE.
Ontario	1,278,635	21,515,780	16·8
Manitoba	2,011,835	50,502,085	25·1
North Brunswick	26,010	478,886	18·4
Territories	508,564	12,676,343	24·9

OATS.

1901.	ACRES.	BUSHELS.	BUSHELS PER ACRE.
Ontario	2,408,264	78,334,400	32·5
Manitoba	689,951	27,796,588	40·3
North Brunswick	184,114	4,944,992	26·8
Territories	229,439	11,113,066	48·4

In Ontario, besides other cereals, pulse and root crops are largely grown, and, in 1901, 3,113,580 lbs. of tobacco were taken from 2,935 acres, and 14,430,650 bushels of apples were produced by 6,777,935 trees, or 2·13 bushels per tree. The vineyard area in the province in 1901 was 12,227 acres. For other provinces the agricultural statistics are insufficient.

* Statesman's Year Book, 1903.

APPENDIX C.

AGRICULTURAL STATISTICS OF THE COMMONWEALTH OF AUSTRALIA.*

PRODUCE OF CROPS.—1900-1.

NAME OF STATE.	BUSHELS RAISED OF			
	Wheat.	Oats.	Barley.	Maize.
New South Wales	16,173,771	593,548	114,228	6,292,745
Queensland ..	1,194,088	7,855	127,144	2,456,647
South Australia ..	11,253,148	366,229	211,102	..
Tasmania	1,110,421	1,406,913	116,911	..
Victoria	17,847,321	9,582,332	1,215,478	604,180
Western Australia	774,653	86,433	29,188	1,399
TOTAL ..	48,353,402	12,043,310	1,814,051	9,354,971

NAME OF STATE.	BUSHELS RAISED OF	TONS RAISED OF		Gallons of Wine Made.
	Other Cereals.	Potatoes.	Hay.	
New South Wales	48,565	63,253	526,260	891,190
Queensland ..	8,798	20,014	78,758	132,489
South Australia ..	67,415	14,566	353,662	1,388,847
Tasmania	244,585	93,862	94,198	..
Victoria	158,346	123,126	677,757	2,578,187
Western Australia	7,658	4,836	103,813	130,377
TOTAL ..	535,367	319,657	1,834,448	5,121,090

*Year-book of Australia, 1902.

NAME OF STATE.	BUSHELS PER ACRE OF				
	Wheat.	Oats.	Barley.	Maize.	Other Cereals.†
New South Wales	10·56	20·27	12·11	30·54	18·17
Queensland ..	15·06	20·40	16·88	19·20	20·85
South Australia*	5·88	13·08	13·75	..	15·14
Tasmania ..	21·43	31·21	25·97	..	24·12
Victoria	8·84	26·42	20·65	64·34	18·34
Western Australia	10·42	18·04	11·51	15·37	9·05
TOTAL ..	8·53	25·61	18·47	27·23	19·11

* Exclusive of Northern Territory.

† Including beans and peas, except in the case of Queensland rye, except in South Australia; also rice, 6,870, in Queensland.

Name of State.	Tons per acre of	
	Potatoes	Hay.
New South Wales ..	2·15	1·13
Queensland	1·81	1·85
South Australia	2·19	1·04
Tasmania	4·07	1·53
Victoria	3·20	1·35
Western Australia ..	2·70	1·00
Total	2·89	1·21

APPENDIX D.

AGRICULTURAL STATISTICS OF THE COLONY OF NEW ZEALAND.

The acreage and produce for each of the principal crops are given as follows :—*

	Wheat.			Oats.		
Years.	Acres.	1,000 Bushels.	Average per acre.	Acres.	1,000 Bushels.	Average per acre.
1897	315,801	5,670	17·95	354,819	9,738	27·44
1898	399,034	13,073	32·76	417,320	16,511	39·56
1899	269,749	8,582	31·81	398,243	16,326	40·99
1900	206,465	6,527	31·61	449,534	19,086	42·45
1901	163,462	4,046	24·76	405,924	15,045	37·06

	Barley.			Hay (Grass).		
Years.	Acres.	1,000 Bushels.	Average per acre.	Acres.	Tons.	Average per acre
1897	29,920	710	23·72	67,865	..	..
1898	45,671	1,678	36·73	75,620	..	..
1899	48,003	1,585	33·02	68,234	..	..
1900	30,831	1,028	33·33	68,023	..	..
1901	26,514	856	32·28	62,984	..	..

* Statesman's Year-book, 1903.

The live stock of the Colony in 1902 consisted of 279,672 horses, 1,361,784 cattle, 20,233,099 sheep (in 1858, 1,523,324; 1864, 4,937,273; 1874, 11,704,853; 1886, 16,580,388), and 224,024 pigs.

Acreage in Sown Grasses.

The following shows the acreage in sown grasses in the Australasian Colonies in 1898–99 :—*

	Acres.
Queensland	12,543
New South Wales	348,829
Victoria	150,157
South Australia	20,946
Western Australia (1898)	3,317
Tasmania	238,799
New Zealand	10,244,739

It will be observed that the acreage of land under sown grasses was more than thirteen times as great in New Zealand as in the whole of Australia and Tasmania.

*New Zealand Year-book of 1900.

Size and Number of Holdings*.

The total extent of occupied holdings of or over one acre in 1902 was returned by the Department of Agriculture at 35,507,889 acres, in holdings of various sizes, as shown in the following table, which deals with all the occupied land, including Crown pastoral leases :—

Sizes of Holdings.	Number of Holdings	Acres.
Acres.		
1 to 10	17,817	73,954
10 to 50	11,531	324,620
50 to 100	7,130	560,888
100 to 200	9,332	1,431,532
200 to 320	5,898	1,543,749
320 to 640	6,201	2,836,787
640 to 1,000	2,324	1,924,982
1,000 to 5,000	2,854	5,849,516
5,000 to 10,000	393	2,525,849
10,000 to 20,000	234	3,285,879
20,000 to 50,000	165	5,578,887
50,000	103	9,571,246
Total	63,982	35,507,889

* Statesman's Year-book, 1903.

APPENDIX E.

PRESERVATION OF FODDER.

Table I.

Showing Approximate Total Capacity of Cylindrical Silos, in Tons, or well-matured Maize Ensilage.

Inside Diameter in Feet. Depth (feet.)	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
20	45	70	80	90	101	113	125	138	151	107	180
21	47	74	84	95	106	118	132	145	159	173	190
22	49	77	88	99	111	124	138	152	166	182	198
23	52	81	92	104	117	130	144	159	174	190	207
24	54	84	96	108	122	135	150	166	179	199	216
25	56	88	100	113	127	141	157	173	189	207	225
26	59	92	104	118	132	147	163	180	107	215	235
27	61	95	108	122	137	153	169	187	205	224	244
28	63	98	112	126	142	158	175	193	212	232	252
29	65	101	116	131	147	164	182	200	220	240	262
30	67	105	120	136	152	170	188	207	227	249	271

Table II.

Showing Approximate Amount of Ensilage required for feeding Cattle during a period of 180 days, 40 lbs. of ensilage being fed daily per head. The dimensions of any silo of a capacity as given in the last column of the table may be easily calculated.

AMOUNT OF ENSILAGE REQUIRED FOR DIFFERENT HERDS.

Number of Cows in the herd.	Weight of Ensilage.	Weight of Ensilage.	Approximate number of Cubic Feet.
	Lbs.	Tons.	
10	72,000	36	2,400
15	108,000	54	3,100
20	144,000	72	4,100
25	180,000	90	4,800
30	216,000	108	5,400
35	252,000	126	6,300
40	288,000	144	7,200

APPENDIX F.

FUMIGATION.—CYANIDE GAS REMEDY FOR RED SCALE ON CITRUS TREES.

Table of Doses.

The following table shows the quantities of the chemicals recommended for various sizes of trees when sound covers are employed :—

Height.	Diameter	Water.	Acid.	Cyanide.	Space Enclosed.
Feet.	Feet.	Fluid oz.	Fluid oz.	Oz.	Cubic Feet.
4	3	½	½	½	25
6	4	1	½	½	65
6	6	2	1	1	140
8	6	3	1½	1½	200
10	8	5	2½	2½	435
12	8	6	3	3	533
12	10	7	3½	3½	815
14	10	8	4	4	970
14	12	10	5	5	1,355
16	12	12	6	6	1,585
16	14	15	7½	7½	2,105
18	14	16	8	8	2,415
18	16	20	10	10	3,085
20	16	22	11	11	3,485
20	18	26	13	13	4,325
22	18	30	15	15	4,835
24	20	40	20	20	6,500

The first two columns have reference to the approximate dimensions of the trees, the three following to the quantities of the respective chemicals, and the last, which is inserted solely to show the relative size of trees of various heights and diameters, to the approximate cubic contents of the space enclosed. The cyanide is understood to be from 98 to 100 per cent. pure, and the sulphuric acid to be the full strength commercial grade. The cyanide is measured in avoirdupois ounces and the water and acid in fluid ounces. Double as much, or even more than double, the amounts of water and acid may be used, but, in general, it is best to follow the table.

The intelligent fumigator of long experience watches his work closely, and varies his doses slightly with the condition of the trees, of the scale, the season, and the weather, being guided by the table, but not clinging stubbornly to it. A larger dose is

justified when the tree is dormant than when it is in active growth, when it is densely foliaged than when open and scraggly; when the scale is abundant and massed than when scattered; in damp, windy, or cold weather than in dry, still, or warm times. After going to all the trouble and expense of an outfit, one should not scruple the use of a larger dose than may actually be necessary, but should rather seek to ensure thorough destruction of the scale by applying as large a dose as the tree can stand without material injury.—(*Lounsbury, Cape Department of Agriculture.*)

APPENDIX G.

SPRAYING MIXTURES.

*Fungicides and Insecticides.

Bordeaux Mixture.—*Copper sulphate* 6 *lbs.*; *quicklime*, 6 *lbs.*; *water*, 40-50 *gallons* :—Dissolve the copper sulphate by suspending it in a coarse cloth bag near the surface in four gallons of water, using a wooden or earthen vessel. Slake the lime in an equal amount of water. Then mix the two and dilute. Ready for immediate use, but will keep indefinitely. Do not use air-slaked lime if it can possibly be avoided. If it is used, take greater quantities than of quicklime. When the mixture is made, insert the freshly polished blade of a knife in it and leave for a few minutes. If the blade now shows a coppery discolouration, more lime must be added. Bordeaux Mixture and Paris Green may be applied together.

Resin Wash.—*Resin*, 24 *lbs.*; *caustic soda* (98 *per cent.*), 5 *lbs.*; *fish oil* (2½ *bottles*), 3 *pints*; *water*, 100 *gallons* :—Place the ingredients in a kettle; cover with water and bring to the boil. Stir until dissolved and cook for two hours, adding hot water when there is a tendency to slop over. Then stir and add hot water to 50 gallons. Put in spray tank and dilute with cold water. Use while warm. Will keep. For all aphides (plant lice), dilute to 150 gallons. Winter Resin Wash is similarly made, but diluted with only 65 gallons.

Lime-Sulphur-Salt Mixture.—*Quicklime*, 40 *lbs.*; *sulphur*, 20 *lbs.*; *stock salt*, 15 *lbs.*, *water*, 60 *gallons* :—Take 10 lbs. lime, all the sulphur, and 10 gallons of water; boil for one and a half hours, or until all is dissolved. Slack the remaining lime in hot

*Substances used to destroy fungi are called *fungicides*; those used to destroy insects are called *insecticides*.

water and stir in the salt. When the salt is dissolved, mix the two solutions and cook for another half-hour. Strain, dilute to 60 gallons, and use warm. Stir while using. Slaked lime is sometimes used, but is probably less efficacious.

PARAFFINE EMULSION.—*Soap, 1½ lbs.; paraffine, 5 gallons; water, 2½ gallons*:—Take whale oil or common bar soap; cut up and boil until dissolved in water. While still boiling, add solution to the paraffine. Churn violently; five minutes if with a pump or syringe, or fifteen with a paddle. Dilute, using nine parts of water to one of the emulsion. This mixture is best used warm. It will destroy aphides (plant lice) if diluted fifteen times.

PARIS GREEN.—*Paris Green, 1 lb., water, 200 gallons*:—For delicate foliage, add 1 or 2 lbs. of quicklime. Stir continually when using. Use a very fine spray.

WHITE HELLEBORE.—*Fresh white hellebore, 1 lb.; water, 40 gallons*:—This will not burn foliage. Be sure the hellebore is fresh.

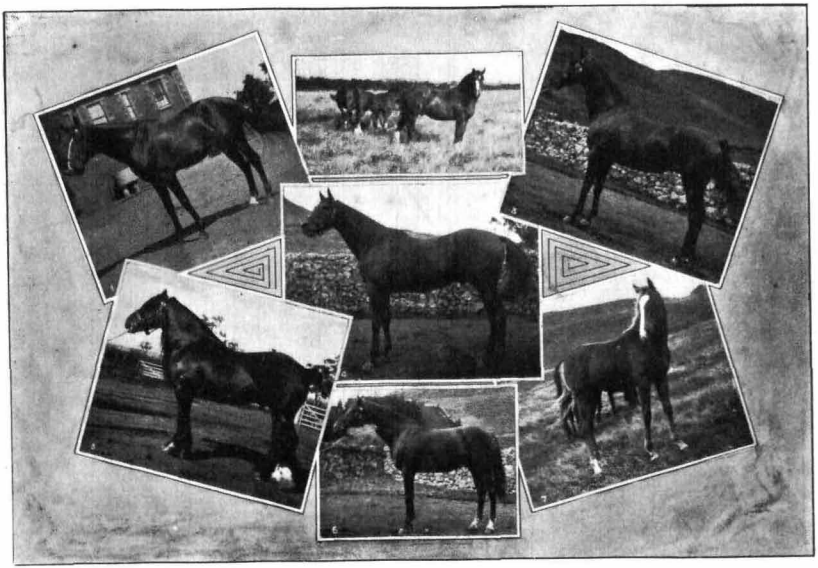


Plate I. **Some Types of New Zealand Horses.**

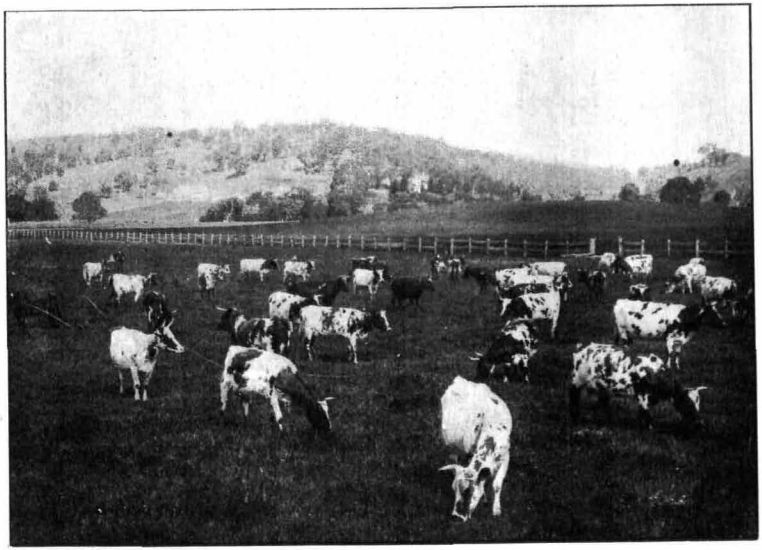
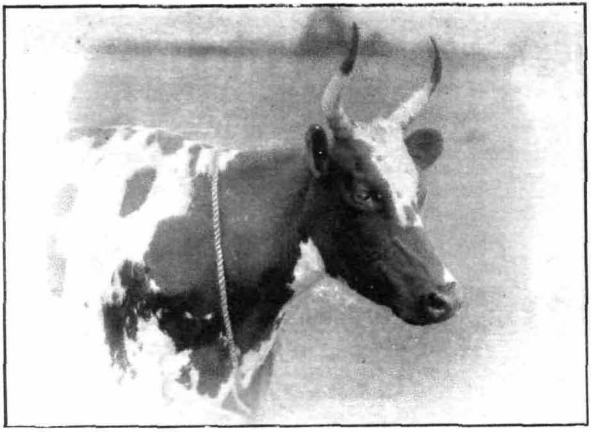


Plate II.

Pure-bred Ayrshires.

(DAIRY HERD—VICTORIA.)



"Maggie Lauder." Ayrshire.

(COOLANGATTA, N.S.W.)

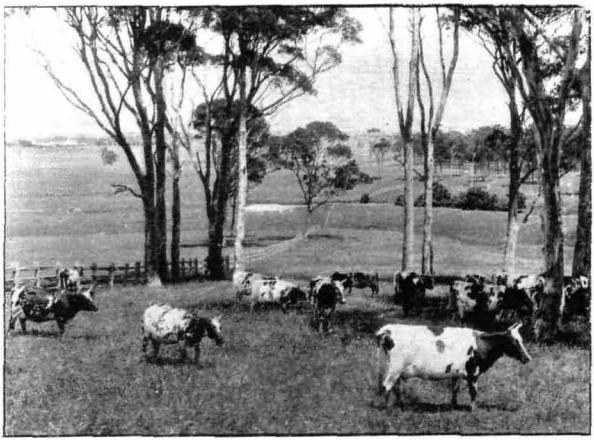


Plate III.

Under the Shade of the Sheltering Gums.

(COOLANGATTA, N.S.W.)

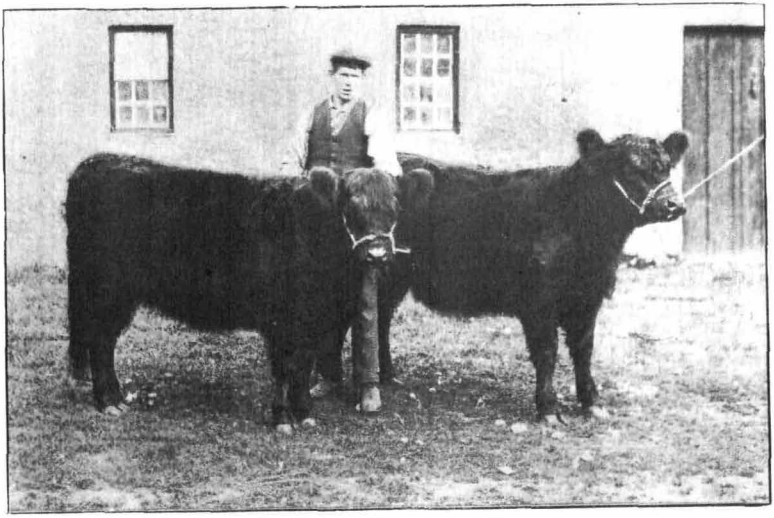


Plate IV.

Prize Yearling Galloway Heifers.

(BRED AT BUSH HALL, LIMAVADY, IRELAND.)

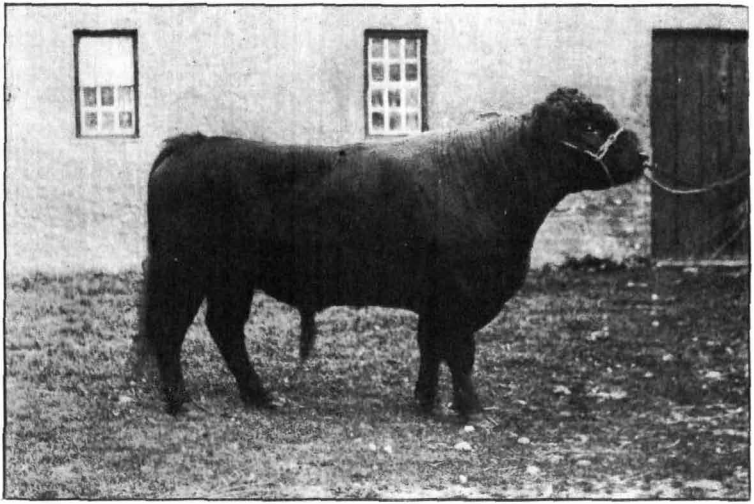


Plate V. **Galloway Bull.**

(The Scottish Standard of Purham Hall." 7775.)

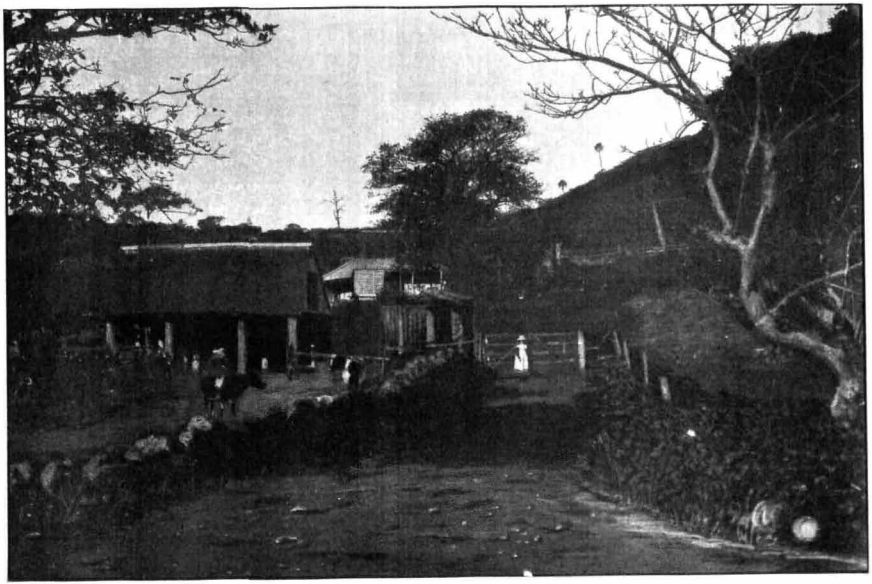


Plate VI.

A Mountain Farm.

(ILLAWARRA DISTRICT, N.S.W.)

Plate VII.

A Flock of Merino Sheep.

(BURRAWONG STATION, N.S.W., AUSTRALIA.)

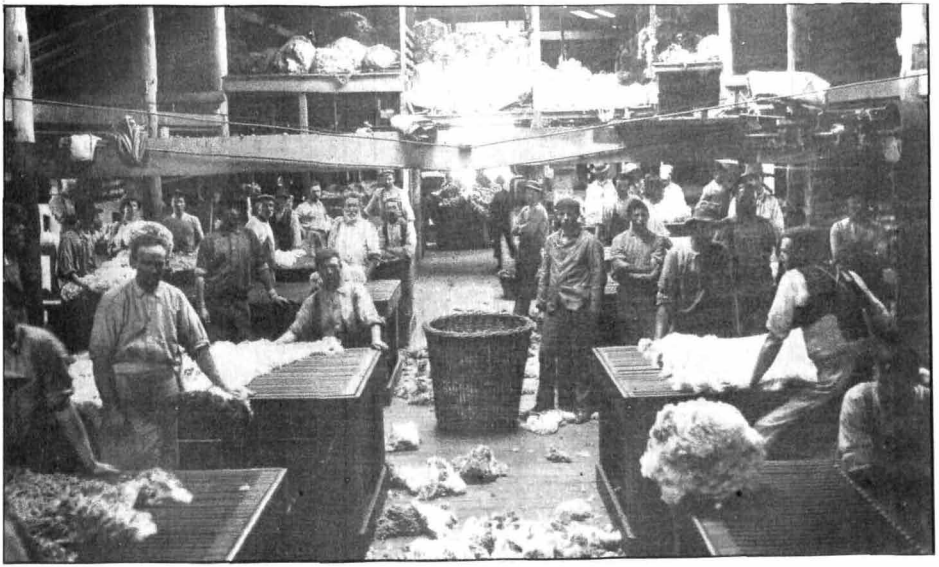


Plate VIII. **Woolsorting and Classing at the Shearing Sheds.**

(BURRAWONG, N.S.W., AUSTRALIA.)

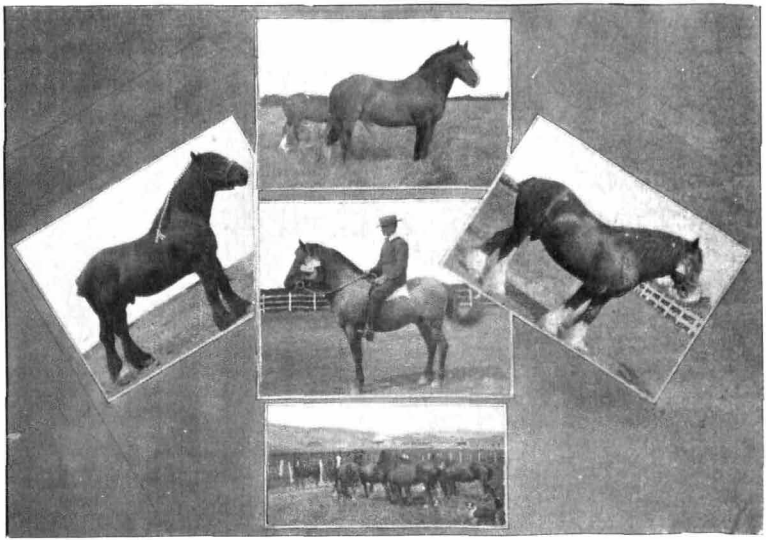


Plate X.

Types of Horses.

(NEW ZEALAND.)

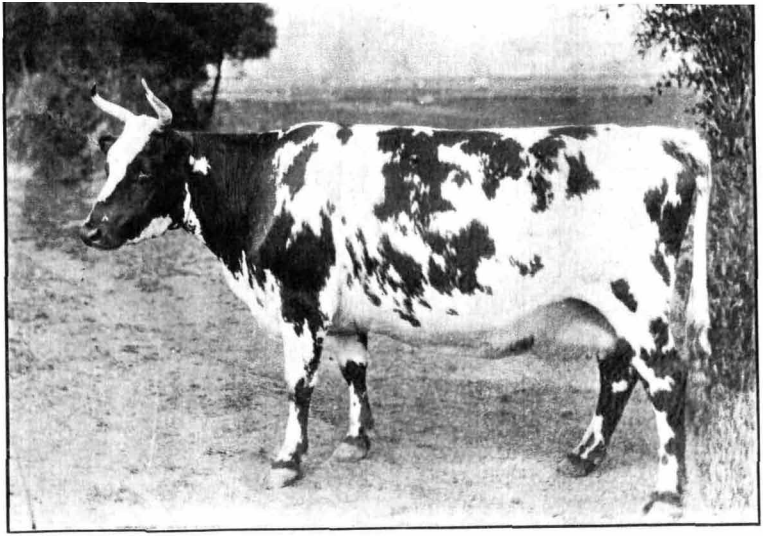


Plate XII.

Pure-bred Ayrshire Heifer.

(FERN TREE GULLY, VICTORIA.)

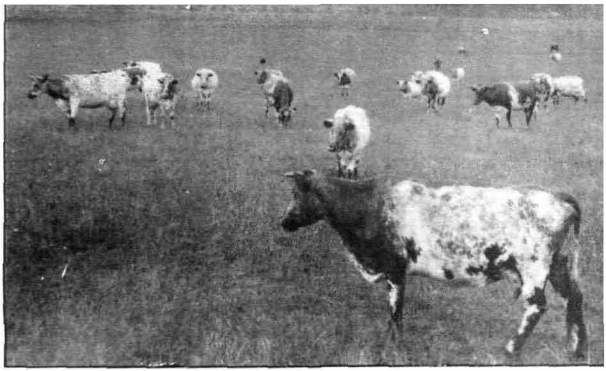
Plate XI. **A Group of Pedigree Clydesdales.**
(IRELAND.)

III.

A Mountain Dairy Farm.

(BERRY, NEW SOUTH WALES.)

e XIV. **A Load of Wool on the road from Queensland to New South Wales.**



Illawarra Durham Cows.

(COOLANGATTA, N.S.W.)

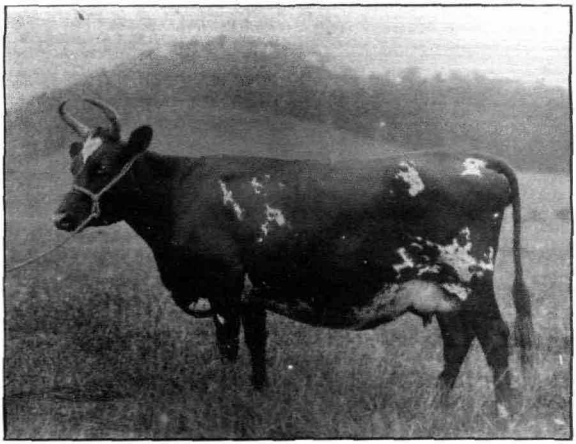


Plate XI. **"Lustre," Champion Ayrshire Cow.**

(Sydney Show, 1902.)

BRED AT COOLANGATTA, N.S.W.

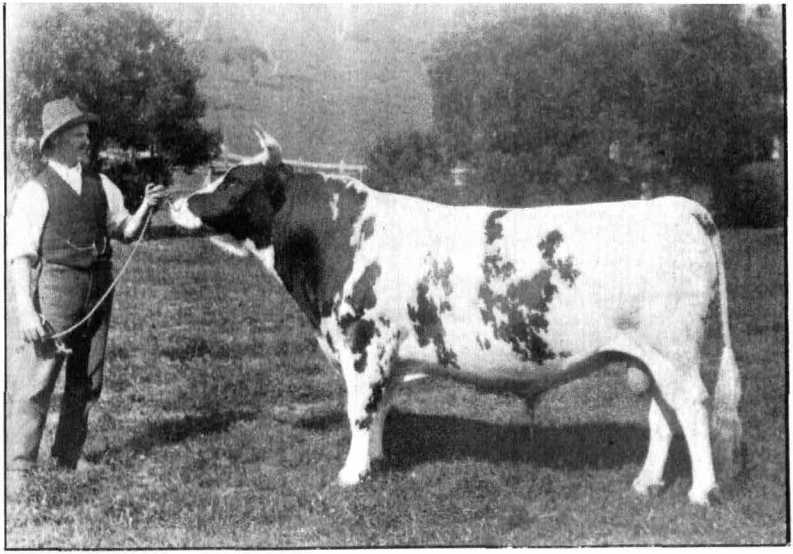


Plate XVI.

Champion Ayrshire Bull.

(FERN TREE GULLY, VICTORIA.)

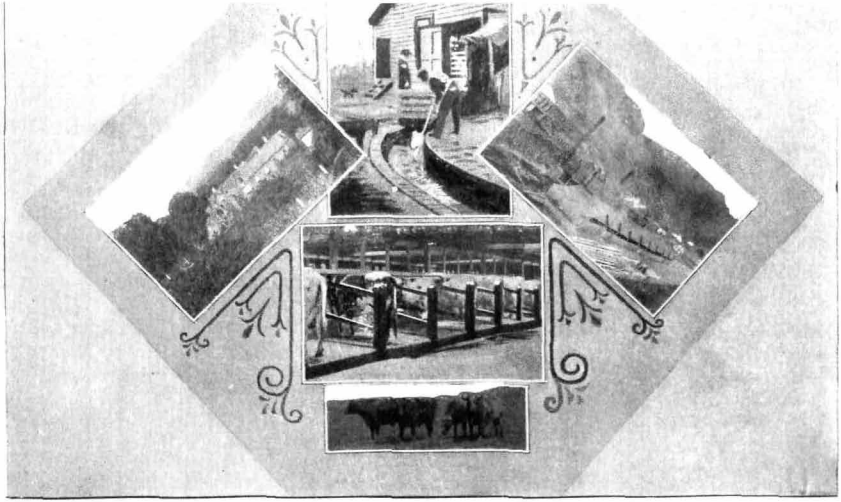


Plate XVIII.

A New Zealand Homestead. **Wellington Meat Export Coy.'s Works.**

Dipping Sheep.

***Interior of* Dairy.**

Fat Cattle.

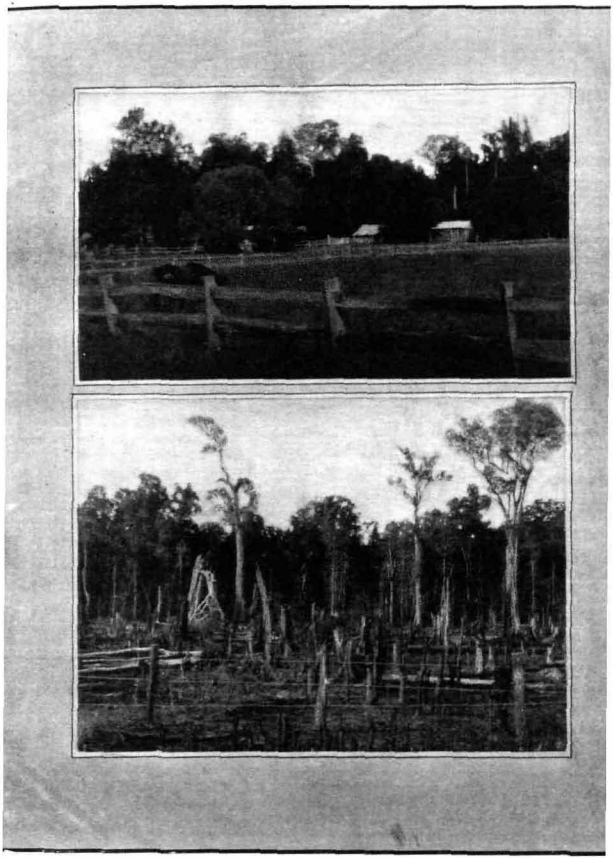


Plate XIX.

To illustrate Cleared and Uncleared Land.

(*NORTHERN RIVERS, N.S.W.*)

Plate XX.

Pure-bred Ayrshires.

(FERN TREE GULLY, VICTORIA.)

Plate XXI.

An Ayrshire Bull.

Agricultural College (CHRISTCHURCH).

Interior of Dairy Shed.

(NEW ZEALAND.)

Plate XXII.

The Dolgelly Bore.

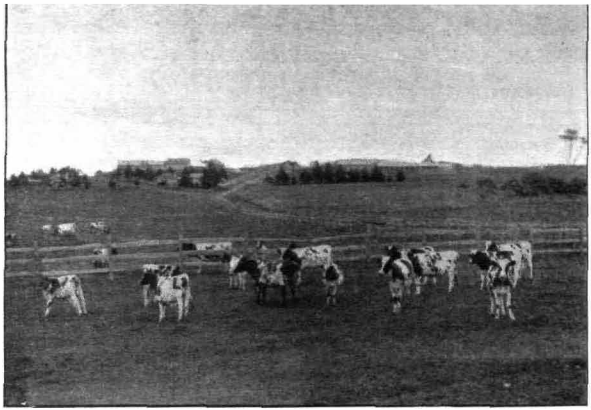
DEPTH, 4,086 FEET. FLOW, 745,200 GALS. PER 24 HRS. TEMP., 130° FAHR.

(MOREE DISTRICT, N.S.W.)

Plate XXIV.

A Woolshed Scene.

(WESTERN, N.S.W.)



Group of Ayrshire Heifers.

(COOLANGATTA, N.S.W.)

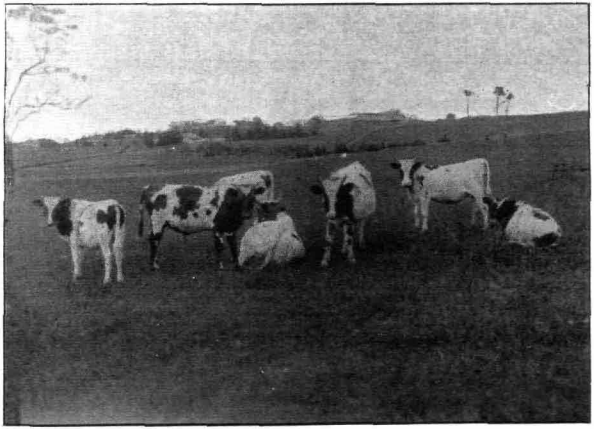


Plate XXV.

Young Ayrshire Bulls.

(COOLANGATTA, N.S.W.)

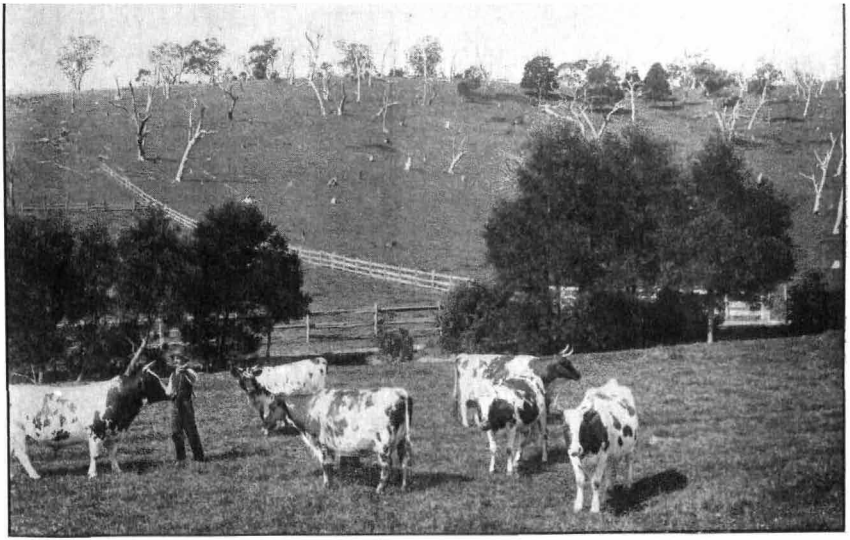


Plate XXVI.

Some Champion Ayrshires.

(FERN TREE GULLY, VICTORIA.)

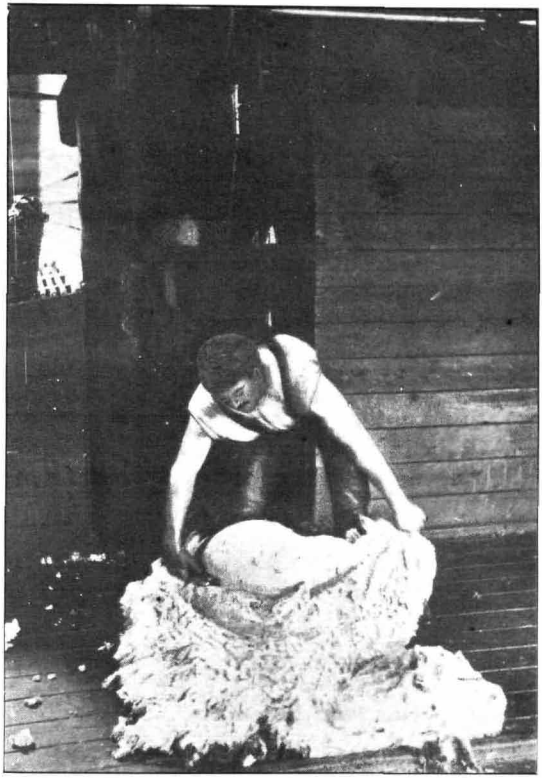


Plate XXVII. **Shearing by Machine.**

(BURRAWONG STATION, NEW SOUTH WALES.)

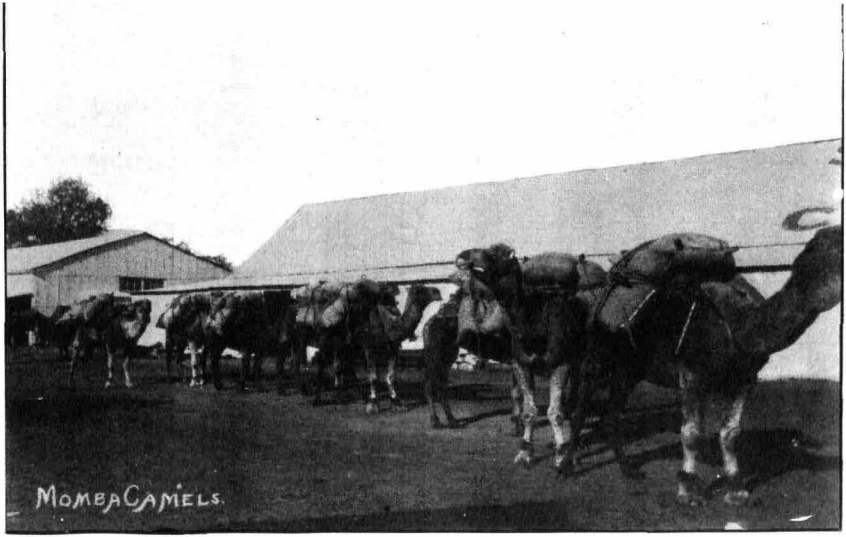


Plate XXVIII. **Camel Transport in the Drought-stricken West.**

(NEW SOUTH WALES.)

Plate XXIX.

The Royal Shanty.

(ROCKLIFFE, CANADA.)

Plate XXX.

Rockliffe Park.

(CANADA.)

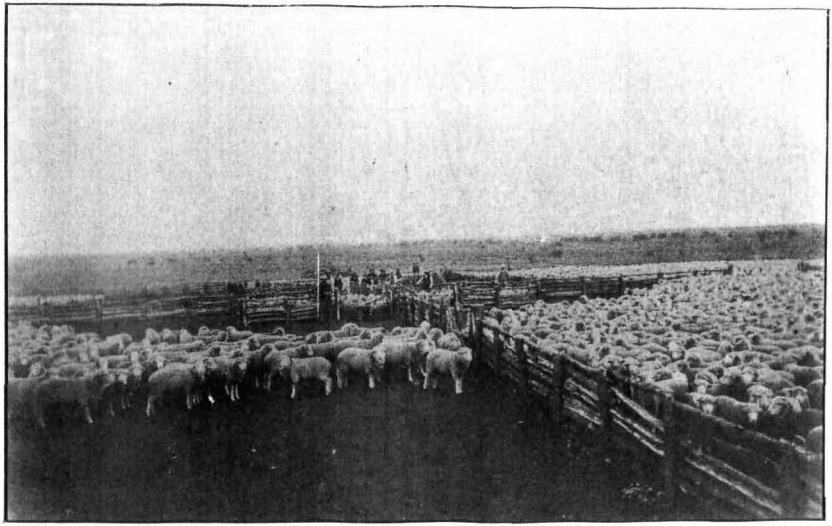


Plate XXXI.

Drafting Yards.—Merino Wethers.

(WESTERN DIVISION, N.S.W.)

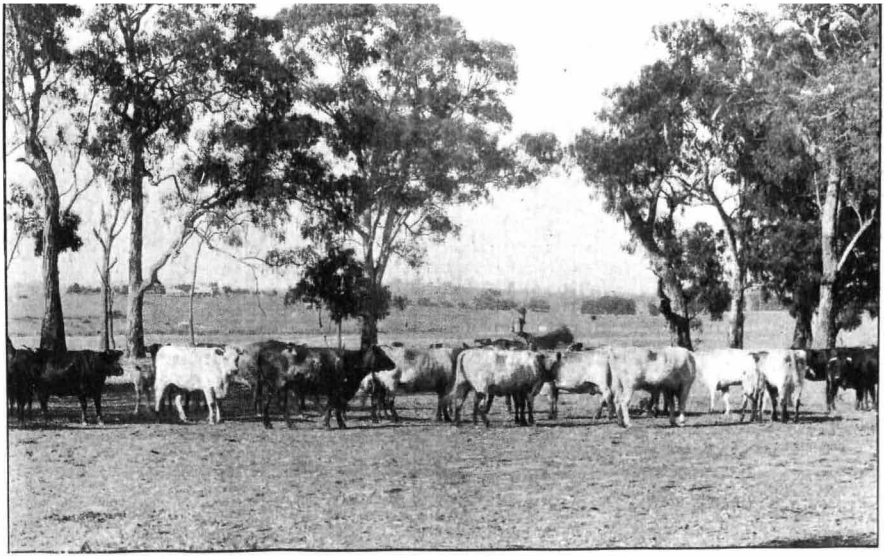


Plate XXXII.

"Borambola" Stud Shorthorn Cows.

(NEW SOUTH WALES.)

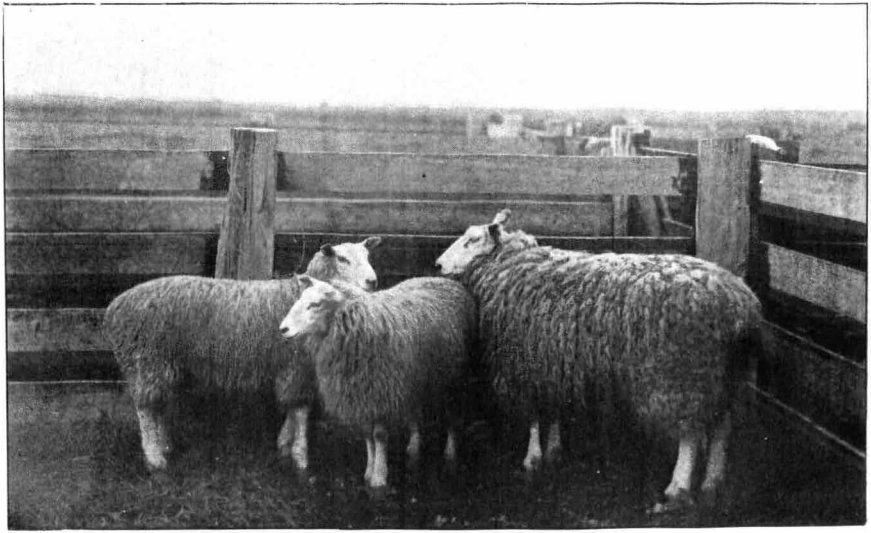


Plate XXXIV. **Prize English Leicester Ewe and Lambs.**

(WANGANUI SHOW, 1901, N.Z.)

Plate XXXV.

A Pen of Lincolns.
(NEW ZEALAND.)

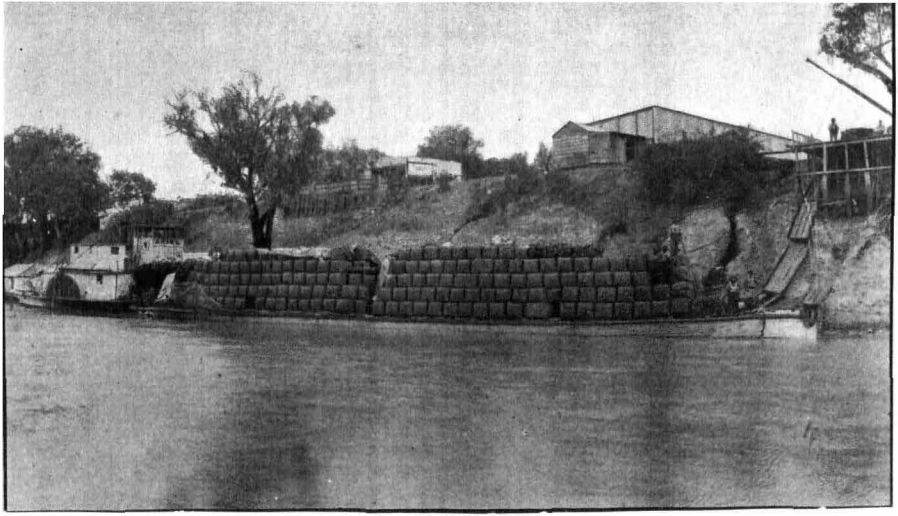


Plate XXXVII.

The River Darling.

Shipping Wool to Melbourne.

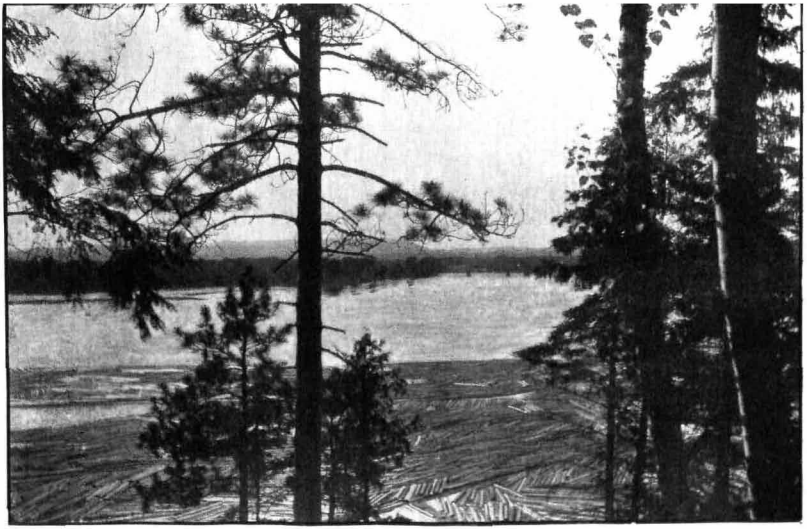


Plate XXXVIII.

Ottawa River.

Pine Logs *en route* to the Mills.

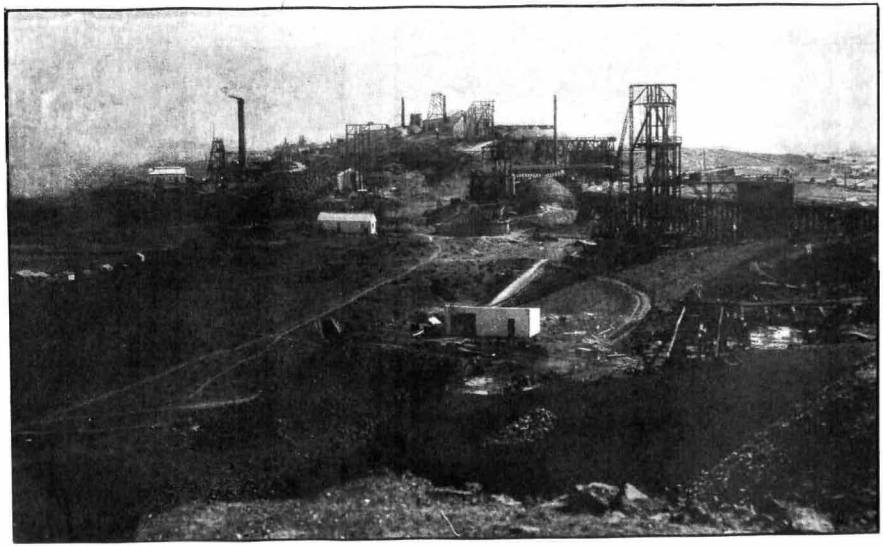


Plate XXXIX. **Broken Hill Silver Mine, N.S.W.**

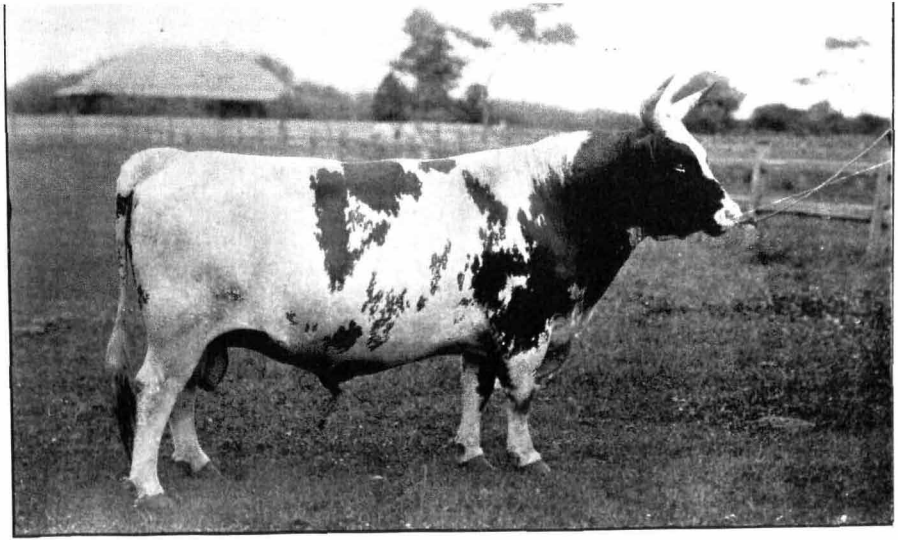


Plate XLI.

Jamie of Oakbank,

Champion Ayrshire of Australia.

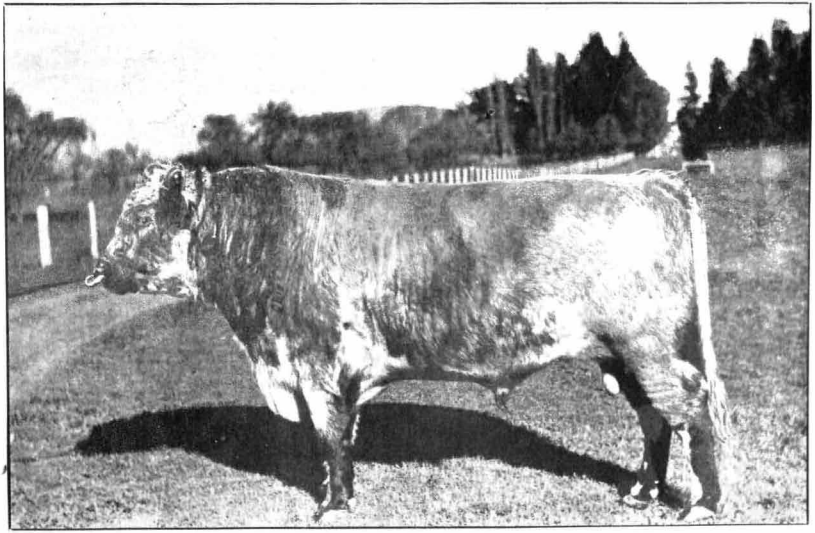


Plate XLII. **An Unbeaten Shorthorn Champion.**

Bred in Victoria (Australia).

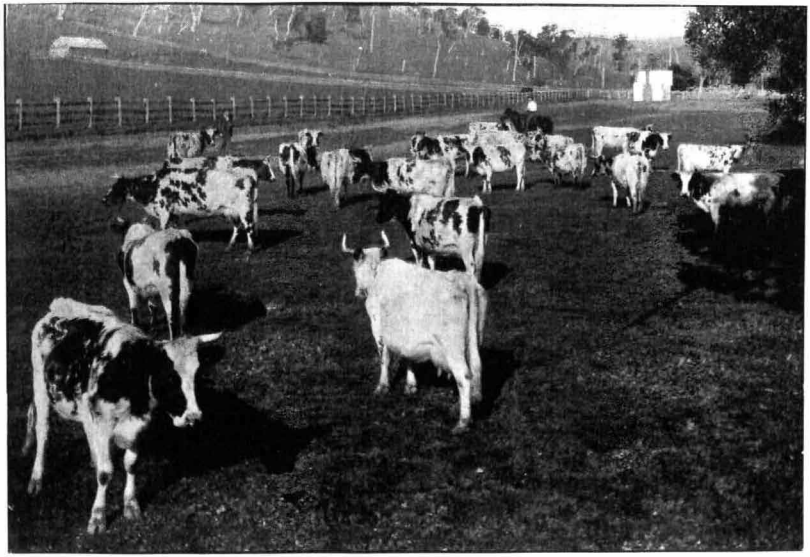


Plate XLIII. **Pure-bred Ayrshire Dairy Herd.**

(VICTORIA.)

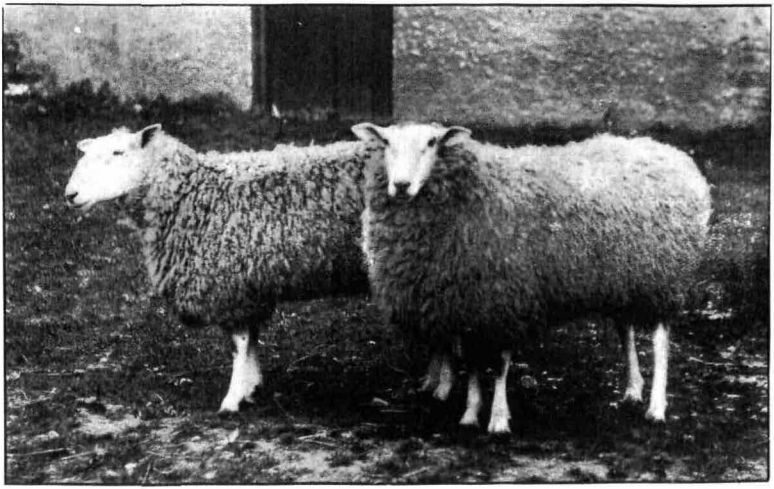
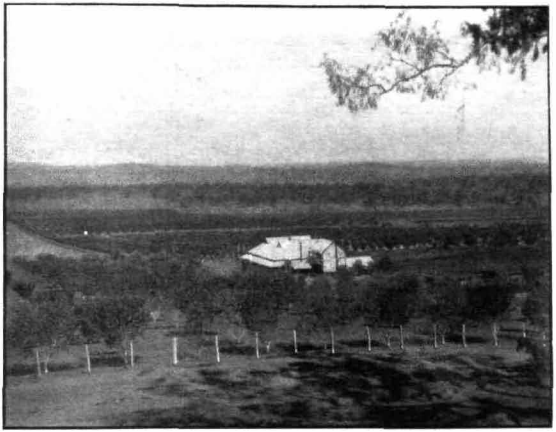


Plate XLIV. **Border Leicester Rams.**

(IRELAND.)



A well cultivated Orchard.

(N.S.W.)

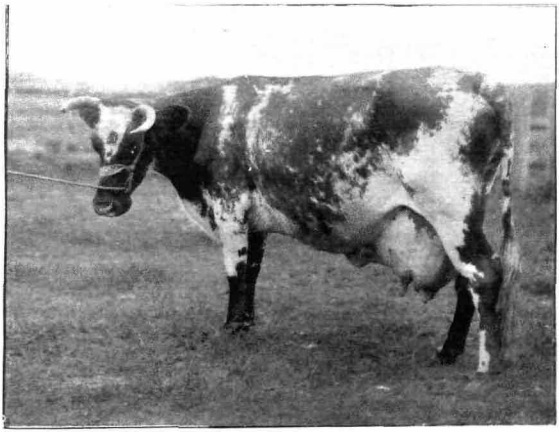


Plate XLV.

Illawarra Durham Cow.

(N.S.W.)

Plate XLVI

In the Rich Clover Fields.

(COOLANGATTA, N.S.W.)

Masterton Show Yards.
(NEW ZEALAND.)

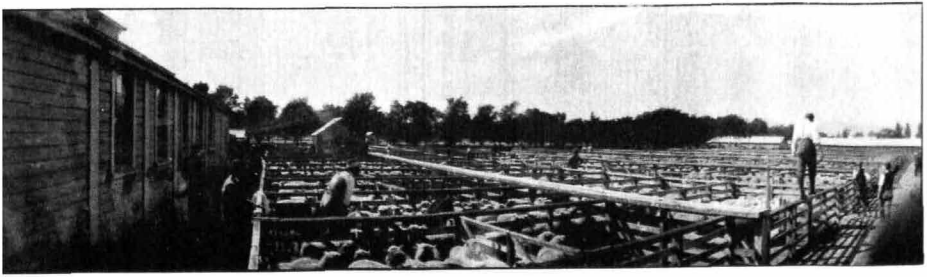


Plate XLVII.

Christchurch Sale Yards.

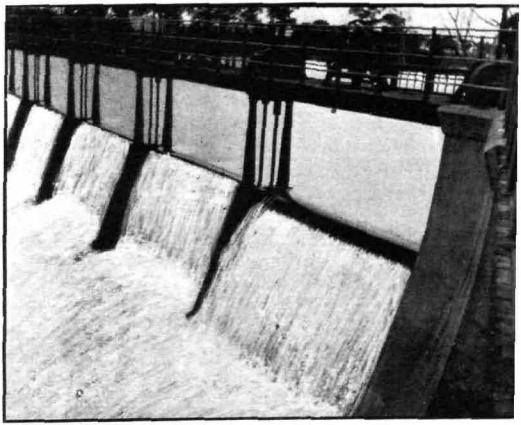


Plate XLVIII. **Irrigation in Victoria.**

(THE WEIR AT GOULBURN.)

Plate XLIX.

The Moree Bore

(NEW SOUTH WALES).

Depth : 2,792 feet. Flow : 1,108,080 gallons. Temp. : 115° Fahr.